Proceedings of 4th National Conference on

SCIENCE, TECHNOLOGY AND COMMUNICATION SKILLS

(NCSTCS 2K21)

24-25th September, 2021

Ideal International E-Publication Pvt. Ltd.

PROCEEDINGS OF 4th NATIONAL CONFERENCE ON SCIENCE, TECHNOLOGY AND COMMUNICATION SKILLS (NCSTCS 2K21)

24-25 SEPTEMBER, 2021

Organized by

Department of Basic Science &Humanities
Narula Institute of Technology
(An Autonomous Institute under MAKAUT)
81, Nilgunj Road, Agarpara,

Kolkata –700 109

2022
Ideal International E – PublicationPvt. Ltd.
www.isca.co.in

Ideal International E-Publication Pvt. Ltd.

427, Palhar Nagar, RAPTC, VIP-Road, Indore-452005 (MP) INDIA
Phone: +91-731-2616100, Mobile: +91-80570-83382
E-mail: **contact@isca.co.in**, Website:**www.isca.co.in**

Title:	**PROCEEDINGS OF 4th NATIONAL CONFERENCE ON SCIENCE, TECHNOLOGY AND COMMUNICATION SKILLS**
Author(s):	**Dr. Sumit Nandi**
Edition:	First
Volume:	I

ISBN: 978-93-89817-63-8

Proceedings of 4th National Conference on Science, Technology and Communication Skills

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ABOUT JIS GROUP

JIS Group Educational initiative is the endeavour of Late Sardar Jodh Singhji, Chairman, JIS Group. Through the years, with this enterprising zeal and vision the empire of JIS Group spanned in the fields of Education, Dairy business, Telecommunication, Transportation, Infrastructure, Logistics, Healthcare and Social service. His aspiration to serve society by imparting knowledge, education and employment culminated into JIS Group Educational Initiatives. This is one of the majestic entrepreneurial endeavours in Eastern India, creating facilities for higher education, Research, industry and creating jobs for thousands of people.

JIS Group Educational Initiatives has heralded new age education in West Bengal by imparting futuristic undergraduate and post graduate programmes. Spread across several sprawling campuses, JIS Group Educational Initiatives has colleges in Engineering, Dental, Pharmaceutical Sciences, Management Science and Polytechnic. The objective was to create an opportunity for students from Eastern India by providing a high standard Education and Research platform in Engineering, Dental Science, Pharmacy, Hospitality management etc.

The journey commenced with a mission

"Igniting Minds, Empowering Lives"

"Learning is the beginning of wealth. Learning is the beginning of health. Learning is the beginning of spirituality, searching and learning is where the miracle process all begins"

ABOUT THE INSTITUTE

Narula Institute of Technology is a leading Engineering & Management college, located at Agarpara in West Bengal. Approved by All India Council for Technical Education (AICTE) and affiliated to MAULANA ABUL KALAM AZAD University of Technology (MAKAUT). The college offers NBA accredited degree programmes in engineering. The four year B. Tech course is imparted in the streams like CSE, ECE, EE, CE, IT, EIE & ME. The institute provides a brilliant platform for pursuing higher studies through PG courses like M. Tech (CSE, ECE-Communication, EE-Power System, CE-Structural engineering), MBA and MCA. It has expanded to include diploma programs in EE, CE and ETC under the affiliation of West Bengal State Council of Technical Education. The Institute is eligible for receiving Central assistance under the recognition of 2(f) & 12(B) under UGC Act. The institute is also accredited by National Assessment and Accreditation Council (NAAC). The college has also received the notable World Bank Assisted and MHRD approved TEQIP (Phase II) grant for the advancement of Technical Education and is a one-stop venue for promoting a vibrant and sustainable. Moreover, it is a proud moment for the institute that presently it has acquired its position (among the top most 150 private colleges in India) in NIRF Ranking and also achieved QS-Star rankimg.

Academic success is the key for laying the foundation for the students and therefore the College emphasizes on quality academic delivery in their stride towards excellence. The College has also significantly reinforced their outreach initiatives by facilitating faculty development programme, knowledge exchange sessions, and procuring funded projects from Government to foster synergy between academia, business, industry and the community.

The institute boasts of a powerful R & D cell with immense contribution from the scholarly faculty members. There is an enormous repository of International and National Journal publications which have drawn nationwide attention. The college is in collaboration with Oracle, INFOSYS, TCS, NIT Sikkim, IIT-KGP, AIT Bangkok and other organizations of repute. The students get an opportunity to interact with foreign experts all across the globe through Conferences, conferences and special teaching-learning sessions. The student chapter plays a crucial role in organizing informative technical events within the campus. At present there are five student chapters in our college: IETE student forum of Electronics & Communication Engineering Department, ICE & ASCE of Civil Engineering Department, CSI of Computer Science Engineering, Information Technology & MCA Department and Institute of Engineers of Electrical Engineering Department. NIT is a one-stop venue for promoting a vibrant and sustainable atmosphere for teaching-learning. Besides academics, the students get an exposure to the world of co-curricular activities which help them in shaping their personality. Thus, the cornerstone of the successful evolution of Narula Institute of Technology lies in its meticulous tutoring and mentoring of the future professionals of the industry as well as of academia and citizens of the society where the Institute's success has always been directly proportional to the success of the students.

PREFACE

The Department of Basic Science and Humanities of Narula Institute of Technology digitally organised two day the 4th National Conference on Science, Technology and Communication Skills (NCSTCS 2K21). This conference is specially designed to bring together an interdisciplinary team of researchers to share their information and research experience on recent trends in Science, Technology and Professional communication. There were invited lectures by eminent resource persons from reputed University and Institutions, paper presentation, and interactive sessions. The faculties from different colleges, research scholars and students had given opportunity to demonstrate their own works and get valuable suggestions from experts. It also aimed to create a teaching-learning environment and encourage academicians, researchers and students to develop various competencies and enhance their self–efficacy in different techniques.We had the pleasure to welcome the eminent speakers and several outstanding researchers from different universities and Institutions of repute.

We would like to take the proud privilege to thank our Managing Director, Principal, Registrar, the organizing committee members, the reviewers, all colleagues and friends, the entire cast and crew who helped us to organize this Conference.

Dr. Sumit Nandi
Associate Professor
HOD, Department of BS & HU
January 2022, Kolkata

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MESSAGE FROM CHAIRMAN, BOG, JIS GROUP

I am happy to observe that the Department of Basic Science and Humanities Department of NiT has digitally organised the **"4th National Conference on Science, Technology and Communication Skills (NCSTCS 2K21)"** on 24- 25th September, 2021. This Conference in terms of its areas and tracks is a comprehensive one providing a platform from multiple disciplines of engineering and technology to participate and contribute. This Conference will definitely be a significant attempt to assemble the leading experts and learners in the field. Understanding the differences between invention and innovation is the keynote to success in today's globalised market driven economy. It is not only important to invent ideas but also to be able to convert them into productive outcomes in consumer's society. Innovation and invention are quite different things. While invention is largely a personal pursuit, innovation is much more akin to social pursuit. Innovation warrants attention because it contributes immensely to social and industrial development.

I am confident that this Conference will come up with new findings, strategies and innovations on various issues laid out by the Organizers and will brain storm the mindset of the participating researchers. I would further expect that this Conference will identify the state -of -art and future directions in the mentioned areas so as to ensure demand driven and productive research to fulfill the societal needs and desire. This Conference must depict a future line transforming the concepts in the published papers into patenting and commercialization of the products.

Prof. (Dr.) Sparsha Mani Chatterjee

MESSAGE FROM MANAGING DIRECTOR, JIS GROUP

I am chasing a dream that my father (Sardar Jodh Singh) cherished, to empower lives through knowledge and education. In this regard we have established the JIS educational initiative which is now one of the leading private educational service providers in India. JIS educational initiative has 25 educational institutes to its credit and holds an average of 25,000 students who have enrolled in diverse academic programmes. We have also created new standards in quality self-financed education and laid the foundation of the JIS University.

I am extremely delighted to share through this message my enthusiasm about the **"4th National Conference on Science, Technology and Communication Skills (NCSTCS 2K21)",** 24-25th September, 2021 digitally organised at Narula Institute of Technology, Agarpara, Kolkata, India. The National Conference promises to be a forum of research scholars and professionals from within the country and outside and will certainly provide a platform for the sharing of experience and the exchange of opinions on technological advancements. I am sure that this event will draw talent from all over the globe and create a great learning experience for all participants, delegates and guests.

I appreciate the efforts taken by the Organizing Committee of the NCSTCS 2K21 and all the eminent persons involved. I wish them great success.

Mr. Taranjit Singh

MESSAGE FROM THE PRINCIPAL, CONFERENCE CHAIR

On behalf of the Organizing Committee, I welcome all to the **"4th National Conference on Science, Technology and Communication Skills (NCSTCS 2K21)"**, to be held on 24-25th September, 2021 organised by Basic Science & Humanities Department of Narula Institute of Technology.

National Conference is a gathering of academicians, researchers and students from several part of our country in a single platform in order to have the opportunity to interact and share ideas among themselves.

I extend my sincere thanks to our Managing Director Mr. Taranjit Singh for motivating us to organize the event successfully. I would like to appreciate the collective efforts put in by the members of different Committees and staff members of the Institute for making **NCSTCS 2K21** a grand success without whom it would have been very difficult for us to arrange the event.

I also offer my thanks to all the participants for their immense support and active participation with sincerity and punctuality. I appreciate the effective assistance of every faculty and staff of the institute in direct and indirect manner to make **NCSTCS 2K21** a grand success.

I hope, every individual will be satisfied and will enjoy the Conference to a great extent.

Prof. (Dr.) M. R. Kanjilal

MESSAGE FROM THE PROGRAMME COORDINATOR

I consider conducting **NCSTCS 2K21** a very challenging job on behalf of the Organizing Committee of the National Conference. The main aim to arrange this National Conference is to bring academicians, researchers and students in a single platform in order to have the opportunity to interact and share ideas among themselves. To make the program most fruitful, the availability of the suitable speakers was our high concern. We are really thankful that the speakers showed their enthusiasm and lend their valuable time to educate our participants in regards to **NCSTCS 2K21**.
The eminent speakers from different disciplines as resource persons are invited to share their valuable research and ideas among students during the Conference to raise the interest of the students on research activity.

Our Principal and the committee members of **NCSTCS 2K21** gave their best effort to materialize the smooth functioning of the Conference. We find immense satisfaction after the successful completion of the Programme. We hope to organize such programme in future to benefit our students as well as the Nation by providing future Researchers. I hope, every participant will be benefitted and will enjoy the Conference to the most.

Dr. Sumit Nandi
Programme Coordinator

LIST OF COMMITTEE MEMBERS

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	Mr. Debotosh Panda (JTA, Physics)
	Mr. Karuna Ketan Karan (JTA, Physics)

INVITED TALK

Dr. Chirasree Chatterjee, Sr. Data Scientist, Lowe's Companies, Inc., Charlotte,
North Carolina, United States

NEURAL NETWORK AND CULTURE

The origin of modern day artificial intelligence can be dated back to the year 1950 with Dr. Alan Matheson Turing's paper titled *Computing Machinery and Intelligence* where he proposed the question "Can machines think?" In his paper Turing developed the Imitation game, commonly referred to as the Turing test, whereby a human can evaluate a machine's ability to exhibit human intelligence. That same year, Dr. Claude Elwood Shannon published a groundbreaking paper titled *Programming a Computer for Playing Chess* where he described how a machine could be taught to play a game of chess by logical deduction of the opponent's strategic moves. A few years later, in 1958, Dr. Frank Rosenblatt, invented the Perceptron, the precursor to neural networks. The efforts of Rosenblatt and many other notable scientists and researchers dated back to the thirties gave rise to Connectionism, an area of cognitive science, which originated as a result of years of efforts to describe certain aspects of human intelligence. Connectionism comm only referred to as Parallel Distributed Processing became popular in the eighties and the concept of Artificial Neural Networks was introduced during this wave. This talk will mainly focus on the origin of neural networks, their evolution through the years and where we stand today.

INVITED TALK

Mr. Edwin Schaeffer, Sr. Salesforce Engineer, Integration at Ameren,
Illinois, United States

CLOUD TECHNOLOGY

This talk will be about business and entrepreneurial advantages and limitations of cloud computing. Entrepreneurial discussion will focus on *Platform as a service (PaaS)* and *Software as a service (SaaS).* Business advantages will run over eight main tenets of cloud managed services including low cost, productivity and collaboration. We will dive into some low cost business success stories, in particular. Limitations will concentrate on working in a shared environment and responsible programming. The lecture will end with a short discussion on future trends such as IoT.

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Date: 24-25 September, 2021 ISBN: 978-93-89817-63-8

INFRARED PLASTIC SOLAR CELLS

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Abstract

The usage of energy is growing with increasing population and this cannot be satisfied by the existing energy resources. . It is said that we use one by ten thousand times of the solar energy only that reaches on the earth. Due to some disadvantages of conventional solar cells the conversion of solar energy into usable form is limited. On cloudy days, conversion from solar to electrical energy becomes difficult and less efficient. To overcome these problems and to increase the efficiency of the solar cells, nanotechnology is applied. On nanometer scale, nanotechnology is very much in use in lots of latest devices with new designs. These nano devices reduced the use of other kind of devices like the complicated integrated circuits. A photovoltaic cell (Solar Cell) is a device that works on the principle of Photovoltaic Effect which converts energy of sunlight directly into the electrical energy. This Photovoltaic Effect is the physical and chemical phenomenon. When these cells are exposed to sunlight their electrical properties such as resistance, voltage and current vary. Solar panels are formed by combining the number of solar cells. The single junction common silicon plastic solar cell can produce a maximum 0.5 to 0.6 volts (approx.) open-circuit voltage. The three basic attributes required for the operation of a PV cell: i) Generating electron -hole pairs by absorption of light. ii) The process to separate opposite types of charge carriers. iii) Those extracted charge carriers are placed into external circuit. On normal days and even on cloudy days infrared plastic solar cells are very efficient and can easily convert the sun light into the electrical power. The combination of Nano Particles (which are also known as Quantum Dots) and a particular type of polymer make a plastic which can detect the infrared rays from sun. In future there is a huge scope of nano particles in the field of solar energy. As they are made by using plastic, they are thin and can be rolled into sheets. When the dimensions of a potential well or box concerned with the particle or reduced to the order of De-broglie wavelength of electron (within few tens of nanometers) then energy levels of electron change. This is called Quantum confinement. In atoms, band gap increases as material size decreases. These cells requiresnano rods of semiconductors (7 nm by 60nm). In semiconducting polymer, Nano rods (200-nm thick) are embedded. These Nano rods are made of Cadmium Selenite (CdSe) and are blended with Poly-3hexylthiophene. Solar plastic cells are more efficient (up to 30%) in comparison with other solar cells. Plastic cells are more expensive than other kind of solar cells. The life span of plastic cells is relatively short and need constant monitoring. Much research is needed to improve the absorption capacity of nanorods in different regions of the sunlight spectrum. If we are able to use surface of earth up to 0.1% with solar forms then we can remove all other kind of energies. In remote areas we can use plastic cells as a poster of power solar panel by connecting number of cells. These cells can also be used in portable devices by spraying it on those devices as paint. Solar plastic solar cells can also be used in mobile phones or on other devices. At present though they are cost effective we can reduce the drawback in future.

Innovativeness of the work

The use of fossil fuel is the major reason of environmental pollution and greenhouse effect. So to turn to green and clean energy is the need of the hour. Solar energy if properly harnessed can save our planet. But much research is needed to form new and effective nanomaterials and devices to achieve this goal.

Keywords: Plastic solar cells; Solar energy; Nano rods; Quantum confinement; Quantum dots

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BIO SENSORS AND APPLICATIONS

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Abstract

A sensor is a device which measures a physical quantity and converts it into a signal. The signal can be read by an observer performing the experiment or by an instrument. Nano sized sensors can be a biological or chemical substance capable of conveying information about nanoparticles to the observer. A biosensor is a sensing device consisting of a specific biological element and a transducer. A "specific biological element" at first recognizes a specific substance known as analyte (glucose, antigen etc) .Then changes in the biomolecule are converted into an electrical signal. The signal is calibrated to a specific scale by a transducer. The device determines the presence and concentration of a specific substance in any test solution. Recognition of the analytedepends on affinity between complementary structures. Some examples of complementary structures are enzyme/protein-substrate, antibody-antigen and receptor-hormone complex. The degree of selectivity and specificity depend on biological recognition systems which are connected to a suitable transducerl. The biosensor device detects, records, and shows information regarding a physiological change or process. The biological material is immobilized and a contact is made between the immobilized biological material and the transducer. The substance used as analyte binds to the biological material to form a bound analyte (like antigen-antibody). This produces the electronic response that can be measured by suitable device. Sometimes the analyte is converted to a product which can be associated with the release of heat, gas (oxygen), electrons or hydrogen ions. The function of the transducer device is to converts the biologicalchanges into electrical signals. The signals are amplified and measured. Bio element is a typically complex chemical system usually extracted or derived directly from a biological organism. Types are: Enzymes • Oxidase • Polysaccharide • Antibodies • Tissue • Nucleic Acid. The ability of a bio-element to interact specifically with target compound (specificity) is the basis for biosensor. Principle of detection are Piezoelectric (Measures change in mass) , Electro-Mechanical (Measures change in electric distribution) , Optical (Measures change in light intensity), Calorimetric (Measures change in heat) . Advantages of biosensors are 1) Highly Specific. 2) Independent of Factors like stirring, pH, etc. 3) Linear response, Tiny & Biocompatible. 4) Easy to Use, Durable. 5) Require only Small Sample Volume. 6) Rapid, Accurate, Stable &Sterilizable.basic characteristics of bio sensors are 1) Linearity (Should be High for the detection of High Substrate Concentration). 2) Sensitivity (Value of Electrode Response per Substrate Concentration.) 3) Selectivity (Chemical Interference must be minimized for obtaining Correct Result.) 4) Response Time (Time necessary for having 95% of the Response).Types of biosensors are 1)Electrochemical biosensor 2) Optical biosensor 3) Thermal biosensor 4) Resonant biosensor 5) Ion-sensitive biosensor. Electrochemical Biosensors are based on the principle that many chemical reactions produce or consume ions or electrons which in turn cause some change in the electrical properties of the solution which can be sensed out and used as measuring parameter. Classification 1) Amperometric Biosensors 2) Conductimetric Biosensors 3) Potentiometric Biosensors 4) Optical – Detection Biosensors 5) Thermal-Detection Biosensors 6) Resonant Biosensors 7) Ion-Sensitive Biosensors 8) Glucose BiosensorsApplications of Biosensors are 1) In food industry, biosensors are used to monitor the freshness of food. 2) Drug discovery and evaluation of biological activity of new compounds. 3) Potentiometric biosensors are intended primarily for monitoring levels of carbon dioxide, ammonia, and other gases dissolved in blood and other liquids. 4) Environmental applications e.g. the detection of pesticides and river water contaminants. 5) Determination of drug residues in food, such as antibiotics and growth promoters. 6) Glucose monitoring in diabetes patients. 7) Analytical measurement of folic acid, biotin, vitamin B12 and pantothenic acid. 8) Enzyme-based biosensors are used for

continuous monitoring of compounds such as methanol, acetonitrile, phenolic in process streams, effluents and groundwater. 9) Detection of viral, fungal, bacterial diseases of plants. 10) In food industry, detection of total microbes & food quantification in soft drinks. 11) To determine the freshness of food items. 12) Makes bacteria glow up by Optical Biosensor.

Innovativeness of the work

It has been shown by research that biosensors have the potential to detect the early onset of many diseases and to provide that information to a physician to begin treatment. Early intervention with the help of biosensor technology will provide the opportunity to cure illness, and even prevent it before it happens. There is ample scope for development of new nano materials to be used as biosensors.

Keywords: Biosensors; Electrochemical biosensor; Optical biosensor; Thermal- detection biosensors

INTERACTIVE VIDEO TUTORIALS CAN BE USED FOR ENHANCING PROBLEM SOLVING AND REASONING SKILLS OF SCIENCE AND ENGINEERING STUDENTS

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Abstract

Problem solving is generally considered as an activity where a student is presented with a novel situation and he/she develops and performs a sequence of steps to achieve a goal. To solve problems effectively one must perform qualitative analysis of the problem, followed by planning, implementation, assessment, and reflection. It has been found that many students leave the STEM subjects or do not want to join these courses as they face problems in understanding. This problem is particularly found among girl student and in most of the institutions the number of girl students is much less than the number of boys, as the science and engineering problems becomes more and more complex it becomes increasingly important to employ a systematic approach. Interactive Video tutorials are being designed keeping these issues in mind so that they can help students learn problem solving and reasoning skills using suitable examples in an interactive environment. The tutorials are designed in such a way so that students are forced to analyze the problem qualitatively and spend time deciding which principles of science are appropriate. Consistent use of qualitative analysis and planning tasks can help students develop reasoning skills. Also, students can reflect upon the problem-solving process at the end of every problem and thus it will force them to think about what they learnt by solving the problem. It helps them to restructure, extend and organize their knowledge and developing their cognitive skills. The nature of the research-guided video tutorials along with rewinding and stopping ability makes them suited for all students in introductory courses. The video tutorials are based on the interactive teaching/learning process in classroom environment. The teacher gives the students a real life problem and divides the class into several groups. The students will discuss among themselves and the discussion will be recorded. This live discussion will help the teacher to understand the difficulty in their concept. This information will be incorporated in the tutorials. The video tutorial will assign students a problem with different answers. If the student chose the wrong answer the tutorial will tell why the answer is wrong. So the student can correct his/her misconception. The interactive tutorials will help students in doing their homework. It will also help students having learning disability. Students will be able to do self study. Preliminary evaluations will show that a majority of students who could not solve the tutorial problem on their own were able to solve similar problems on their own after working through video tutorials. Future evaluations will compare the development of skills in video tutorial learners with a control

group that learned the same material for the same period of time using other means. Eventually the following questions can be tested like: (a) Can students still do original or similar problems after a couple of weeks? (b) When confronted with a problem they cannot do, do students consider the videos as a useful resource? This will also help teachers to prepare curriculum and assignment for the students.

Innovativeness of the work

Scientists and researchers are working on different teaching /learning methods to help students in understanding STEM subjects. The interactive video tutorials are designed based on the group discussion made by students in class. So the tutorial will be able to guide students to clear their concept. The tutorials will explain why an answer is wrong. It will help the students to solve home assignments without the help of any tutors.

Keywords: Interactive video tutorial; Teaching/learning method.

NUTRITIONAL DIETETICS: AN INNOVATIVE APPROACH AMIDISTS THIS PANDEMIC

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Abstract

Nutritional Dietetics is the topic of current interest. This is mainly because of the current situation the entire world is facing. Our entire human community is wrapped in the humongous grasp of the virus "Covid 19". Amidst this severe pandemic, numerous people fought against this evil and lost their lives. We all are acquainted with the proverb "Health is Wealth", hence every individual's prime concern is healthy dietary regime and nutritious food. Hence our present paper discusses primarily about the initiatives taken by The World Health Organization and our INDIAN Government regarding the proper nutritional values which should be added in our diet and the innovative approach towards immunity build up. We also came up with a different approach with the idea of implementation of an app, towards the weaker community, so that they are not deprived of nutritional education and their share of healthy bellies.

In the present scenario the whole world is facing the deadly repercussion of the COVID-19 outbreak. Millions of people have been infected and sadly many people have passed away. During the novel coronavirus pandemic, it has been more important for a human being than ever to incorporate positive lifestyle habits. Making a habit of in taking healthy nutritious diet has been recommended by scientists and doctors so that we have a strong immunity system to fight against the present evil "the coronavirus".

WHO Recommendations and The Government's Initiatives: WHO recommends consuming a minimum of 400 g of fruits and vegetables per day.Citrus fruits like oranges, grapefruit are good options, as well as bananas and apples. Root vegetables such as carrots, turnips and beets, as well as vegetables like cabbage, broccoli and cauliflower are relatively nonperishable. The government had listed food items on its mygovindia Twitter handle. The main focus of the meal plan is to help rebuild muscle, immunity, and energy levels. It says a healthy diet include whole grains such as brown rice, whole wheat etc, with beans, lentils & pulses, citrus fruits like lemons & oranges which are a good source of Vitamin C and low-fat milk & yogurt as they are good sources of protein & calcium.

A Supportive Immune System**:** Nutritional conditions are very important in supporting the immune system. Numerous nutrients, such as vitamins A, C, D and E, as well as the minerals zinc, copper and selenium,

assist in regulating this immune response. Fruits, vegetables can also have a positive impact. Also, proper maintenance of stress, sleep and exercise is beneficious.

Here are some creative immunities boosting recipes

1) **Carrot-Ginger Immune-Boosting Soup:** The two main spices, turmeric and ginger, Carrots contain vitamin A, an important vitamin for immunity build-up.

2) **Healthy No-Mayo Broccoli Salad:** Broccoli may increase the body's levels of glutathione, plus, this recipe is made with Greek yogurt and it is another immune-boosting ingredient.

3) **PumpkinSuperfood Energy Bites:** Pumpkin puree is packed with fiber, vitamins and potassium. These snack balls contain reishi mushrooms, which are known to help support immunity, and ginger, which contains anti-inflammatory and antioxidant properties.

Innovativeness of the work: development of nutro (the global app)

People below the poverty line, cannot afford high-prized products available in the market. Hence, to help them, we have come up with an idea to develop an app with an AI base which legally be connected to the governmental servers, and the development is under process. This app mainly deals with the spread of nutritional education, a help line, where people will be sharing us their problems. Mainly, we are trying to make the food availability more reachable.

Finally to conclude, our main focus is to maintain a proper dietary regime particularly during this time when the entire world is fighting against the novel corona virus. We should also keep a mind-set that spreading of "Nutrition education" can promote lifelong healthy eating habits and lifestyles in community. As we are well acquainted with the proverb "Charity begins at home" we ourselves should be attentive enough to be aware of our surroundings, follow protocols and guidelines and must maintain a nutritious dietary routine. Thus the tag line will be “Healthy Diet Nutritious life, boosts our immunity for tomorrow's fight!”

Keywords: Nutrition; Healthy diet; Immune system; Global app

A STUDY TO FIND OUT HOW SURFACE ROUGHNESS, CHIP THICKNESS AND MRR ARE RELATED TO EACH OTHER

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Abstract

In this experimental based work the authors have taken an approach to find out how surface roughness, chip thickness and MRR are related to each other. For this, Aluminium work piece and Carbide tip HSS tool were used. Three levels of input parameters are taken and weight of the job before and after machining were measured and also time taken for each machining were measured by stopwatch. With the help of these data MRR was calculated.

Design of Experiment

Table 1: Design of Experiment

Parameters	Level1	Level2	Level3
Speed(rpm)	750	1000	1250
Feed	50	75	100
DOC	0.05	0.075	0.1

.

Experiment Procedure

In this experimental process, 9 different combinations of Spindle Speed (RPM), Depth of Cut (mm), Feed

Rate (mm/min) are used. The 3 specific values of each parameter are tabulated above.
The procedure is as follows -
i) At first, the Aluminium job is weighted. Its diameter is measured by Micrometer. Chip thickness is measured by VernierCaliper. The values were noted down.
ii) Next the job is set in three jaw chuck in CNC lathe.
iii) Then in the control panel X and Z axes are selected and fixed using CNC programming commands.
iv) Next, values of Depth of Cut (mm), Spindle Speed (RPM), Feed Rate (mm/min) are entered and saved.
v) Lathe operation is started.
vi) Time taken for the action is noted using stopwatch.
vii) When lathe operation is finished the job is taken out.
viii) The job is again weighted. Its diameter is measured by Micrometer. Chip thickness is measured by VernierCaliper. The values are noted down.
ix) The surface roughness of the job is measured in Talysurf Surface Roughness Tester in to and fro motion. The value is noted down.
These steps are repeated for 9 different combinations of Spindle Speed (RPM), Depth of Cut (mm), Feed Rate (mm/min).

Taguchi Orthogonal Array: (input method)

We have used a special set of arrays called orthogonal arrays. These standard arrays stipulate the way of conducting the minimal number of experiments which could give the full information of all the factors that affect the performance parameter.

Results and Analysis -The effect of lathe operation on the job for 9 different combination of Spindle Speed (RPM), Depth of Cut (mm), Feed Rate (mm/min) are included in the following table.Comparisons between few parameters are made via table and graph.

Table 2: Observation Table

Sl no.	Srpm	D	F	w_b	w_a	T_m	MRR (g/s)	D_b	D_a	L_m	V_m	V_m/sec	W_m/sec	R_a	C_t
1	750	0.05	50	74.6	74.1	26	0.019	10.1	10	10	1	0.038462	0.000103846	1.567	0.7
2	750	0.075	75	74.1	73.9	26	0.007	10	9.85	10	1.5	0.057692	0.000155769	1.597	0.31
3	750	0.1	100	73.9	73.7	26	0.007	9.85	9.65	10	2	0.076923	0.000207692	1.333	0.51
4	1000	0.05	75	73.7	73.5	26	0.007	9.65	9.55	10	1	0.038462	0.000103846	1.654	0.14
5	1000	0.075	100	73.5	73.3	22	0.009	9.55	9.4	10	1.5	0.068182	0.000184091	1.942	0.52
6	1000	0.1	50	73.3	73	18	0.016	9.4	9.2	10	2	0.111111	0.0003	1.686	0.98
7	1250	0.05	100	73	72.9	26	0.003	9.2	9.1	10	1	0.038462	0.000103846	1.182	0.5
8	1250	0.075	50	72.9	72.7	15	0.013	9.1	8.95	10	1.5	0.1	0.00027	0.926	0.13
9	1250	0.1	75	72.7	72.6	18	0.005	8.95	8.75	10	2	0.111111	0.0003	1.941	0.16

[S_{rpm} = Spindle Speed (rpm), D = Depth of Cut(mm), F = Feed rate (mm/min), T_m= Time of machining (sec), D_b = Diameter before Machining (mm), D_a = Diameter after machining(mm), L_m = Length of machining (mm), V_m = Volume of material removed (mm^3), R_a = Surface roughness (m X 10^{-6}), W_m = Weight of material removed, W_b = Weight of the Job before Machining, W_a= Weight of the job after

Machining, C_t= Chipthickness (mm)

i) Surface roughness (m X 10^{-6}) Vs Chip thickness (mm)

Surface roughness (m X10^{-6})	Chip thickness (mm)
1.567	0.7
1.597	0.31
1.333	0.51
1.654	0.14
1.942	0.52
1.686	0.98
1.182	0.5
0.926	0.13
1.941	0.16

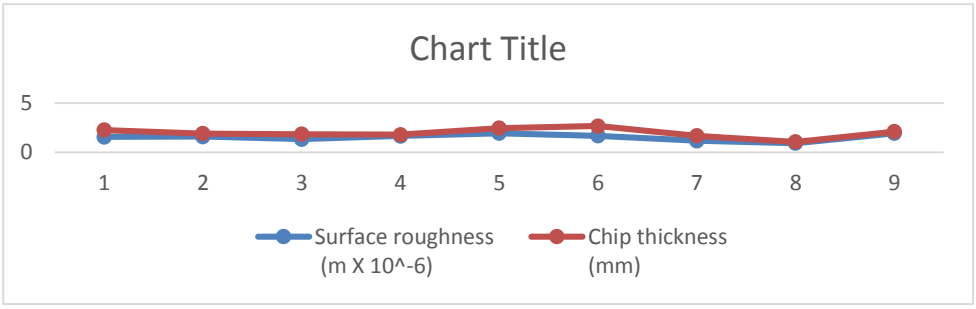

Table 3 and Fig. 1: Surface roughness (m X 10^{-6}) Vs Chip thickness (mm)

ii) MRR (g/s) Vs Chip thickness (mm)

MRR (g/s)	MRR (g/s) X 100	Chip thickness (mm)
0.019	1.9	0.7
0.007	0.7	0.31
0.007	0.7	0.51
0.007	0.7	0.14
0.009	0.9	0.52
0.016	1.6	0.98
0.003	0.3	0.5
0.013	1.3	0.13
0.005	0.5	0.16

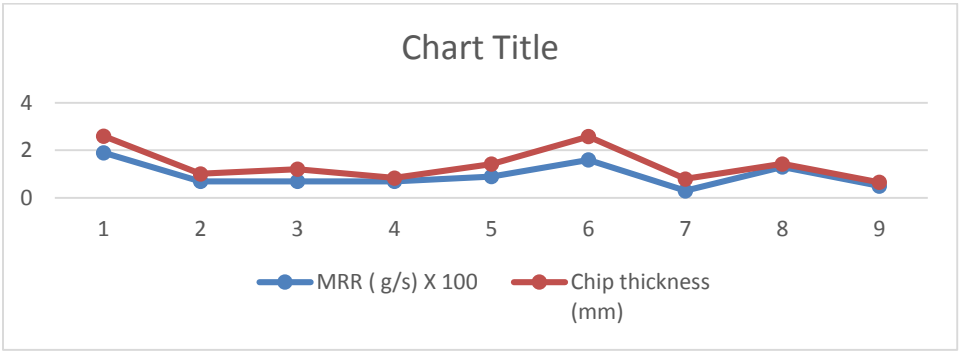

Table 4 and Fig. 2: MRR (g/s) Vs Chip thickness (mm)

iii) MRR (g/s)Vs Surface roughness (m X 10^{-6})

MRR (g/s)	MRR (g/s) x 100	Surface roughness (m X 10^{-6})
0.019	1.9	1.567
0.007	0.7	1.597
0.007	0.7	1.333
0.007	0.7	1.654
0.009	0.9	1.942
0.016	1.6	1.686
0.003	0.3	1.182
0.013	1.3	0.926
0.005	0.5	1.941

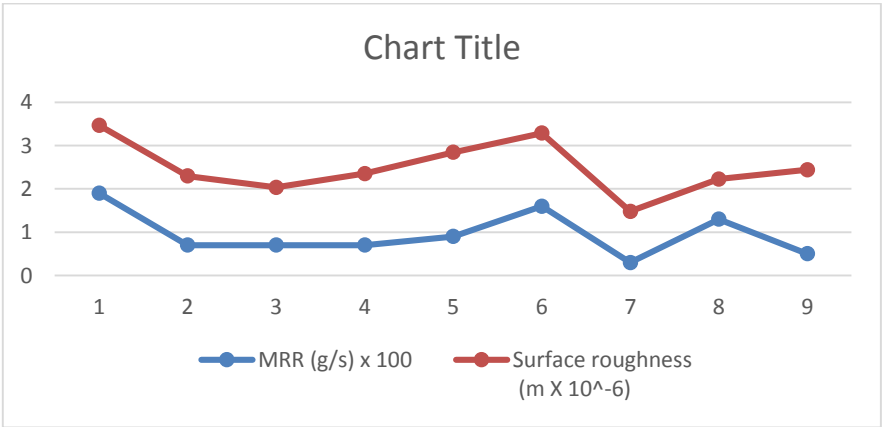

Table 5 and Fig. 3: MRR (g/s) Vs Surface roughness (m X 10^{-6})

Analysis

The first comparison was made between Surface roughness and Chip thickness. Here in the graph we can observe that as surface roughness value increases the chip thickness also increases and as surface roughness value decreases the chip thickness also decreases. But between the observations 1 to 2, when surface roughness value increases the chip thickness value decreases. Same observation is observed between observations 4 to 5. So for most of the cases linear relationship is observed between surface roughness and chip thickness.

The second comparison was made between MRR and chip thickness. Here also a linear relationship is observed. Exception is observed between observations 7 to 9.

The third comparison was made between MRR and Surface roughness. Here, upto observation no. 8, a linear relationship is observed between MRR and Surface roughness.

Innovativeness of the work

Here, we have drawn a comparison between Surface Roughness, Chip Thickness And MRR. The machining was performed in CNC lathe with Aluminium job and Carbide tip HSS tool.

Keywords: Surface Roughness; Chip Thickness; Materials Removal Rate (MRR); Taguchi Orthogonal Array;

A COMPARATIVE STUDY BETWEEN WEIGHT OF MATERIAL REMOVED/SEC VS. MRR (G/S), DEPTH OF CUT VS. MRR AND FEED RATE (MM/MIN) VS. MRR

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Abstract

The authors have conducted an experiment, taking three levels of Spindle Speed (RPM), Depth of Cut (mm), Feed Rate (mm/min) as input constrain and surface roughness, materials removal rate and chip thickness were taken as output parameters and were measured. Graphs were drawn between Weight of material removed/sec vs. MRR (g/s), Depth of cut vs. MRR and Feed rate (mm/min) vs. MRR.

Design of Experiment:

Table 1: Design of Experiment

Parameters	Level1	Level2	Level3
Speed(rpm)	750	1000	1250
Feed	50	75	100
DOC	0.05	0.075	0.1

Results and Analysis –Experiments were conducted for 9 different combination of Spindle Speed (RPM), Depth of Cut (mm), Feed Rate (mm/min), obtained from Taguchi orthogonal array, are included in the following table.Comparisons between few parameters, as stated above, are made via table and graph.

Table 2: Observation Table

Sl no	S_{rpm}	D	F	w_b	w_a	T_m	MRR (g/s)	D_b	D_a	L_m	V_m	V_m/sec	W_m/sec	R_a	C_t
1	750	0.05	50	74.6	74.1	26	0.019	10.1	10	10	1	0.038462	0.000103846	1.567	0.7
2	750	0.075	75	74.1	73.9	26	0.007	10	9.85	10	1.5	0.057692	0.000155769	1.597	0.31
3	750	0.1	100	73.	73.	26	0.007	9.8	9.65	10	2	0.07692	0.0002	1.333	0.51

				9	7			5				3	07692		
4	1000	0.05	75	73.7	73.5	26	0.007	9.65	9.55	10	1	0.038462	0.000103846	1.654	0.14
5	1000	0.075	100	73.5	73.3	22	0.009	9.55	9.4	10	1.5	0.068182	0.000184091	1.942	0.52
6	1000	0.1	50	73.3	73	18	0.016	9.4	9.2	10	2	0.111111	0.0003	1.686	0.98
7	1250	0.05	100	73	72.9	26	0.003	9.2	9.1	10	1	0.038462	0.000103846	1.182	0.5
8	1250	0.075	50	72.9	72.7	15	0.013	9.1	8.95	10	1.5	0.1	0.00027	0.926	0.13
9	1250	0.1	75	72.7	72.6	18	0.005	8.95	8.75	10	2	0.111111	0.0003	1.941	0.16

S_{rpm} = Spindle Speed (rpm), D = Depth of Cut(mm), F = Feed rate (mm/min), T_m= Time of machining (sec), D_b = Diameter before Machining (mm), D_a = Diameter after machining(mm), L_m = Length of machining (mm), V_m = Volume of material removed (mm^3), R_a = Surface roughness (m X 10^{-6}), W_m = Weight of material removed, W_b = Weight of the Job before Machining, W_a = Weight of the job after Machining, C_t= Chipthickness (mm)

i) Weight of material removed/sec vs. MRR (g/s) –

Weight of material removed/sec	**(Weight of material removed/sec) * 100**	**MRR (g/s)**
0.000103846	0.010384615	0.019
0.000155769	0.015576923	0.007
0.000207692	0.020769231	0.007
0.000103846	0.010384615	0.007
0.000184091	0.018409091	0.009
0.0003	0.03	0.016
0.000103846	0.010384615	0.003
0.00027	0.027	0.013
0.0003	0.03	0.005

Table 3: Weight of material removed/sec vs. MRR (g/s)

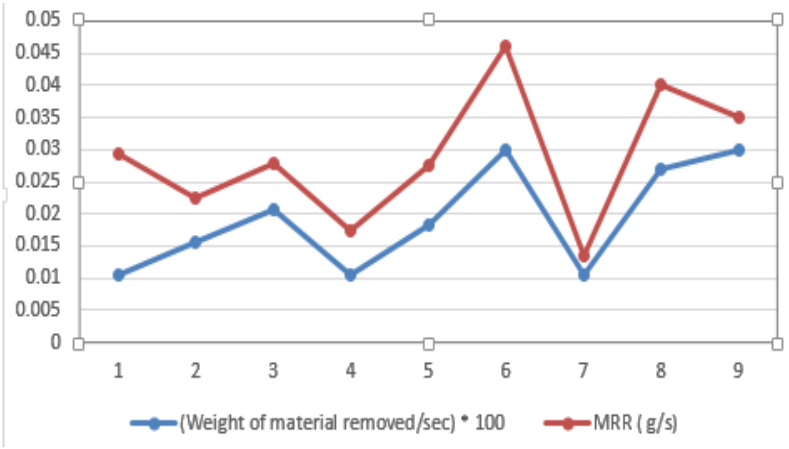

Fig. 1: Weight of material removed/sec vs. MRR (g/s) graph

ii) Spindle speed vs MRR(g/s)

Spindle Speed (rpm)	**Spindle Speed (rpm) X 10^{-4}**	**MRR (g/s)**
750	0.075	0.019
750	0.075	0.007
750	0.075	0.007
1000	0.1	0.007
1000	0.1	0.009
1000	0.1	0.016
1250	0.125	0.003
1250	0.125	0.013
1250	0.125	0.005

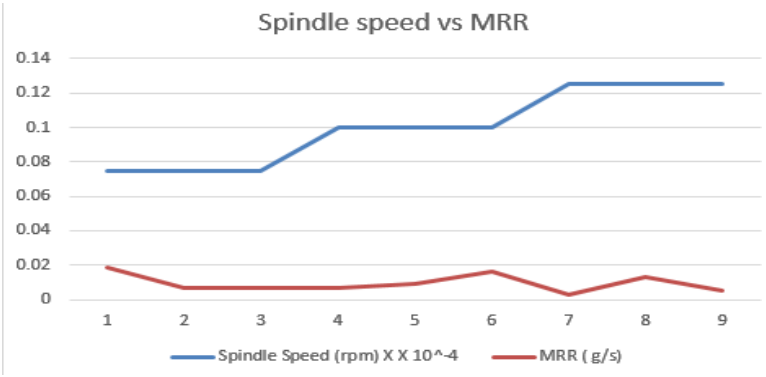

Table 4: Spindle speed vs MRR(g/s)
Fig 2: Spindle speed vs MRR(g/s) graph

iii) Depth of cut vs. MRR

Depth of Cut(mm)	MRR (g/s)
0.05	0.019
0.075	0.007
0.1	0.007
0.05	0.007
0.075	0.009
0.1	0.016
0.05	0.003
0.075	0.013
0.1	0.005

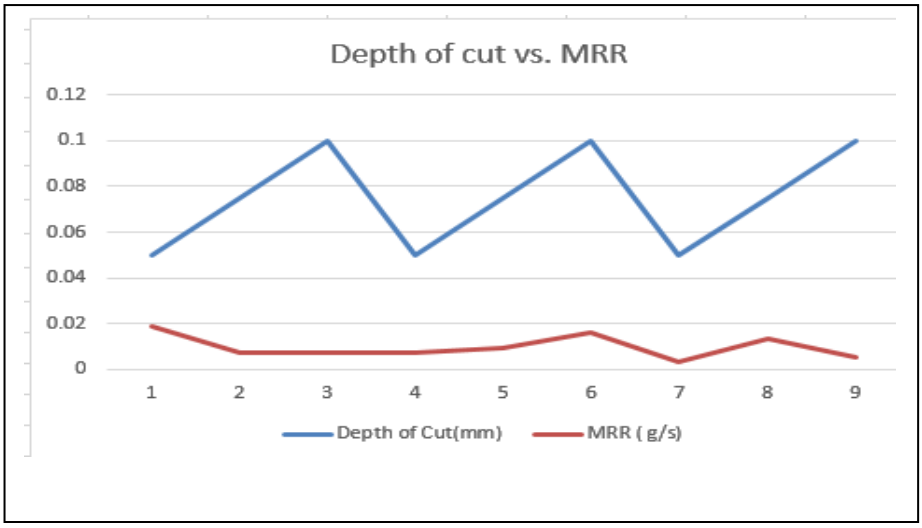

Table 5: Depth of cut vs. MRR Fig. 3: Depth of cut vs. MRR graph

Analysis

The first comparison was made between Weight of material removed/sec and MRR (g/s). It was found in the graph that for observations between 2 to 8 a linear relationship were observed. Exceptions were seen between observation 1 to 2 where Weight of material removed/sec is being increased and MRR being decreased. Also, same exception was seen for observations between 8 to 9.

In the second comparison, for the spindle speed value 750 rpm, first, the MRR value is being decreased and then remained constant. For spindle speed 1000 rpm, MRR value is being increased continuously. Lastly, for spindle speed 1250 rpm, MRR value firstly being increased and then decreased. Hence, we can not say for sure that spindle speed and MRR are depending on each other.

The last comparison was made between Depth of cut and MRR. From the graph drawn we can not draw a relationship between these two parameters. Hence we can say that depth of cut and MRR are not depending on each other.

Keywords: Surface Roughness; Chip Thickness; Materials Removal Rate (MRR); Taguchi Orthogonal Array;

A STUDY ON THE USEOF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN EDUCATION TO ENHANCE THE EQUAL OPPORTUNITY AND LEVEL OF COMMUNICATION

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Abstract

We are all aware that education smoothens the path of equal opportunity. But as we know, due to different constraints, it is yet not possible to reach education the periphery of every community. This requires a shift in the delivery and pedagogy used in the current education system. The main aim of this paper is to promote the integration of Information and Communication Technologies (ICT) in education for imparting easily accessible, affordable, and quality education leading to the equality of educational opportunity for

the oppressed community of India and hence a sustainable development. The focus of the paper is on the benefits that ICT integration in education that can provide, distance barriers to facilitating collaboration and knowledge sharing among geographically distributed students. ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. ICT also allows academic institutions to reach disadvantaged groups. Thus ICT enabled education will ultimately lead to the democratization of education.

Equalization of educational opportunities and enhancing communication was recognized as one of the primary goals of Indian educational policy. The National policy resolution (1968) calls for strenuous efforts to correct regional imbalances and minimize inter-group disparities in the academic sphere. The national policy on education (1986) lays particular emphasis on the removal of disparities and equalization of educational opportunity by attending to the specific needs of those who have been denied equality so far. Now it will be pertinent to discuss the different advantages of e-learning in connection with equal opportunity in education.It was eliminating time barriers in education for learners as well as teachers. Eliminating geographical barriers as learners can log on from anyplace; Asynchronous interaction is made possible, leading to thoughtful and creative interaction; enhanced group collaboration made possible via ICT; new educational approaches can be used. It can provide speedy dissemination of education to target disadvantaged groups. It offers a combination of education while balancing family and work life. It enhances the international dimension of educational services; it allows for just in time and just enough education for employees in organizations.It can also be used for non-formal education like health campaigns and literacy campaigns.

Benefits of ICT in education to enhance equality of educational opportunity as well as the level of communication. Increased access, the flexibility of content and delivery, Combination of work and education, Learner-centred approach,Higher quality of teaching and new ways of interaction Government or Education provider, Increased the capacity and cost-effectiveness of education and training systems, to reach target groups with limited access to conventional education and training, to support and enhance the quality and relevance of existing educational structures, to ensure the connection of educational institutions and curricula to the emerging networks and information resources, to promote innovation and opportunities for lifelong learning Source: (UNESCO, 2002)

Notable initiatives of the use of ICT in education in India include: Indira Gandhi National Open University (IGNOU) uses radio, television, and Internet technologies.National Programme on Technology Enhanced Learning: a concept similar to National Programme on Technology Enhanced Learning: a concept similar to the open courseware initiative of MIT. It uses Internet and television technologies (National Programme on Technology Enhanced Learning, India, 2007). Elkay initiative: Uses Internet and television to promote distance learning (EKLAVYA Technology Channel, India, 2007).IIT-Kanpur has developed Brihaspati, an open-source e-learning platform (Bhattacharya and Sharma, 2007). Premier institutions like IIM-Calcutta have entered into a strategic alliance with NIIT for providing programs through virtual classrooms. Jabalpur University is using a mobilelearning center (Bhattacharya and Sharma, 2007). IIT-Bombay has started the program of CDEEP (Centre for Distance Engineering Education Program) as emulated classroom interaction through the use of real-time interactive satellite technology (Centre for Distance Engineering Education Programme, (India, 2007). One Laptop per Child (OLPC) in Maharashtra (One Laptop per Child, 2007).

Innovativeness of the work

Education is the only tool that can change the spectrum of life. But unfortunately, it is not widely available for everyone. The paper discusses how information and communication technology can solve the problem and how ICT can bridge the gap for people with less advantaged classes.

Keyword: Equality of Educational opportunity; ICT as a Solution.

Proceedings of 4th National Conference on Science, Technology & Communication Skills (NCSTCS2K21)
Date: 24-25 September, 2021 ISBN: 978-93-89817-63-8

GAMIFICATION—A NEW WAY OF COMMUNICATION IN CLASS ROOM TEACHING LEARNING

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Abstract

A teaching method comprises the principles and techniques used by teachers to enable student learning. These strategies are determined partly on subject matter to be taught and partly by the nature of learners. The teaching-learning aids used in classrooms provide the students a better understanding to acquire the concept of any subject. In the modern age, the computer is a powerful tool to achieve any subjects' objectives. Mathematics is an abstract subject, and it is the backbone of science discipline. The study of mathematics is essential in an individual's education because it serves as the science and engineering fields' foundation. Thus, knowledge in mathematics plays a productive role in national development. Students' interest in mathematics suffers due to a lack of instructional materials and proper methodology. Based on these findings, the researcher adopted a gamification framework as an intervention that can facilitate teaching and learning of Mathematics for secondary students. The introduction of Gamification and blended learning into the classroom encouraged active, participatory, and collaborative learning by engaging pupils. This intervention helps in changing classroom dynamics and fosters new teaching and learning approaches. This gamification model's introduction also boost pupil-teacher interaction and turned the pupils into motivated, active learners. Gamification as an intervention to augment the traditional teaching methods used in the teaching of mathematics in secondary schools to increase pupil engagement, motivation, and interaction in the classroom lessons and make the teaching and learning of mathematics enjoyable in schools. Gamification has become a popular approach to encourage and influence specific behaviours in today's digital generation to increase motivation and engagement. Although commonly found in marketing strategies, it is now implemented in many educational programs. It helps educators find the balance between achieving their objectives and catering to evolving student needs (Huang &Soman, 2013). Gamification helps to motivate students towards studying; because of the positive feedback, they are encouraged, show interest, and are stimulated to learn. By using Gamification in the Education, the study wishes to trigger a more efficient and engaging learning behaviour among pupils in secondary mathematics.

The teaching methodology is a system of practice and procedure that a teacher used to teach in different subjects. Science teaching mainly depends on the demonstration method, 5 | P a g e laboratory method, heuristic method, project method, problem-solving method. There is a search of methodology for teaching-learning Mathematics, which will help the learners to understand the abstract idea into concrete form. In 2002, Nick Pelling deliberately coined the word 'gamification' to use the game in nongaming subjects. In 2009 Foursquare, the first gamification app allowing the user to search and discover new places. Wang (2011) describes Gamification as a series of design principles, processes, and systems used to influence, engage, and motivate individuals, groups, and communities to drive behaviours and affect desired outcomes. They all seem to tie Gamification as a means of engagement. The term 'gamification' was first used in 2008 but was not widely adopted until late in 2010. It is frequently confused with other names such as a game layer, applied gaming, productivity games, and behavioural games (Deterding, Dixon, Khaled, &Nacke, 2011). The concept is that a designer takes the motivational properties of games and layers them on top of other learning activities, integrating the human desire to communicate and share the accomplishment with goal setting to direct learners' attention and motivate (Landers & Callan, 2011).According to Kapp (2012), Gamification is using game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and solve problems. Yu-kai Chou (2012) has

defined Gamification as the craft of deriving all the fun and addicting elements found in games and applying them to real-world or productive activities. When the students met with difficulties, they may feel depressed, devastated, discouraged or cynical; such feelings are not present in the gaming environment. They may also prefer instant pleasure to keep themselves engaged and motivated. A study published in the May 1998 issue of Nature by Koepp demonstrated that video game players experienced regular dopamine release during gameplay. Dopamine is a neurotransmitter that signals pleasure rewards for food, sex, and addictive drugs, such as cocaine. This study proves that playing games stimulate pleasure centres in the brain.

Innovativeness of the work

Gamification is successful in making learners focused and engaged in learning with a good attention span. It is a methodology which opposes rote learning and tries to concretize the abstractness of mathematical concepts. In this paper the researcher try to develop a new methodology of teaching learning Mathematics.

Keywords: Gamification; New Methodology; Mathgames.

IOT BASED HEART DISEASE PREDICTION

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Abstract

Health is the most important thing cause without good health we cannot achieve anything in our lives, due to pollution and our rough, unhealthy lifestyle it affects the most. And the most common disease in today's world is cardiovascular disease and is a leading cause of death also. But now to reduce the mortality rate from this disease doctors are finally able to predict whether a person is prone to suffer from heart disease or not. Thus, this solution not only provides a significant human benefit but also enables proactive health monitoring data with a predicting accuracy of 88.52%.

Thisis possible because many hospitals use the previous health care data to extract hidden information to make intelligent medical diagnoses with the help of machine learning. Machine learning has an important role inhealthcare because it has the ability to process large data sets and is beyond human capacity. It uses the past heart disease history to diagnose heart disease by using thirteen medical terms like sex, blood pressure, cholesterol and etc. To get the perfect result it also uses two more traits, which are obesity and smoking. Intelligent Heart Disease Prediction System (IHDPS) uses data mining technology which is Decision Trees, Naïve Bayes, and Neural Network.

This technology uses the available clinical information very few times; it mainly depends on doctor intuition and patient track record.Improper treatments due to poor diagnosis can make a serious threat to medical industry so using a proper data with patient's track record and doctor's intuition is necessary. And to avoid all this kind of problems data mining is used.

This system detects heart attacks monitoring the heartbeat of the patient by using a heartbeat sensor, Arduino board, and Wi-Fi module. After setting the program the sensor begins to examine the heartbeat of the patient and display it through the LCD Monitor. It also uses the Wi-Fi module to transmit the data through the Internet. This system checks the patient's heart rate and monitors if the patient is healthy or not. When the heart rate goes above or below the specific limits it immediately sends a warning message to the doctor. Doctors can also use an android app model to track the patient's heart rate and monitor if he/she has a chance of heart attack and if they have then it provides an urgent message about the risk of a heart attack. The system allows us to set the limits of our heartbeat and after setting up the heart rate limit a

person can monitor his/her heart rate. The system also going to give us a warning if the heart rate goes above or belowthe specified limit.The rate of heart disease can be reduced by predicting it from before.

Innovativeness of the work

In today's world, the main reason for death after Covid-19 is heart disease. It is responsible for the world's 16% of total death and since 2000, death from heart diseases increased up 2 million to 8.9 million. So, it is our responsibility to generate awareness aboutandmaking them aware of the technologies which can help them to reduce the rate of these diseases.

Keywords: Mortality rate; Neural Network; A heartbeat sensor; Arduino board; Warning message.

ROBOTIC NURSE

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Abstract

As we all know, that about 54% of Artificial Intelligence has taken up the whole world. And the foremost example of it is, Robotics, and it is also believed that by 2050 the Robots might carry all the tasks performed by humans. Robotics has taken a major sector under its arms i.e. Healthcare. Nurses are the spinal cord of the healthcare industry and it covers a huge segment of healthcare. Constant rising healthcare expenses and population are the main factors affecting the healthcare system. Over 20% of the population of 17 countries consists of persons 65 years or older and this results in the increase in the aging population and hence giving rise to the shortage of Nurses and caregiving professionals. Therefore, Technology proposed its solutions by creating Nursing Robots. They can perform multiple tasks and can be placed within the hospitals as well as in homes for taking care of elderly people. They can perform laborious physical jobs and also can interact with old people to fight loneliness, and can also perform routine tasks like giving medication, measuring a patient's health, etc. Therefore, the need for Robots in the field of Healthcare is increasing thus creating a prosperous future for robotics in Healthcare.

Nursing Robots play a vital role in both hospitals and in homes to take care of elder people. In hospitals, Robots play an effective role in removing some of the primary duties from the shoulders of the nurses. They perform duties like distribution of food trays, medicines, laboratory reports throughout a hospital, etc. They are also designed to assist the nurses to support their work and boosting efficiency. Many of the nurses and caregiver professionals suffer from back pain and other job-related illness, so to make them relieved, Robots are designed in a way that they can perform laborious tasks like transferring patients, ambulating, lifting, etc.

Some of the important elements that are associated with a person's day-to-day life, get hampered due to some medical complications like strokes, neurodegenerative diseases, bone fractures, paralysis which led to the loss of mobility. To fight this situation, robotics offered assistance to persons who are partially or wholly impaired. A Robotic Wheelchair can overcome the constructed barriers in front of doors, slanting or high-level areas, etc. It also prevents collision and helps in directing and many more.

The patients who are physically disabled with any spinal injury or with some locomotor disabilities are offered an exoskeleton named ATALANTE designed by French Company Wandercraft. It is a self-activating, self-balanced lower limb exoskeleton. It is used in walk rehabilitation; patients can redevelop their locomotion and can perform their daily life tasks.

Mental health plays a very important role in a person's well-being. Patients who are suffering from any of the medical complications mostly suffer from depression. Some Robots are designed in such a way that they can support patients suffering from dementia, motivates them by physical exercises, provides post-

stroke rehabilitation, entertain them with news, and many other information. They also connect with the patient's family and friends to make communication and enhance their social life. Among all these things they also keep track of their patients via video and keep informing the nurses about the patient's health. For all these tasks, a seal-like Robot, Paro was designed, it is used in hospitals and various healthcare institutes all over the world. It acts as a bridge between the patient and the Nurses. It also relaxes the patient by imitating the voice of a baby harp seal and it also adapts to the patient's behaviour through its five senses- light, audio, temperature, posture, and tactile. Overall, it helps to reduce patient's stress and to motivate them.

So, Robotics has started making a huge impact in our lives with its advanced applications. Robotic Nurses and caregivers are spreading their branches in the field of healthcare. Their involvement in this field will increase efficiency and will enhance the quality of treatment and will decrease the expenses too. They are not only focusing on the hospitals but also in homes to take care of the elders. Robotic Nurses are also fighting during the outbreak of diseases. They are designed in such a way that they can work logically as well as laboriously. They are monitoring a patient and informing their nurses about the patient's health conditions. They are also excelling in the field of entertaining and motivating their patients in order to make them stress-free. By taking up the Healthcare sector, the robots are seen making a prosperous future for them. But, one last important thing, Robots are not here to replace Nurses, they are here to empower the field of Nursing.

Innovativeness of the work

This research paper shows that how the Robotics is spreading its branches in the Healthcare Industry. It consists of the application and the functionalities of the Robots in hospitals as well as in homes to take care of the elders. It's making us aware about the fact that without a proper Healthcare system the world cannot put its step forward towards advancement. Furthermore, it's also stating us the need of Robotics in this particular field. And by all these facts, it can be clearly stated that Robotics is going to spread its arms over every particular field in few years and will have a brighter future.

Keywords: Artificial Intelligence; Healthcare; Nursing Robots; Atalante.

CYBER ATTACKS: BASICS AND FRAMEWORK

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Abstract

Network safety is the assemblage of advancements, cycles, and practices intended to ensure networks, PCs, projects, and information from assault, harm, or unapproved. Cybercrime envelops any criminal demonstration managing PCs and organizations (called hacking). Moreover, cybercrime likewise incorporates conventional wrongdoings directed through the Internet. A significant piece of Cyber Security is to fix broken programming. A significant assault vector of Cybercrime is to abuse broken programming. Programming security weaknesses are brought about by damaged details, plan, and execution. The regularly acknowledged meaning of network safety is the assurance of any PC framework, programming system, and information against unapproved use, divulgence, move, adjustment, or annihilation, regardless of whether inadvertent or deliberate. Digital assaults can emerge out of inward organizations, the Internet, or other private or public frameworks. Organizations can't bear to be pretentious about this issue in light of the fact that the individuals who don't regard, address, and counter this danger will definitely become casualties. Sadly, normal improvement rehearses leave programming with numerous weaknesses.

To have a protected US cyber infrastructure, the supporting programming should contain hardly any,

weaknesses. The pattern includes misusing weaknesses that go as far back as 2009 in Office reports. Other cross-stage, outsider innovations supported by programmers incorporate Java, Adobe PDF, and Adobe Flash. Network protection relies upon the consideration that individuals take and the choices they make when they set up, keep up, and use PCs and the Internet. Digital protection covers physical insurance (both equipment and programming) of individual data and innovation assets from unapproved access acquired through mechanical methods. The issue of End-User botches can't be settled by adding more innovation; it must be addressed with a joint exertion and association between the Information Technology people group of interest just as the overall business local area alongside the basic help of top administration. The possible earnestness of cybercrime is much more noteworthy on the off chance that it influences basic IT frameworks of media communications, power dispersion, banking, or transport, for example of the foundation on which for all intents and purposes all individual organizations depend. Such concerns drove the US President to set up a Commission on Critical Infrastructures.
Such cybercrimes can't be considered independently for singular frameworks, due to the quickly developing interconnectivity between IT frameworks, by means of Intra-nets, Extra-nets, and the actual Internet, just as by direct actual interconnection, or interchangeable stockpiling media like diskettes. Such interconnectivity transforms separate IT frameworks into segments of what is basically a solitary enormous supersystem that may endure a general disappointment, or whose information or programming might be genuinely dirtied because of a single noxious demonstration (or mishap).

Dangers to network protection can be separated into two general classes: activities focused on and intended to harm or obliterate digital frameworks and activities that try to misuse the cyberinfrastructure for unlawful or destructive purposes without harming or trading off that infrastructure cyber abuse. While a few interruptions may not bring about a quick effect on the activity of digital frameworks, concerning model when a Trojan Horse penetrates and sets up itself in a PC, such interruptions are considered as digital assaults when they can, from there on grant activities that annihilate or debase the PC's abilities

Innovativeness of the work
Cybersecurity is important because it protects all categories of data from theft and damage. This includes sensitive data, personally identifiable information (PII), protected health information (PHI), personal information, intellectual property, data, and governmental and industry information systems. It refers to protecting systems connected to the internet from threats in cyberspace. It involves protecting software, data, and hardware and helps prevent cybercriminals from gaining access to devices or the networks.
Keywords: Cyber-attacks; Frameworks; Software; Cybercrime; Cybersecurity

AUTOMATION, ROBOTICS IMPLEMENTED CONSTRUCTION AND IoT ENABLED WIRELESS SENSING & MONITORING SYSTEM FOR SMART BUILDING SYSTEM

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Abstract
The construction industry demands effective construction organisations, efficient construction processes and innovative construction techniques to compete effectively under increasing globalisation, market competition and technological advancements in the twenty-first century. In this paper, we reviewed on the reconciliated potential use of Automation, Robotics and IoT enabled Wireless Sensing and Monitoring platform to monitor the temperature, relative humidity and light in the context of the building automation and implementation of such innovative technologies in construction to improve the productivity, safety and

quality. In developed system, data is sent from the transmitter node to the receiver node through a customized hopping method. AnAndroid application has also been developed through which data is transferred from LabVIEWto a smartphone through whichdata is remotely monitored.

The IoT is a network of physical objects that consists of sensors, software and electronics whichhaveability to communicate with each other as well as with users. It is rapidly evolving due to the convergence of information and communication technologies and the internet.The Internet of Things (IoT) is an interconnected system only addressable physical items with different degrees of processing,sensing, and actuation capabilities that share the capability to interaction and communication through the Internet as their jointplatform.Thus, the main purpose of the Internet of Things is to make it possible for objects to connected with other objects,individuals, at any time or anywhere using any network, path, and also the main thing is to automatically transfer the data more to anetwork without requiring human-to-human or human-to-computer communication.

Applications of IoT in the urban context isthe smart building applications that promise to improve the quality of lifestyle of the residents by use ofInformation and Communications Technology.The services for which quality can be enhanced in a smart buildingare air quality management for reduction of pollution and healthy environmentand automation of publicbuildings for reducing human effort and energy consumption. There have been numerous efforts on microclimatemonitoring using Wireless Sensor Network (WSN). In authors report indoor air quality monitoring bymeasuring pollution levels for indoor environments. In author attaining energy autonomy for sensor node. In day-to-day life, humans interact with environmental parameters like temperature, humidity, light etc. and try to regulatethem manually. Monitoring of these parameters through WSN, makes the system suitable without majormodifications in the infrastructure. Such monitoring system for home automation, a part of building automationprovides people comfort, security as well as option of energy saving by monitoring the daily energy consumption.

The proposed IoT-WSMP consists of a transmitter node, repeater node and a sink node (receiver node) as shownin Fig. 1. The sensing platform supports a one-way communication from the transmitter to the receiver node and canaccommodate more repeater nodes, if required, to cover a larger area. Furthermore, the proposed system uses acustom hopping method for transmission over some number of nodes.. Finally, the data received at the sink node is transferred to a PC through a USB interface. The sensed datais depicted graphically and recorded in an excel sheet through a customized GUI, which is developed in LabVIEW.The PHP API execution, oninternet enables transfer of data from the MySQL database to the android based smart phone, thereby enabling IoTbased applications.

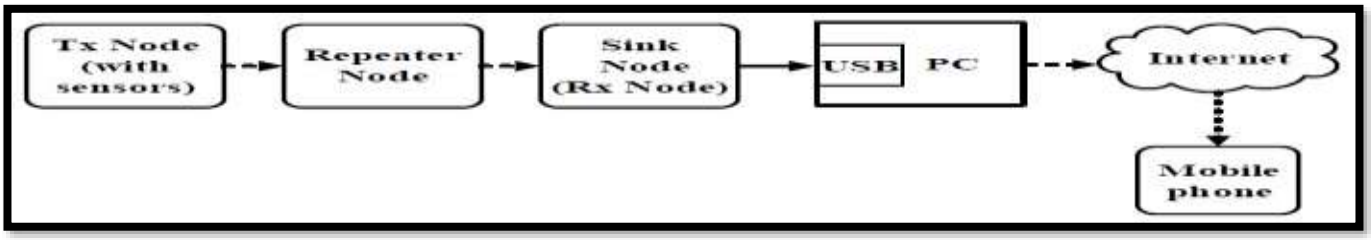

Fig-1. Proposed System Block Diagram

Innovativeness of the work

Robotics and the key elements of IoT towards the better future of Construction and Wireless Sensing and Monitoring Platform for Smart Building System. This paper discovers some main potential of Automation and Robotics through Smart Building System. They are improved quality product, improved occupational safety & health, higher productivity, reducing production time, reduction of labour workforce, reduce overall cost, reduce construction period etc. The developed IoT-WSMP system for monitoring temperature, relative humidity and light with double hoppinghas been successfully implemented and validated in a

building environment. A high reliability of 99.6 % is obtainedthrough customized double hopping method. The average power consumption of the transmitter node is *43.25 mW*.Further power reduction ispossible through algorithms, hardware optimizations and coding techniques and is dependent on specific applicationstudy and is left as future work.All of the key elements and used that been discussed could be the potential for the organizations to have a clear view in enhancing Automation, Robotics and IoT thus contribute towards the better future of both the Construction and IT Industries.

Keywords: Introduction; Strategy; Technology; System Description.

CYBER SECURITY AND MORDEN NETWORK SECURITY: TRENDS ON LATEST TECHNOLOGY

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Abstract

As more business activities are begin automated and an increasing number of computers are begin used to store sensitive information, the need for secure computer systems becomes more apparent. As a consequence, cyber security issues have become national security issues.

The security of computer networks plays a strategic role in modern computer systems. In order to enforce high protection levels against malicious attack, a number of software tools have been currently developed. Cyber security mainly defending computer, servers, mobile devices, electronics system, networks, and data from the malicious attacks. It is also known as information technology security or electronic information security.

Businesses that use mobile devices, such as cell phones, laptops, and tablets, should use mobile security measures to protect the information that is being stored on those devices from a range of different threats.Access control is a security technique that regulates who or what can view or use resources in a computing environment. Physical access control limits access to campuses, buildings, rooms and physical IT assets. Logical access control limits connections to computer networks, system files and data.

Network security tools and devices exist to help your organization protect not only its sensitive information, but also its overall performance, reputation and even its ability to stay in business. Continued operational ability and an intact reputation are two key benefits of effective network security. Companies that fall prey to cyberattacks often find themselves crippled from the inside out, unable to deliver services or effectively address customer needs. Similarly, networks play a major role in internal company processes, and when they come under attack, those processes may grind to a halt, further hampering an organization's ability to conduct business or even resume standard operations.

Network security tools supports growth, carries vital resources and helps our organization stay healthy. And if data is blood, then your network is the beating heart that pumps it through your system. But modern cyber threats are like vampires, doing everything possible to get at the blood that keeps your business going. Businesses currently fall victim to ransomware attacks every 14 seconds. These ransomware attacks are growing more than 350% annually with IoT attacks increasing by 217.5% year over year (YoY) from 2017 to 2018.Statistics show that approximately 33% of household computers are affected by some type of malware, more than half of which are viruses. Viruses are attached to a system or host file and can lay dormant until inadvertently activated by a timer or event.Advanced Persistent Threats (APTs for short) are cyber-attacks that call for an unauthorized attacker to code their way into an unsuspecting system network, remaining there undetected for quite some time. Instead of revealing its position, the APT siphons financial information and other critical security information away from the victim's network.

Innovativeness of the work

Cyber security is one of the most important aspects of the fast-paced growing digital world. The threats of it are hard to deny, so it is crucial to learn how to defend from them and teach others how to do it too.Network security is a crucial factor that many organizations consider. An attack or threat may cause substantive loss of information or data to an organization. It may also destroy critical infrastructure. It is, therefore, the best decision to develop a reliable security policy for the firm's network.

Network security policies can play a significant role in mitigating the risks that the firm may experience in its operational environment. All the security policies should ensure that the information and data are confidential without affecting its availability or integrity.

Keywords: Cyber security; Network security tools; cyber-attacks.

'THE RISE OF THE MACHINE' - WHY AUTOMATION IS DIFFERENT THIS TIME

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Abstract

Automation describes a wide range of technologies that reduce human intervention in processes. Human intervention is reduced by predetermining decision criteria, subprocess relationships, and related actions — and embodying those predeterminations in machines. Automation includes the use of various equipment and control systems such as machinery, processes in factories, boilers, and heat-treating ovens, switching on telephone networks, steering, and stabilization of ships, aircraft, and other applications and vehicles with reduced human intervention.

Several significant developments in various fields have occurred during the 20th century: the digital computer, improvements in data-storage technology and software to write computer programs, advances in sensor technology, and the derivation of a mathematical control theory. All these developments have contributed to progress in automation technology.

Development of the electronic digital computer (the ENIAC [Electronic Numerical Integrator and Computer] in 1946 and UNIVAC I [Universal Automatic Computer] in 1951) has permitted the control function in automation to become much more sophisticated and the associated calculations to be executed much faster than previously possible. The development of integrated circuits in the 1960s propelled a trend toward miniaturization in computer technology that has led to machines that are much smaller and less expensive than their processors yet are capable of performing calculations at much greater speeds. This trend is represented today by the microprocessor, a miniature multiseriate device capable of performing all the logic and arithmetic functions of a large digital computer.

In the year 1979, General Motors worked with 800 thousand Labours and generate a revenue of 11 billion, whereas, in the year 2013, Google worked with 58000 laborers and generated 14 billion. These are some reasons why automation is important, but there are some dark sides too, let me make you aware why automation is different this time.

According to the records, In the year 1998, US citizens worked for 194 billion hours and generated revenue, whereas, in the year 2013, US citizens worked for the same time but generated revenue, think this is a piece of good news, no it is not. Even after years of automation, the number of jobs in the US didn't increase, which is not good news at all. According to the shreds of evidence found earlier in the decade of 1990s, automation was necessary, as it helped by increasing productivity and helped humans to deal with complex situations. It created a lot of job opportunities and helped the world to improve. But in this epoch, the world is completely transformed, we human beings all more rely on machines. Machines are replacing

humans starting from a factory to a household. The whole world is now mostly automated. Earlier, automation gave birth to thousands of new job opportunities, but in today's world automation is replacing humans.

Machines are learning faster than humans and now they are excelling in all fields. Humans cannot compete with machines. In today's era, every company is replacing humans with machines, Companies are purchasing software rather than hiring employees and they are getting the efficient job done in less time, which is one of the reasons why there are a smaller number of job opportunities in the market, and as a result of which human is completely involved in Jobs which requires no degree even after completing graduation courses.

Innovativeness of the work

In this new era of automation, companies are replacing middle-level management with software, this software are employing freelancers all over the world to complete the tasks and at the same time these machines are learning how to do the task for the next time, this is making rich people richer as they can own a machine and run a company, and the poor will starve to death because they won't be having any source of income from which they can earn their livelihood.

Keywords: Automation; Machines; Integrated circuits.

THE ART OF DIGITAL COMMUNICATION IS THE LANGUAGE OF LEADERSHIP

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Abstract

"One of the emotional affordance of digital communication is that no one can always hide behind deliberated nonchalance."

This paper highlights the importance of the Digital communication in this pandemic situation, in the career of the students of engineering both in global and local contexts. Have you ever wondered who's responsible for the targeted social media ads you see as you scroll through your feeds or the emails that let you know about events and promotions you're actually interested in?

The professionals behind these marketing tactics work in digital communications—a field that is indispensable to most organizations today.

Digital communication has proliferated in a big way in the previous years. Today leave aside private sector even the Government departments are digitalized. This is the information age and the era calls for all market leaders to digitalize their processes.

Leadership is the ability of an individual or a group of individuals to influence and guide followers or other members of an organization. When communication is effective, it leaves all parties involved satisfied and feeling accomplished. By delivering messages clearly, there is no room for misunderstanding or alteration of messages, which decreases the potential for conflict.

Verbal communication is mostly face-to-face, but the effectiveness of verbal communication depends on the speaker and how well he can express his ideas with clarity. Whereas, electronic communication, however, is done through electronics. It can be carried by wires or can be wireless. Nowadays, electronic communication has become the most important means of communication in the business world. This has made long-distance communication very convenient and the world a smaller place.

In this increasingly digital world – it's more important than ever to make sure we do our best to communicate effectively. And effective communication is a real leadership skill – getting it right could

make the difference between getting the outcome you want and not. So it's worth fine-tuning these skills.
Digital communications is a subject that is synced to today's needs. Digital communication involves an organization's online communication efforts. Most organizations today use a wide range of online channels—from their website to mobile chat to blogs—to connect with current and prospective customers, employees, and other stakeholders. In digital communication, the data transfer rate depends upon it's characteristics. Digital communication can be done over large distances through internet and other things. Digital communication is always preferred over analog communication as it is less prone to noise or distortion and its relatively easy to manipulate signals. Digital communication is a mode of communication where the information or the thought is encoded digitally as discreet signals and electronically transferred to the recipients. Digital communication is one of the most commonly used mode of communication in the current scenario. During the first months of the pandemic, research reports showed that digital media use tremendously increased as people spent more time at home due to coronavirus lockdowns. As people adopt new digital communication methods, they may develop preferences for these new approaches and retain them longer term.
Digital communication is any type of communication that relies on the use of technology. There are many types of digital communication, commonly referred to as digital communication channels. These include email, phone calls, video conferencing, and many types of instant messaging like SMS and web chats.
Bad-news conversations and presentations are particularly challenging because leaders understand their primary role is to motivate and inspire. Bad news and the resulting disappointment jar that vision and make them uncomfortable—something to be overcome.

Innovativeness of the work
This paper summarizes the various aspects of Digital communication as the most lucid language of communication in leadership and how and why it can potentially survive in the upsurge of other alternative vernaculars, establishing the fact that no other communication holds the ability to establish itself as the link communicative language across the world.
Keywords: Digital communication; Pandemic situation; Targeted social media; Encode; Vernaculars.

NUMERICAL UNDERSTANDING AND APPLICATIONS OF CRISP RELATION AND FUZZY RELATION

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Abstract
In all disciplines of engineering, relationships are crucial. Similarities can be represented by relationships. Logic, categorization, pattern recognition, and control are all examples of relationships. Some of the connections are between elements in the same universe: one measurement is greater than another, one occurrence occurs before another, and so on. Fuzzy relationships are based on formal models capable of understanding the human way of dealing with complex phenomena, thus, towards the complete completion of information. The ambiguous relationship is based on Zedah's model which states that, instead of a set of sharp border or specific border line cases, a sudden, non-membership transition to full membership allows for partial degrees of membership. The existence or lack of connection, interaction, or correlation between items of two or more sets is represented by a crisp relationship. This idea may be expanded to include the power of relationships or interactions between various degrees or powers. In the same manner that set membership degrees are represented in a fuzzy set, association degrees may be expressed from a membership level in a fuzzy relationship. In reality, the crisp connection may be thought of as a finite

matter of fuzzy relationships, just as the crisp set can be thought of as a finite matter of the more popular fuzzy set notion.Crisp Relations Operations, Let A and B be two relational matrices that are defined on X x Y and represent two relations.On these relations, the procedures listed below can be used. A and B are two pairs of letters. Union A ∪ B (x,y) = max [A (x,y) , B (x,y)]. Intersection A ∩ B (x,y) = min [A(x,y) , B (x,y)]. A clear connection denotes whether or not the members of the two sets are associated, interact, or correlate. This notion may be used to various degrees of interactions between an association's strengths or components. These degrees are linked to membership levels via an unclear connection. As a result, a clear connection is a subset of a tangled one. Therefore, a crisp relationship is a limited matter of an fuzzy relationship.Face pattern recognition, air conditioners, washing machines, vacuum cleaners, anti-skid braking systems, transmission systems, subway system control, and unmanned helicopters are just a few examples of where fuzzy logic has been applied. In this paper we discuss about fuzzy relation and crisp relation, numerical understanding between them and applications of crisp and fuzzy sets.

Innovativeness of the work

In our work we mainly demonstrate different numerical problems of crisp relations and fuzzy relations, their inter disciplinary approaches and numerical analysis & understanding. We gave brief discussion about fuzzy relations & crisp relations, fuzzy sets and crisp sets, their numerical operations and also various applications of crisp relations and fuzzy relations.

Keywords: Relation; Fuzzy Relation; Crips Relation; Fuzzy Set; Crips Set.

A STUDY ON LEAN SIX SIGMA MANAGEMENT

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Abstract

In this era where ‘time and tide wait for none’; we need a methodology which focuses on providing client-customer satisfaction in minimum time and variance. For years many companies have struggled with the dilemma of which improvement program to use: Lean or Six Sigma. While some continue to debate the issue, others have come to realize that Lean and Six Sigma can work well together to improve processes, increase quality and drive out costs which resulted in Lean Six Sigma, a fact-based, team-focused managerial approach and data-driven philosophy of improvement that values defect prevention over defect detection. It combines Six Sigma methods and tools and the lean manufacturing philosophy, striving to eliminate waste of physical resources, time, effort and talent while assuring quality in production and organizational processes. It drives customer satisfaction and bottom-line results by reducing variation, waste, and cycle time while promoting the use of work standardization and flow, thereby creating a competitive advantage. Wherever variation and waste exist, LSS (lean six sigma) can be implemented and requires involvement of every employee. Lean six sigma primarily includes Cellular manufacturing (the re-arrangement of workstations to facilitate production characterized continuous flow and less downtime), takt Time (the rate at which a finished product is completed to meet customer demand).One Piece Flow or Continuous Flow **(**To reduce the batch size in order to eliminate system constraints), then comes a Kanban pull system (A pull system refers to Just in Time efficiency, where the product meets customer demand, not exceeds it. With a pull system you will have an easier time responding to market forces, but it is chiefly about making what the customer wants when they want it) and apart from these, there are other secondary essentials. The Lean Six Sigma management approach is being used across sectors and industries either product or service-oriented companies. It promotes exceptional changes in an organization's performance.

This method improves processes and makes them efficient and creates competitive advantages in many organisations. The key to success is management support, employee engagement, and commitment to improving customer satisfaction. Likewise, Lean Six Sigma methodologies are critically important in healthcare because they can reduce defects that can result in medical errors. Medical errors in the United States contribute to the deaths of more than 210,000 people annually and cost the healthcare industry an estimated $17.1 billion each year. Moreover, it helps to shorten wait times in hospitals and private practices, prevent falls and injuries in hospitals and nursing homes, reduce medication errors when prescribing and administering drugs or filling prescriptions and increase turnaround time for the lab results. A current work investigation was done in order to reduce the chilling cost of milk which was dependent on the following critical factors such as improper production planning, poor maintenance of machine, lack of coordination between production and Refrigeration section and others. These factors were analysed and minimized by the application of lean six sigma. This finally improved process efficiency, optimizing resources, and increasing customer satisfaction while improving profits and curtailing cost.

Innovativeness of the work

During the pandemic, we have seen the dire need of supplying food, oxygen and other commodities to quarantined people in minimum time. We can use Six Sigma to anticipate demand for food or oxygen in a region in less time and minimum errors and with standardized procedures ensure best quality. The goal of the research was to introduce a problem-solving technique to reduce downtime within a manufacturing site without affecting the production required to fulfil customer demand while increasing product quality. The research utilized an integrated Lean Six Sigma methodology which identifies, stratifies and effectively eliminates non-value adding activities, by following a DMAIC model (Define, Measure, Analyse, Improve and Control) which resulted in complete elimination of the issue. The presented results demonstrated that Lean Six Sigma methodology and tools are effective to implement a continuous improvement.

Keywords: Lean; Six Sigma; Variance; Just-in-time; Healthcare.

IMPACT OF SOFT SKILLS IN THE LIFE OF AN ENGINEER

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Abstract

We are living in an era, where you need more than technical skills to be successful in your career. Employers of today's era seek candidates who not only can perform their jobs well but also can fit into the company culture and interact with other employees in a proper manner. In order to do these things successfully, students need to develop soft skills. For them to stand out as promising assets to multinational organizations, they need to invest in the sharpening of what are labelled as soft skills.

Soft skills are attributes that enable us to engage in meaningful interactions with others, these are the skills we possess that go beyond our technical as well as our measurable abilities. These focus more on our ability to work under time management, self-motivation, team work, communication and problem-solving skills. Since most jobs require teamwork, it's important to have certain soft skills, which can enhance our employability and achieve our dream job. They would help us to increase our productivity in our career, build professional relationships and thrive at our jobs. These skills may be less easy to measure, but this are suggesting essential phenomenal to a student's development.

There are different types of soft skills we can learn and practice in order to become and effective communicator. Soft skills are needed to deal with the external world and to work in a collaborative manner with one another, which requires good communication skills.By the term communication, we can say that it

is a process of our informational strength, signs or gestures.It is naturally used to language and express our personal thought in an effective way. The next soft-skill imperative to know is self-motivation. It is the inspiration behind our own behaviour and its actions. Ithelps us in managing every small thing in our lives. Motivating ourselves improves our confidence and self-esteem, as well as gives us the solidity to achieve our goals in life. In the Teamwork skills, we should have the qualities and abilities that allow us to work well with others during conversations. Having good teamwork skills depends on our ability to communicate well, actively listen and be responsible and honest. Once we have accustomed all these skills, it is necessary to know the skill of problem solving, which is all about using logic, as well as our own imagination, in order to make sense of a situation and come up with an intelligent solution. Last, but the most important skill a person should be aware about is their time management skill, which is the planning on how to divide our time between specific activities. A good time management enables us to work in a smart way, so that more work is done in lesser amount of time.Moving forward with soft skills nowadays means multifaceted development of our own future. That's why every university has been doing unprecedented work for soft skills development.

However, if anyone participates in a soft skills course for at least a month, it can be said that if he does not have proper time management, it will improve to some extent. As for the communication skills discussed earlier, we can say loudly that if he is not a good communicator, he will become a somewhat better communicator in the co-operation of that course.

According to our topics, it is important for every engineer to have better soft skills, especially the five soft skills discussed above. Soft skills make these engineers smart as well as help them to maintain good relations with their clients.

Innovativeness of the Work

During the lockdown, one of our friends enrolled himself in a Soft skill course. It was so effective that, within three months, he became a good time-manager, a very good communicator, a better teamworker, and a good challenge solver, which made him a good communicator alongside an engineer.

Keywords: Soft Skills; Communicator; Time-Manager; Team worker; Engineer.

SOFTWARE AND THE FUN WITH LANGUAGE ACQUISITION

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Abstract

Language acquisition is the skill of learning any language and being able to understand and comprehend the same and also use the words to produce meaningful sentences that help us to communicate. Ever since the advent of language which isbelieved to have happenedabout one lac years ago the progress of the human race has never stopped. The skill of language acquisition has ever since been a part of the human race to communicate effectively between people and share their needs, ideas and emotions. The language has also evolved after it had been invented and till date its still evolving.

The invention of language and the aquation had begun in general to convey the thoughts in once mind so that the others could benefit from it. Thoughts in general are just a frame of logical ideas that give a particular result but it isn't necessarily thought in any language. For instance, if the thought is regarding an equation it consists of mainly numbers and certain variables (in any one of many mixed languages), but to share the idea of it one needs to give out a proper definition and logical reasoning to support the idea which

actually needs a language to be understood by the masses. There is a connection between the development of the human brain and the language. As over the years, the human brain evolved the language once represented by howls and other noises, started to become more distinct words, then sentences to form a meaning.

After the advent of modern technology, the acquisition of language has not only become easier and friendly but also more accessible. Earlier back in the last decade, the people in huge multinational companies had to higher a professional translator to translate the conversation between the company and the foreign client, but in the recent scenarios we have different web services to do that for us. We also have devices that can translate live spoken conversations into different languages, something like the professional translators used to do. This is also far more effective than the native methods as it works in real time.

Learning new language has also become a lot easier because of the same services that we have discussed above. There are different applications for mobiles that help anyone learn from the basics of a language to learn the advance level in just a matter of days. This is not only just effective but an efficient way of learning as well because anyone can learn it at their own pace.

In the paper we discuss all these things regarding the recent developments in software, its effectivenessand the role it plays to acquire a new language in a few buttons clicks - in details and the way the acquiring of a new language has not only become seamless but also accessible to the masses. Here we also discuss that there can be also other developments in the field of language acquisition like using Artificial intelligence for an instance to train someone to increase fluency and talk to them like a friend to make the process a bit more fun and enjoyable.

Innovativeness of the work

In the paper we have put together the history of importance of acquisition of language of the centuries, the present developments that have been made due to the availability of modern technology and accessibility of vast spectrum of software. We also discuss some more developments that could be made in this sphere using updated technologies like Artificial Intelligence and its benefits.

Keywords: -Acquisition; Communicate; Artificial intelligence.

EBONICS AND BLACK ENGLISH

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Abstract

American African Vernacular Englishis a matter of some public controversy as was seen most recently in the debate over the Ebonics ruling by the **Oakland School Board.** In this study we are going to analyse why American African Vernacular Englishhas been a dialect of English Language.

Since 1996, the term Ebonics (*Ebony + Phonics*) which literally means *"Black English",* has sometimes been used as a synonym forAmerican African Vernacular English. This term is originally coined by psychologist Dr. Robert Williams in 1973, intending to refer to the language of all people descended from black African slaves particularly in West Africa, the Caribbean, and North America. The American Speech, Language and Hearing Association classifiesAmerican African Vernacular Englishas a distinct dialect, with a recognized vocabulary, grammar, and word meaning. Among these distinctive elements of Ebonics are the use of double negatives such as "*I ain't going there no more***,**" and such sentences as "*She be at home*" instead of "*she is usually at home*". This language is also called asBlack Poverty Language, Nonstandard Black Dialectand Casual Register Englishby many researchers.

The history of Ebonics and its genetic affiliation, by which we mean what language varieties it is related to, are also a matter of controversy. Some scholars contend that American African Vernacular Englishdeveloped out of the contact between speakers of West African languages and speakers of vernacular English varieties.

Ebonics, first gained notoriety when the **Oakland Public School District**recognized it as a primary language, thereby recognizing that its Black pupilsneeded to learn standard English as if they were non-English speakers.Black Vernacular Englishinfluences popular culture in hip-hop **R&B** and rap as according to **Billboard** it's the most popular genre of music by sales and downloads. Though many people say that Black English is simply a degradation of music.It is extremely difficult to say how many people speak American African Vernacular Englishbecause it is not clear what exactly this would mean. Some speakers may use some distinctive aspects of *phonology* (pronunciation) and *lexis* (vocabulary) but none of the grammatical features associated with the variety. Many sociolinguists would reserve the term American African Vernacular Englishfor varieties which are marked by the occurrence of certain distinctive grammatical features. American African Vernacular English andStandard American Englishare two different languages. Students, who use American African Vernacular Englishand demonstrate a decent command of theStandard American English, are bilingual.Any denial of this fact and attempt to limit American African Vernacular Englishspeakers is an act of oppression and linguistic racism.

Overall, we conclude that physical reality must respond to the language that it understands. Instead of criticizing, ostracizing, and traumatizing our scholars for speaking in their native tongue, celebrate their ability to successfully navigate between two or more linguistic worlds.

We should always remember that Ebonics (Black English)is a dialect that hails from West American linguistics.It's not *" ghetto talk"*, what they speaking is a dialect called Ebonics and it does not reflect their learning capacity.

Innovativeness of the work

In this study we declare the black history of English communication and give a way out not to bound the human communication or ostracize a group of people only for their dialect.They are distinct to improve their lives in theirway, and we should accept them how they are.

Keywords: Communication; Racism; Vernacular; Controversy.

STUDY ON JUST-IN-TIME

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Abstract

By this 21st Century and with the fast changing world there is a lots of work to be accomplished within a limited period of time which poses hindrance to work productivity. Moreover, due to the current pandemic situation, peoples are running out of money. So in this situation, there should be a methodology that can cut down expenses with increasing Efficiency. One such methodology can be termed as Just-In-Time (JIT), Just-In-Time (JIT) is a type of inventory management system strategy that aligns raw-material orders from suppliers directly with the production schedules without any intermediate personal.Just-In-Time (JIT) is defined in the APICS (American Production and Inventory Control Society) dictionary as "a philosophy of manufacturing based on planned elimination of all waste and on continuous improvement of productivity". Companies implement this inventory strategy to decrease the waste by receiving goods only when it's needed for the production process and to increase efficiency, which helps to reduce the inventory costs. Now the Question arrives how the JIT inventory process function, The Just-In-Time inventory system

basically minimizes the inventory costs and increases the efficiency of the production. The system cuts the inventory costs because they only order when they needed which cuts down the storage cost too. Due to which the manufacturers are also not left with the unwanted inventory items if an order gets canceled or has not been fulfilled. Just-In-Time inventory system was firstly adopted by a car manufacturing company viz. TOYOTA in the year 1970, after which Just-In-Time manufacturing was also known as the Toyota Production System (TPS). These car companies operates with low inventory levels but heavily depends on its supply chain to deliver the parts they require to build a car, on an as-needed basis. Depending upon the order received the manufacturer orders the parts required for assembling or manufacturing a car. Due to the JIT methodology companies are succeeding and their productivity is increasing but they must be focused on certain things like they should have steady production, high-quality workmanship, glitch-free plant machinery, and reliable suppliers, for far better results. Everything available in this planet have pros and cons, therefore, JIT too have some pros and cons. Some advantages of JIT be like It's Time Efficient, improves work efficiency and worker motivation, Increase profit margin, administration efficiency, equipment utilization and flexibilityand many more. Some disadvantages of JIT be like as the whole process depends upon the supply chain, therefore, any disrupts in the supply chain will hamper the production. A sudden unexpected order for goods may delay the delivery of finished products to the end clients. By using JIT in manufacturing industries for the production of products there is less wastage of raw material and fewer defectives. It creates customer satisfaction delight. Applying JIT, it also decreases the wastage increasing productivity and reduces the cost of the final product. Mainly by applying this methodology the quality of the product has beenenhanced. So, when there is less wastage of the material automatically the productivity increases.

Innovativeness of the work

The JIT system predominantly depends on the industriousness of the suppliers and proficiency of the workers running the manufacture. Any error in the work process can bring the entire production to a halt. Therefore, there should be an impeccable communication system between the production centers and the suppliers. An algorithm to determine the best supplier for a particular required part or raw material might be helpful. The suppliers should be ranked according to their product quality, manufacturing time, maximum production capacity, cost effectiveness, nearness to the center etc. It should further be sorted in accordance with the preponderance with respect to profit and then the urgency of the order. This might help the production companies to contact the suppliers which best suit their demands in that prevalent situation.

Keywords: Just-In-Time; Inventory; Workmanship; Glitch-free; Methodology.

SINGLE IMAGE DEHAZING WITH DEEP RETINEX FRAMEWORK

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Abstract

In this work, a retinex-based decomposition model for a hazy image with a novel end-to-end image dehazing framework has been discussed. In the architecture, haze-free natural illumination and residual illumination caused by haze is obtained from the illumination of the hazy image. Thus, a deep retinex dehazing Framework (DeReDeF) is modelled to estimate simultaneously the residual illumination map and the haze-free image. The DeReDeF consists of a multiscale residual dense network for estimating the residual illumination map and a U-Net with channel and spatial attention mechanisms for image dehazing. The multiscale residual dense network can simultaneously capture global contextual information from small-scale receptive fields and local detailed information from large-scale receptive fields to precisely estimate the residual illumination map caused by haze. In the dehazing U-Net, we apply the channel and

spatial attention mechanisms in the skip connection of the U-Net to achieve a trade-off between over-dehazing and under-dehazing by adapting the channel-wise and pixel-wise attention weights adjustments. Compared with scattering model-based networks, fully data-driven networks, and prior-based dehazing methods, the DeReDeF can avoid the errors associated with the simplified scattering model and provide better generalization ability independent of prior information. The superiority of the DeReDeF to other state-of-the-art methods has been observed with extensive experiments.

Innovativeness of the work

The proposed retinex-based model uniquenesses are : i) averts the classical model errors associated with the simplified scattering model and the dependence on the prior information of traditional retinex-based dehazing methods, ii) achieves a trade-off between over-dehazing and under-dehazing, iii) a multiscale residual dense network to learn the residual illumination map is placed on retinex-based dehazing decomposition model to develop coarse haze-free image, iv) finally, the dehazing refinement subnetwork embeds both channel-wise and pixel-wise attention mechanisms into a U-Net to reinforce haze-free image learning with results on synthetic and real-world datasets.

Keywords: Image dehazing; U-Net; Retinex theory; Channel-wise attention; Pixel-wise attention; Image restoration.

ARTIFICIAL INTELLIGENCE AND THE FUTURE OF SPACE EXPLORATION

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Abstract

Mankind has always been creative and such creative feature of human brain is the key to AI. Advances and development in AI have allowed us to make progress in all kinds of manner including deep space explorations. From designing missions on different planets to clearing earth's orbit of junk, we've come a long way in handling and advancing artificial intelligence.

As of May 2021, there have been six successful robotically operated mars rover missions and out of six five were administered by National Aeronautics and Space Administration (NASA). The rovers were Sojourner (1997), Opportunity (2004), Spirit (2004), Curiosity (2012), And Perseverance (2021). The sixth mission is Zhurong (2021), launched by the China National Space Administration. Other than rovers there have been number of space missions by various countries that were only possible because of AI.

Today, many companies, such as Google, Tesla and NASA, have already implemented AI in search of new celestial bodies, alien life forms and easing the work of astronauts when they are in space. AI helps in processing satellite images, helps in building personal assistance in space, conducting system monitoring, in building Spatial telescopes which can play crucial role in debugging the mystery of black holes and most importantly the role of AI in the development of satellites and spacecraft.

The meaning of AI and Machine Learning in itself holds the key and hope of future space explorations. In simple AI Refers to the simulation of human intelligence in machines that have been programmed to think like humans and copy their actions. AI aims to solve traditional problems like planning, reasoning, knowledge representation, perception, and the ability to move and manipulate objects on a given situation. AI can be utilized to understand the possible outcomes and result of different scenarios and situations. It can build predictive models based on sample data which can create pattern and can make conclusive decision without being explicitly programmed to do so. We can further use another form of machine learning which is known as Deep learning to copy human capacity of performing classification task directly from image, sound data and text.

We can clearly see that our desire to explore the final frontier and space beyond that seems to be growing and we will continue to plan ambitious missions to satisfy our inherent curiosity as well as to improve the human lives on earth. In our endeavors, Artificial intelligence would be proved path breaker in arena of space exploration over the next couple of year to assist new Deep space missions and many more.

Innovativeness of the work

Use of AI in space explorations can play a crucial role. We can look into deep space, search for Extraterrestrial life, can debug mysteries of black holes. In the 21st Century, we have AI enabled telescopes and star-gazers, that are working non-stop and excellently, rejoicing at the possibilities of using Artificial Intelligence to rediscover the world beyond our expectations. Wonder what Elon Musk might have to say.

Keywords: AI; Space; Rovers; Machine Learning; NASA.

ROLE OF ARTIFICIAL INTELIGENACE IN FUTURE COMPUTING

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Abstract

Technology has become the use of scientific knowledge for welfare. ARTIFICIAL INTELLIGENCE (AI) is one of the most important technology in this world today. The United States and China compete for dominance in their development. And it has helped companions such as Facebook, Google, and apple to become among the largest world. It will significantly change the way they do business. In addition, even though AI is advancing rapidly, we believe that we are at least many decades away from the day when computers have complete, human-level artificial intelligence as we tend to progress through the study, we'll conclude the assorted level of AI.

There are many ways to define AI but one is simple definition is "intelligence demonstrated by machine. "With the long-standing time of AI definition AO, generally referred to as machine intelligence, is intelligent watertight by machines, in distinction to the natural intelligence displayed by humans and animals." SUPERPOSITION AND ENTANGLEMENT" properties of quantum computing built it gate able to carry several operation streams in parallel each at the amount of 1 "qbit" and far of "qubits" so creating a quantum laptop, PC additional suited to tackle troublesome machines issues, as compared to a classical laptop PC.

Artificial Intelligence machines having ethical and moral values which can end in positive results and direction of individuals to try and do things that they're well versed with. Construction of varied AI systems will facilitate the complete world to the commercial sector to presuppose the out their symbolic structures like, the power to reason and additionally information existence. Additionally, at the time AI acquires intelligence bigger or equal to that of men, there'll be a priority about social and political modification. In what is more, AI will have all the benefits of colonize the globe while not the help of men. within the close to future, self-replicating AI could be created wherever human colonies on the far side the globe can never have potentials to fight within the free house with crucial terms. The long run AI in numerous regions in the world may even be as a result of varied investigation technologies like stellar travel, transportation etc.

Innovativeness of the work

Artificial Intelligence and thus the technology is one side of the life that always interest and surprise us with the new ideas, topics, innovations, productsetc. AI remains not implemented because the films representing it (i.e., intelligent robots), however, there are many important tries to succeed in the extent and

to compete in the market, like sometimes the robots that they show in TV. Nevertheless, the hidden projects and therefore the development in industrial companies.

Keywords: Artificial Intelligence; Robotics; Natural Language Processing.

OVERCOMING CULTURAL CLASHES

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Abstract

Human behavior is diversified. The varied behavior is primarily due to the community we live in.Though every individual is unique, we possess shared values of the family members and the surroundingpeople we live with. Community plays a significant role in shaping our minds.Culture is a people's way of life. It can also be defined as a set of traditions adopted by certain groups of people. We also have to talk about the cultural values, which are salient in a group of people which decideon a community's perception of considering something as ethical. Different people from different parts of the world have different ways of life. An activity carried out by some peoplemay not be considered right by others. The culture of people can remain the same or change with time, especially as people become more civilized. The change can also arise because of a prolonged exposure to different culture. The exposure to these different cultures can result to positive or negative changes. Therefore, when such people with different cultures come together**,** conflicts can arise. This happens especially when the two groups of people differ with respect to a certain activity carried out by either of them.The diversified behavior of certain groups of people serves as the backbone of cultural clashresulting in cases of failed business deals. Strategic alliances such as merger and acquisition strengthen an organization's impact and sustainability until cultural differences emerge as a barrier to successful outcome. Differentcompany leads with varied communal backgrounds when come forth for joint ventures, cultural clash leads to disagreements in effective decision making due to varied perceptions of unalike minds. The best way to avoid this is to analyse the cultural differences by communicating with the employees before the mergerhappens. Most companies fail to identify cultural clash as an important criterion to analyses potential mergers resulting in failed attempts of potential business strategies.Cultural clash can also play cynical role for the negotiators. Varied communities follow different ideologies. Like a community appreciates slower pace with more focus in relationship building and other community supports effectively utilizing the time in the course of negotiations**.** Anegotiator who makes agreement with two different communities should be familiar with their ideologies by communicating with them and device a strategy apt to tackle the situation.The integration of different cultures in one environment leads to disruption of traditions. Contacts between different cultures are also viewed as cultural clashes for they are bound to result in undesirable consequences. Culture clash by definition is a conflict that occurs when people with different cultural values come together. In the time of global village cultural bondages are one of the curses. But when this cultural bondage comes between communications that leads to crisis. Cultural clash is involuntary mistake. From the days of antiquity, it is a great challenge to overcome cultural clash. To overcome cultural differences understanding the characteristics of the culture is crucial.The power distance indexprovides opportunities to know how the leaders are treated, whether on the basis of their social status or their leadership qualities. Dominance of feminine vs masculinecharacters helps to know about the orientation of the cultural ideologies. Analysing the characteristics of different cultures can help the business investors on predicting the cultural values, mindsets and situation dealing abilities of individuals.

Innovativeness of the work

This is a result of the fact that people from different cultural groups approach challenges and problems in different ways. Different cultures think and react differently to the same situations. They get the job done in different ways.By combining those different approaches and mindsets, a culturally diverse team not only expands their skills and knowledge pool, but has the power to think in more abstract terms and find solutions on various levels.Of course, this only works if the team works well together — and that tends to be the tricky part. Cultural differences can lead to barriers between team members, when their different styles of approach are misunderstood, misinterpreted or not accepted.

Keywords: Cultural values; merger; acquisition; negotiators; The power distance index;

PREVENTION OF NOISE POLLUTION

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Abstract

Pollution is a self-made curse for evolution. We already face lots of difficulties in our daily lives due to pollution but we also made it our habit to endure it in spite of what damage they cause to us. Physically and mentally pollution causes lot of damages to us. Among several pollution, noise pollution is one of those which damage silently and prolongedly. Though there is a strict rule for noise controlling all over the world India is one of those countries which use to take back volt. The rate of sound pollution in India slowly and steadily increasing. Horning or miking in school and hospital areas are strictly prohibited but it is often observed that people are making their own rules and regulation to follow. And this sometimes becomes fatal for patent in hospital and students in school. The present work suggests a solution to this problem. We suggest use of sensors and modern technology to control this over levelled sound and create a data base along. Recent days had witnessed a tremendous development in field of sensor technology and with the development of sensors a lot of sensors are available in the market in affordable price. The sensor will sense this sounds and try to alarm or reduce the generate sound as well as will create data base with time and other surrounding details. This may control lot of uncivilized attitudes as well as helpful for silent zone in demand. By using this data base culprit will be punished according to Indian penal code.

This technology will include lots of modern technologies like Machine learning, Artificial Intelligence that even be a real-life application of computer science. Our idea is to making a device which will consists of a CCTV camera, a sensor and a monitor. A CCTV camera and a sensor will be installed in the road side gate of the hospital and schools and where needed. If any vehicle blow horn continuously and the frequency of sound is above 45 db then the camera will zoom in and focus on to the vehicle and through the artificial intelligence we can identify the car owner. After that the owner will get the notification about it through email with penalty amount. If the same person will do the same thing for second and third time, the penalty amount will be 5x and 10x respectively and after 3rd time his/her licence will collapse for a certain period of time with a penalty. Through this device we can control the noise pollution caused by vehicles. We also can use it in roads as well by increasing the sound's frequency a little bit. Its user friendly and involves minimal human being to operate it. In this modern civilisation and increasing population it is very difficult to monitor the rules breaker for whom physical and mental health can be affected, by a traffic police. In this situation this device can help to control this pollution which we easy neglect.

Innovativeness of the work: Noise pollution is increasing day by day and sometimes it is becoming difficult to control noise pollution particularly in the sensitive zones inspite of enforcing several laws and orders. The present work highlights some low cost technology, which can be efficiently utilised to have a

check on noise pollution.

Keyword: Pollution; Involuntary; Prevention; Modern Technologies; Horning

ARTIFICIAL INTELLIGENCE IN THE FIELD OF LITERATURE

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Abstract

Artificial intelligence is the simulation of Human mind (Intelligence) processed by machines basically computer. Specifically, AI system includes expert system, natural language processing system, and speech recognition system and machine vision. Artificial intelligence is mainly categorized into four parts:

1. Reactive machines:- These machines are given a certain task and don't have capabilities beyond those duties. They don't interact to the world as a result they respond to identical situations in the same ways every time those scenarios are encountered.

2. Limited memory: - This kind of technology is already used in some autonomous cars, they observe others cars moving around it, in the present and as time the passes. Collected data gets added to the static data within the AI machine.

3. Theory of mind: -It is a very advance class of technology it can interpret applicants' word and also recognize the people.

4. Self-awareness: -This most advance type of AI involves machines that consciousness and don't only recognize it in humans. It is an extension of the self-aware Artificial intelligence.

Artificial intelligence can be profitable for increased comprehension of reading preferences, introducing/interfacing multi-kind books with the readers, analyzing and foreseeing top-rated books, creating data-driven works, and editing manuscripts with devices like Pro Writing Aid. The study of ancient civilization is concerned with the earliest segments of the much broader subject called ancient history. The span of ancient history began with the invention of writings about 3100 BC and lasted for more than 35 centuries. Humankind existed long before the written word, but writing made the keeping of a historical record possible. So to understand what is written on those ancient script we need to teach the machine for more efficient and precise work. To do so we need to work on image processing.

Image processing is playing a major role in the field of artificial intelligence, where a machine is able to read what is written on a piece of paper, recognize it and converting it into a human readable language. So, if we are able to teach a machine how to understand the writings on the wall of ancient caves and places like pyramids and other ancient civilization. Then we may learn a newer concept about the past of human kind. We may learn something new which was missed by human eyes and brain as a machine works precisely in every aspect as it never gets tired and never need rest. We can work at a greater speed. This is a picture taken of an ancient script inside the Pyramids.

Innovativeness of the work

To understand such scripts, we are planning on a machine which will be able to click pictures, scan and recognize / analyze the picture and later convert it into human understandable language. For that we need to create a software which will be able to process the image.

Keywords: Artificial Intelligence; Image processing; Language acquisition

Proceedings of 4th National Conference on Science, Technology & Communication Skills (NCSTCS2K21)
Date: 24-25 September, 2021 ISBN: 978-93-89817-63-8

ROLE OF TEACHER IN LANGUAGE ACQUISITION

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Abstract

This article is about the role of teacher in language acquisition. This teaching profession is exciting and challenging, teacher act as role model, mentor and advisor.As language acquisition is the process by which Human acquire the capacity to perceive and comprehend language. However according to the analysis and many researchers believe that there is a logical problem at the centre of language acquisition, the input to the learner is too inconsistent and incomplete to determine the acquisition of grammar once a teacher studied their students their learning skills will increases.

There are stages in language acquisition.

Stage 1_ Beginners: - this is the most delicate phase because everything is new it takes time for the brain to use the sounds, pattern, and vocabulary grammatical structure of new language

Stage 2_ Intermediate: - In this stage brain is putting the pieces of languages absorbed through listening and reading.

Stage 3 _ Advance:-In this stage brain is putting the pieces of languages absorbed through listening and reading.

Teaching a language, however, seem more intimidating. You are probably reading this because you are wondering what the qualities of a good language teacher are. Most of the teachers will know that fluency in a language is not enough to be an effective teacher. Teachers are unsung heroes, and like any great hero, they have amazing qualities that influence all of our learning journeys.teachers create the condition for students to manage their own learning process and learn collaboratively. The main goal is to make the student aware of the effectiveness and also help student concisely control how they learn so that they can be efficient, motivated, and independent language learners.

Here I want to highlight some points which makes a good language learning teacher_

1. Competence and patience: - This is especially important in language teaching as many students may enter the course as complete beginners, false beginners, or have little knowledge of the language but lack confidence.The learning doesn't always happen quickly. Give them space and time. Patience in the learning process is one of the greatest qualities of a good teacher.

2. Personalized learning environment: - Every individual learns differently. Changing the classroom environment in a manner to customize learning can be extremely beneficial to students and lead to increased motivation. Connectingthe studentswith the manner of learning – whether it is visual, audio, or even kinesthetic.

Innovativeness of the work

In this research I began with the result that the role of teacher in language acquisition or learning is really very complex and challenging. Learning a new language is always a daunting as well as a challenging task. Many learners don't complete their challenge and many of them submit themselves to the hitches. In the present day the progress in the field of education is due to the development of web assisted language learning. It facilitates the learner with innovative gears for teaching and also help the learners to help to spread the known faster to the world. In this report I have also highlighted some points on good Language learning teacher, every teachers must follow these things.

Keywords: Role of Teacher; Language Acquisition

Proceedings of 4th National Conference on Science, Technology & Communication Skills (NCSTCS2K21)
Date: 24-25 September, 2021 ISBN: 978-93-89817-63-8

VITAMIN–D DEFICIENCY IN CHILDERN DURING COVID PERIOD

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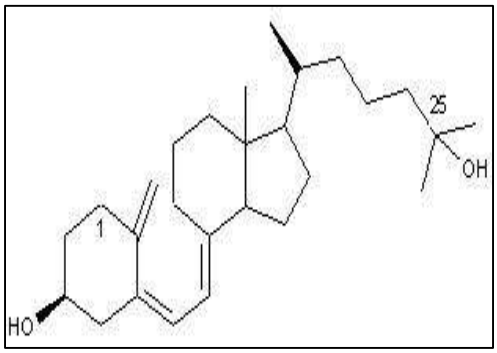
Abstract

Vtamin D deficiency is common in children and this deficiency will be triggered in the COVID period as they are staVitamin D is a fat-soluble vitamin which is mainly produced endogenously when ultraviolet (UV) rays from sunlight strike the skin and trigger vitamin D synthesis. Vitamin D obtained from sun exposure, is biologically inert and must undergo two hydroxylations in the body for activation.

The stucture of Vitamin D is as follows:



Vitamin D is an essential for bone development and growth and as well as optimal health of children. Serious vitamin D deficiency in children can cause rickets, delayed motor development, muscle weakness, aches and pains, and fractures.

For the past two years, a majoriy of world's population especially children has been shuttered inside their homes only stepping out for essential supplies. During the lockdown and the COVID period children long at home created not only a lot of psychological issues but also health problems as well. Although this has reduced the chances of children of being exposed to COVID-19, it had an obvious effect on their immune system by leaving them more prone to other infections.

The present work focuses on the possible long term heath issues which may affect the children. And also suggest a remedy to control the situation. A recent study showed that patients with COVID-19 had significantly lower vitamin D levels 13.14 μg/L (4.19-69.28) than did the controls 34.81 (3.8-77.42) μg/L ($p < .001$). Another study conducted mostly on mild to moderate COVID 19 (1 to 18 years) pediatric patients showed that the proportion of patients with vitamin D deficiency was significantly higher in the COVID-19 group than the control group (44% *vs.* 17.5%, $P < 0.001$). Patients with low vitamin D levels were older than the patients with normal vitamin D levels (11.6 ± 4.9 *vs.* 6.2 ± 1.8. Vitamin D deficiency is common in COVID 19 affected paediatric patients but also will effects the non COVID children due to long term non exposure to sunlight. Though the immediate effect is not visible in these children but their Vitamin D deficiency will act as a silent killer and will affect their bones in future. Thus with low vitamin D they may suffer from muscle pain. Very low vitamin D can also lead to soft bones resulting in fractured bones.

Hence, to overcome this situation the present work suggests various solutions so that children gets sufficient amount of Vitamin D.

Children at these time should follow a few

(i) Daily 20-30minutes exposure to sunlight is important for triggering cells for vitamin D synthesis'
(ii) Parents should take their children for a run/jog in the morning, they should keep the windows and doors open in the morning for sufficient sunlight to enter.
(iii) By bringing changes in their diet like providing them vitamin D rich products like cow milk, boiled eggs, fish, yogurt, cereals, and fruits on regular basis.
(iv) Also in addition to this green vegetables and Red meat thrice a week.

Innovativeness of the work

Present study provides an insight into the relationship between vitamin D deficiency and non COVID children staying indoor for a period of around two years and their possible muscular and bones problem and the precautionary measures every child should take to have a better health during the post COVID era.

Keywords: Ultraviolet Rays; Immune system; Trigerring cells; Diet.

NEW TECHNOLOGY FOR CYBER-SECURITY

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Abstract

The Internet is drawing the world ever closer together. Increased connectivity has blessed humanity with unimaginable opportunity, but has come with a price. We have created the Internet, a place where people share ideas, meet others from distant lands, and conduct business just as they do offline. At the same time, we have become vulnerable to nebulous dangers that threaten to take a severe toll on society. Well-organized cyber-attacks and cyber terrorism are two of the most striking examples, posing persistent threats to virtual and physical targets globally. Cybersecurity can be broadly categorized as responsive or preventive. Incident response requires culling threat and attack information from diverse sources as quickly as possible. Complex monitoring systems collect vast amounts of information that requires analysis and sharing. Only after analysing information can technicians respond to cyber-attacks quickly and effectively. The results of data collation and evaluation of threat information should be widely shared through an open, distributed system to proliferate knowledge regarding possible attacks and threat vectors. To maintain trust in a society, governments must take measures that, to the extent possible, ensure security relative to the risk factors are inherent to IT. Automation has become an integral component to keep companies protected from the growing number and sophistication of cyberthreats. Using artificial intelligence (AI) and machine learning in areas with high-volume data streams can help improve cybersecurity in three main categories:

- **Threat detection:** AI platforms can analyse data and recognize known threats, as well as predict novel threats.
- **Threat response:** AI platforms also create and automatically enact security protections.
- **Human augmentation:** Security pros are often overloaded with alerts and repetitive tasks. AI can help eliminate alert fatigue by automatically triaging low-risk alarms and automating big data analysis and other repetitive tasks, freeing humans for more sophisticated tasks.

Vendors in the cybersecurity field typically offer a variety of security products and services. Common security tools and systems include Identity and access management (IAM), Firewalls, Endpoint protection, Antimalware, Intrusion prevention/detection systems (IPS/IDS), Data loss prevention (DLP) etc.

Well-known cyber security vendors include Check Point, Cisco, Code42, Crowd Strike, Fire Eye, Fortinet, IBM, Imperva, KnowBe4, McAfee, Microsoft, Palo Alto Networks, Rapid7, Splunk, Symantec, Trend Micro and Trustwave.

The deployment of 5G has begun, it will enable large-scale connections, capabilities, and services that can pave the way for smart cities, remote surgery, autonomous vehicles, and other emergent technologies. However, these capabilities also make 5G networks an attractive target for criminals and foreign adversaries to exploit for valuable information and intelligence and even global disruption. To secure the full scope of 5G use cases, it is critical that strong cyber security practices are incorporated within the design and development of 5G technology. In March 2020, the White House developed the *National Strategy to Secure 5G*, which outlines how the Nation will safeguard 5G infrastructure domestically and abroad. The Department of Homeland Security's Cyber security and Infrastructure Security Agency

(CISA), the National Security Agency, and the Office of the Director of National Intelligence, as part of the Enduring Security Framework (ESF)—a cross-sector, public-private working group—initiated an assessment of the cyber security and vulnerabilities to 5G infrastructure. Artificial Intelligence security tools are trained through data systems. For this, cyber security firms need to collect large amounts of data related to malware codes, malicious and non-malicious codes and abnormalities.

Innovativeness of the work

In our research we came to know that Machine learning is still a comparatively new addition to the field of cyber security. The only thing to keep in mind is that machine learning algorithms should minimize their false positives i.e. actions that they identify as malicious or part of a cyber attack but that are not. Companies need to ensure that they consult with their cyber security specialists who can provide the best solutions in identifying and handling new and different types of cyber attacks with even more precision using machine learning.

Keywords: Artificial Intelligence; Machine Learning; Internet; Cybersecurity; Cyberattacks.

HUMAN FACE RECOGNIZITION USING ANN

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Abstract

A conventional computer or a supercomputer can do exactly what we want it to do, very quickly. Unfortunately, it can't help us when it doesn't understand our problems properly. That's why we need (ANN), a computing system that can learn on it's own.

The idea of neural networks began unsurprisingly as a model of how neurons in the brain function works. In early 1949, proposing that neurons can act as fire at the same time from the very beginning where the long journey happened towards the complex process of the human brain. The first artificial neural network was invented in 1958, called perception. It was represented by an object of how the human brain processes visual data and learns to recognize objects. In today's computer science field artificial neural networks are used to solve the problem of pattern reorganization, prediction, optimization and control.

In the past 10 years, the best performing artificial-intelligence systems - such as face recognizers which are used in smart phones, laptops. Human face reorganization is one of biometric methods to identify the face. In this paper we delimitate an experiment to the face reorganization problem by ANN. In the step of face reorganization, we show it works into two pathways namely image shaving faces and images that do not have faces. Firstly detect the required images into the input layer. It refers to all the transformations on the raw data before it is fed to the machine learning or deep learning algorithm in the hidden layer part. Hidden layer works the computation part on that image by PCA (Principal Component Analysis) algorithm. At first partitioning face images into sub-pattern, then compute the expected contribution of each sub-pattern, lastly classification, when an unknown face image comes in sub-pattern and it's identity to all sub-patterns to the final classification result. And then prepares it to pass in the output layer by forward propagation. The classifier of the object significantly improves the accuracy and the robustness of local searching on faces with expression variation and ambiguous contours.

Innovativeness of the work

Humans can detect facial expressions of any person easier, because it's naturally directly recognized, but it's very difficult to do by machine or computer. There are 3 main stages when designing a facial expression recognition system, that is, face detection (recognizes faces), and extraction of the facial

expression information (feature extraction which is separate parts of the face that has information about facial expressions) and the last is the classification of the expression. This research facial expression, especially for smile and not smile expression, recognition using Artificial Neural Network algorithm with Back Propagation models and optimization using Principal Component Analysis. The accuracy of the results obtained to predict the smile image is equal to 81.67%, while the accuracy for predicting not smile image is 61.67%.

Keywords: ANN; Perception; AI System; Face Reorganization.

A DETAILED STUDY ON MACHINE LEARNING

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Abstract

Machine Learning is defined as an application of artificial intelligence where available information is used through algorithms to process or assist the processing of statistical data. Machine Learning involves concepts of automation, it requires human guidance. Machine learning is a relatively within Computer Science that provides a collection of data analysis techniques. Some of these techniques are based on well established statistical methods while many others or not. For e.g. logistic regression and principal component analysis. Machine learning might be able to provide a broader class of more flexible alternative analysis methods better suited to modern sources of data.

There are mainly two classes of machine learning techniques: supervised machine learning and unsupervised machine learning.

Example of supervised learning

Logistic regression (statistics) vs Support vector machines (machine learning): Logistic regression, when used for prediction purposes, is an example of supervised machine learning. In logistic regression, the values of a binary response variable (with values0 or 1, say) as well as a number of predictor variables (covariates) are observed for a number of observation units. These are called training data in machine learning terminology. The main hypotheses are that the response variable follows a Bernoulli distribution (a class of probabilistic models), and the link between the response and predictor variables is the relation that the logarithm of the posterior odds of the response is a linear function of the predictors. The response variables of the units are assumed to be independent of each other, and the method of maximum likelihood is applied to their joint probability distribution to find the optimal values for the coefficients (these parameterise the aforementioned joint distribution)in this linear function. The particular model with these optimal coefficient values is called the "fitted model," and can be used to "predict" the value of the response variable for a new unit(or, "classify" the new unit as 0 or 1) for which only the predictor values are known. Support Vector Machines (SVM) are an example of a non-statistical supervised machine learning technique; it has the same goal as the logistic regression classifier just described: Given training data, find the best-fitting SVM model, and then use the fitted SVM model to classify new units. The difference is that the underlying models for SVM are the collection of hyper planes in the space of the predictor variables. The optimization problem that needs to be solved is finding the hyper plane that best separates, in the predictor space, the units with response value 0 from those with response value 1. The logistic regression optimization problem comes from probability theory whereas that of SVM comes from geometry. Other supervised machine learning techniques mentioned later in this briefing include decision trees, neural networks, and Bayesian networks.

Examples of unsupervised learning

Principal component analysis (statistics) vs Cluster analysis (machine learning): The main example of an unsupervised machine learning technique that comes from classical statistics is principal component analysis, which seeks to "summarize" a set of data points in high-dimensional space by finding orthogonal one-dimensional subspaces along which most of the variation in the data points is captured. The term "unsupervised" simply refers to the fact that there is no longer a response variable in the current setting.
Cluster analysis and association analysis are examples of non-statistical unsupervised machine learning techniques. The former seeks to determine inherent grouping structure in given data, whereas the latter seeks to determine co-occurrence patterns of items.

Innovativeness of the work

Although a critical part of the economy, the healthcare industry still operates on top of an inefficient legacy infrastructure. A major point of concern is finding ways to preserve sensitive patient details while still optimizing the system. Luckily, we can apply innovative machine learning algorithms (that operate without humans) to process large sets of healthcare data without breaching confidentiality contracts. Furthermore, we can use these models to better analyze and understand diagnoses, risk factors and coefficients of causation.

Keywords: Machine Learning; Supervised machine learning; Unsupervised machine learning.

ROLE OF NON VERBAL COMMUNICATION IN CORPORATE COMMUNICATION

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Abstract

The huge part of the manner that we use to communicate with each other is non-verbal communication. Nonverbal communication including communication using hand gestures, eye contact etc. can be one of the strongest forms of communication between coworkers. It can be used to express thoughts, concern and so on in many workplace situations including during meetings as well as interviews or casual conversations.as examples of nonverbal communication, we can speak of coordination among coworkers. They would often feel valued just with getting some attention from their fellow, like eye contacts while talking or nodding. Using a positive tone while talking to someone always carries a good vibe too, that may be in real or virtual as well. Keeping eyes on the speaker rather than anything else such as computer can spark an enthusiasm for sure.

There are so many ways to have a better communication like personal appearance, maintaining a good posture, expressing kindness, proper facial expressions and many more. Talking of personal appearance, its nothing but a smooth balance between you and your objective. Looking neat and prepare, maintaining a tidy workstation, having a proper attire not only make things good but also convey your self-confidence. Maintaining a good postureis about the of your sitting or standing as well. It displays your attitude or attentiveness towards certain situations. Having a professional appearance through appropriate touch is also a way of expressing kindnessbut you always need to know the optimum. A same touch carries different reflexes in different places. But after all an appropriate touch always shows your support or encouragement nonverbally. Another important thing to be remembered is facial expressions. We have all heard that face is considered as the mirror of our mind whether its real or virtual. So, we need to have a proper facial reflex like smiling, nodding or using eyebrows to indicate our mindset. That really encourages the speaker. While

telling you need to repent others personal spaceeven if it's a one-to-one conversation. To show your interest to know someone's story you can get up and seat near to them but remember to respect that space. Another point, and literally an important one, is using hand gestures while expressing a feeling. It not only makes you confident but also make the listeners more attentive towards what you are saying as well as carries a good vibe. And, for now, the concluding one is the body language. The overall body language can showcase the feelings during an interaction. Everything, your way of speaking, your facial expressions, your hands as well as feet are included in this, through your body language you can easily show your interest or disinterest to something. Nonverbal communication is really a important thing. It helps to understand the emotions or attitude of your mates while doing a work together as well as encourages collaboration which may boost productivity and strengthen the cultural competence. It also helps to convey our own feelings to, just having a good nonverbal communication really can be a good solution of many miscommunications.

Innovativeness of the work

In this paper we have put together the actual role of nonverbal communication n different corporate sector, how body language, facial expression and hand gestures express our feelings, emotion and mental state. We have also put the way of nonverbal communication in this pandemic situation with maintaining social distance and finally by using nonverbal communication how we can overcome different type of matters or situation**.**

Keywords: Communication; Collaboration; Coordination.

CROSS-CULTURAL COMMUNICATION: A STUDY ON ETHNOCENTRISM

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Abstract

Culture isan assemblage of many written and unwritten principles, values and beliefs that bind a group of people together, and guide them to interact with the outside world. The culture in which individuals socialize, influence the way they communicate and the way they communicate, can in turn, change the culture. Since the dawn of civilization, communication has been an integral part of culture and communication patterns have effectively changed with the progress of culture. But in a world where "Unity in Diversity" is the precept, these assumptions can often be construed as a predicament to thecurrent socio-economic framework.

As each culture has its own set of values, often quite divergent from those held in other cultures, the concept of proper and improper, foolish and wise, and even right and wrong become blurred? This is where ethnocentrism becomes precisely deceptive for an individual's logical behavior and subtly goes unrecognized. The concept of ethnocentrism not only affects the bigoted, but due to misunderstanding of elements in cross-cultural communication, might affect even the enlightened.

People belonging to a particular culture are united by religion, geography, race or ethnicity and that is what makes them believe they are different and, in some cases, superior. When two individuals of different cultures interact, they are differentiated by their style of working, age, sexual orientation, race, nationality, ethnicity and a number of other factors which only contributes to a mismatch between them. Therefore, at its core, effective cross-cultural communication would involve understanding the ways in which culturally distinct individuals communicate with each other. Its purpose is to produce some guidelines with which people from different cultures can better communicate, thereby establishing a bond with each other.In this scenario, cross-cultural communication gets adversely affected due to an individual's cultural identity,

racial identity, ethnic identity, gender roles, social class, etc. thereby causing conflict or generalized hatred. With increasing globalization and international trade, it has become customary for different cultures to meet, conflict, resolve and ultimately blend together. When the languages are different and translation has to be used to communicate, the potential for misunderstandings increase. Incidentally, the effect brought by cultural differences override the language gap which in turn contributes to one of the biggest challenges for cross-culture communication.

A variety of academic disciplines influence cross cultural communication. To reduce the previously cited barriers, one can take an effort to develop one's listening skills. It tries to create a feeling of trust and enables cooperation. The optimum focus has to be on providing the right response rather than providing the right message. Becoming aware of our perceptiontowards others will ensure that we take steps to not prejudge a person or stereotype them. This can only be achieved by accepting people and their differences and also acknowledging our own.

Culture and communication reciprocally influence each other. While 'culture' is the structure, 'communication' becomes the process. And this worldview, would essentially have to pertain humanity as its brainchild, rather than preferentially segregated norms. Hence, the cross-cultural communication evidently becomes a concept to be apprehended for global relations to smoothen while culture plays the most striking role in it.

Innovativeness of the work

Cross-cultural communication has emerged today as one of the most essential interpersonal skills for any aspect of life, be it business, be it personal. This paper dwells into the concept of ethnocentrism at its core and the unrecognition of the same, even in the enlightened part of the society.

Keywords: Cross-cultural Communication; Ethnocentrism; Globalization.

WAS 2020-LOCKDOWN A BOON FOR THE REDUCTION OF CARBON EMISSION OR WAS IT JUST A MYTH

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Abstract

This paper basically intensifies the knowledge on reduction of carbon emission in the environment over the year 2020. The entire data of carbon emission has been examined over the year 2020 and a detailed analytical flowchart was made which portrayed the various mediums and their percentage of carbon emission. Hypothetically, COVID-19 Pandemic is considered to be one of the main reasons for reduction of carbon emission in the environment by the people. Well, it might just be a "myth. If we look deeper into it, we can see the dominance of carbon everywhere. Basically Carbon is an abundant element on our earth. When we are talking about carbon emissions, naturally we focus on carbon dioxide. This carbon dioxide is released in the air in many ways. If we analyze a little deeper, it will be seen that the level of carbon emission has been high in the last few years but relatively less carbon emissions in 2020. However, even if this carbon emissions seem to be low, if we look at this paper, we can see that carbon emissions have increased considerably.

Due to the 2020-lockdown there was less emission of carbon in the air from the vehicles and the industries. Well, we have referred to various graphs and images to examine the amount of carbon emission throughout the year 2020 from different sources. It can be stated that carbon emission might have reduced in the year 2020 over a period of one week but again it was increased because of the emission of carbon compounds

like Chlorofluorocarbons leading to an increase in the global warming. It is known that refrigerators emit Chlorofluorocarbons (CFCs) which are harmful for the environment. Since the hospitals and nursing homes were very active for the Covid-19 situation last year, we can say that the carbon emission was low but to a large extent. We can apparently say that, due to the lockdown, there was less emission of carbon in the atmosphere from the vehicles and the industries. But almost everyone is now using their own vehicle without using public transport, for this more carbon is being released like a second thorn. Many people state that this reduction of carbon emission in the air due to the reappearing of small species like sparrows which was disappearing from the environment as they could not resist the harmful carbon compounds present in the environment. So, the basic study is on the fact that carbon emission might have reduced due to the vehicles but on the other hand it has increased due to the emission of the greenhouse gases like chlorofluorocarbons. The effect of carbon emission in the environment leads to various health issues. Actually, we can say loudly that even carbon levels have apparently seemed to be low but are slowly moving to a more dangerous level because carbon emitted from various economic resources is also leading to global warming as it is raising temperatures.

Innovativeness of the Work

COVID-19 vaccines are refrigerated at 2-5 degrees over a month, resulting in hole expansion in ozone layers allowing larger amount of ultraviolet radiation to penetrate the earth surface. In hospitals, the functional areas of the wards release the highest energy (approximately 52% above the average) compared to other functional areas.

Keywords: COVID-19; Greenhouse gases; CO_2; Refrigerants.

ENGLISH: AN INDISPENSABLE LANGUAGE FOR SCIENTIFIC RESEARCH WORK

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Abstract

The use of English as an international language of science is by now accepted and presented. English is seen as a neutral language accepted by mass working as a bridge between different native languages. It is a fact that English is the de facto global language of science and is not likely to change anytime soon. The adoption of English as the universal language of science and its research, has an extraordinary effect on scientific communication. Just by learning a single language, scientists around the world gain access to the galore of scientific literature and can communicate with other scientists anywhere in the globe.

Often, there is a back-and-forth argument on whether the English Language is indispensable for our scientific development and Scientific Research. Being an Indian, we are not native English-speaking countries by real terms of language. It's a fact that our sense is found in our thoughts and not in our language but our thoughts need a gateway, to communicate with others and to carry out a teamwork, here comes the need of a language and English being the language of the world, it has become indispensable to expertise the English language to carry out our scientific research. It has been inferred that 50% of the problems of Science and Scientists rest on communication. A lot of Scientists around the world have brilliant ideas that can change the world in many ways, but for the change to come about, they have to communicate effectively in the language acceptable to Science.

Scientists could have their papers rejected for publication in journals if they couldn't communicate their brilliant ideas effectively, while some could have their papers accepted even though they may not have presented too-impressive ideas but in admisable language. In order to have our work published in the top journals of the world, our language is as important as our ideas. A good language command is the ability to

tell a good story in plain language, while being clear, simple and concise. Besides command over the originality of work, expertise and command over the international languages are equally important too.
It is important to note that the dominance of the English language in scientific communication must not imply that people throughout the world should not develop their ideas in their own languages but to have access to the vast body of scientific knowledge or to contribute to it, the language of communication which is English, is very important and crucial. It has been observed that students before enrolling in the M.Tech (CSE) course may find themselves bolt from the blue while writing a literature on Scientific Research. After studying the course paper 'English for Research Paper Writing ' it has become easier for them to give a shape to their ideas and help them to publish a write up in any journal.

Innovativeness of the work

After an extensive case study on a group of students of Narula Institute of Technology for a month it has been observed that students were at mess while attempting to publish their research work in an esteemed E-journal of science and technology but fortunately the able guidance of the professors has paved the way to learn the innovative techniques to publish their novel ideas and works specially during the time of on-going pandemic when reaching out to people physically, was getting impossible. E-publication of the research work has become the only measure to cater the demand of the time. They have learnt to make Youtube videos and blogs based on their scientific research and ideas. Students have been benefited to a great extent with the enhancement of innovative techniques like E-learning and E-books and this has struck the idea of E-publication. Here an example can be cited of the E-publication of an article named, 'A LITERARY REVIEW ON BIG DATA AND HADOOP ‘by the students of M.tech (CSE) course. The course paper 'English for Research Paper Writing ' has enabled them to frame and cater their ideas in English, the most communicable language and they finally published their work successfully.

Keywords: English; Indispensable; Language; Science; Research.

STUDYING ENGLISH FACILITATES EMPLOYMENT: A BRIEF ANALYSIS ON COMMUNICATION SKILLS

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Abstract

English is a global language. People from different countries, regions, and cultures can interact and communicate with each other. This common language has helped individuals to share their ideas, thoughts, and information. As there is no language barrier now, people can pursue different career options from abroad. English is in different accents like Indian, American, British, Canadian, Scottish, etc. Though British English is considered the standard one, the influence of American English has changed the scenario. The English language has become a bridge language for many multinational companies and businesses. So, communication in English has gained popularity and importance in India as well. We need this language in different aspects of life. Nowadays, conversing in English has become a key feature for students seeking jobs in private sectors or corporate areas. It has become one of the basic requirements to be employable in the IT sector. Employers and recruiters seek graduates with adequate communication skills and technical expertise. Many students are technically sound having sufficient domain knowledge. But, due to poor communication skills, they fail to crack the interviews. So, to overcome this issue to some extent, an experiment was conducted among the B.Tech. 2nd-year students to find out the productive way of learning English communication skills. Randomly 40 students from different departments were selected. We took a

test on English communication skills. After that, an equal division of two groups, Group A and Group B, was formed. We asked Group A to study through conventional methods. It may include reading daily newspapers, taking personal training classes, watching the news, referring to spoken tutorial programs, etc. We asked Group B to study through creative approaches like listening to songs, watching movies, reading storybooks, diary writing, etc. We gave each group 2 weeks to complete their task. Then they were asked to arrive for another test. As a result, Group B secured better marks than Group A. It is because students showed less interest in conventional methods. But the creative approaches were appealing and enjoyable to them. It enhanced both verbal and non-verbal communication.

Moreover, among different creative approaches, maximum students preferred to opt for watching movies. They started by watching animation movies with subtitles and then gradually moved to watch other movies from various genres of their choice. But, in this case, the listening ability is less prioritized due to the presence of subtitles. So, to make it more effective, we asked the students to watch movies with subtitles by delaying them for 1.5-2 seconds. It helped them to improve their reading as well as listening capabilities. Their vocabulary and written communication upgraded automatically. Moreover, the narration of movies benefited them to develop fluent speaking quality leading to better pronunciation. This new approach with a modern twist has created excitement and fascination among the students.

Professionals with proper English communication skills have a high standard level in their respective companies or organization. For that, one needs no mastery of the English Language. They require candidates who can speak properly, listen attentively, and understand effectively; to deliver their thoughts and views in respective forms. Therefore, many multinational companies conduct various training and induction programs for the freshers to nourish and develop their communication skills. It helps build a strong relationship and better understanding among fellow-mates, clients, and colleagues and hence creates a valuable asset for any organization. It also helps them to achieve a progressive career by sustaining in the workplace for a longer duration.

Innovativeness of the work

We surveyed a few B.Tech. 2nd-year students and divided them into two groups. Group A studied through conventional methods. Group B watched English movies with delayed subtitles. After conducting a test, Group B advanced their communication skills efficiently than Group A. Hence, practical ideas proved to have more influence and long-term impact than the standard ones.

Keywords: EnglishCommunication Skills; Conventional methods; Creative approaches; Professionals; Multinational companies.

DEVELOPMENT OF ROBOT NAVIGATION BASED ON GESTURE RECOGNITION

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Abstract

The rapid development in robotic systems is becoming the most advanced field of technology. Demand lying mainly in areas where direct human interaction is not possible, or is a challenge, a constant need for more efficient, accessible, reliable and more accurate robotic operations has developed during the past decades. Gesture recognition has the ability to recognize and interpret movements in order to interact with a robotic system both physically and virtually. It is an active research field which tries to integrate the gestural channel in human-computer interactions. Various ways and algorithms have been proposed and being implemented for robots to better interpretate human body language. It can be a great tool to increase

usability and reduce any necessary resources for either primary or secondary input systems.
Wireless controlled robot operations are very essential in many fields such as remote surveillance, military, medical, manufacturing, exploration, entertainment, automobile, etc. Wireless gesture control also made development in kind of robots in medical sector for various purposes, like by physically challenged people in wheel chairs. Gesture recognition can also be used to immerse players in the virtual world. Recognition of human gestures comes within the more general framework of pattern recognition, consisting of two processes: the representation process converts the raw numerical data into a form adapted to the decision process which then classifies the data. Here one only needs to move their hands or palms to operate the robot. A transmitting device is placed in the user's hand, containing transmitter and an accelerometer to transmit a command to the robot so that it can perform the required task. Accelerometer are an ideal tool for tracking gestures and movements which can be helpful to navigate robots in their fields of operation. Accelerometer with specific set of mathematical algorithms is a solution to communicate between the physical and virtual world implemented through gestures. Modern devices like smart phones are already equipped with in-built accelerometers. In this paper we proposed a framework to implement a smartphone based wireless gesture-controlled robot via in-built accelerometers. The idea is cheap to provide, easy to implement and the result will be more intuitive.

Innovativeness of the work

Today Human computer interaction is an emerging area in artificial intelligence. Here target device is controlled by speech or gesture information. So artificial navigation is used here to control the action of target device without help of a remote control device. This paper proposed an algorithm for robot navigation by gesture recognition. This technology can be used not only in the area of robot or vehicle navigation in the industrial site, but also it is most useful for physically disabled person.

Keywords: Gesture Control; Robotic; Accelerometer; Algorithms; Wireless Module.

NANOTECHNOLOGY: THE TECHNOLOGY THAT CAN BRING REVOLUTION

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Abstract

Nanotechnology is the study of manipulating matter on an atomic scale.Nanotechnology refers to the constructing and engineering of the functional systems at very micro level or we can say at atomic level.A Nanometer is one billionth of a meter, roughly the width of three or four atoms. The average human hair is about 25,000 nanometers wide. Nanotechnology has gone a long way since it's concept was first presented in 1959 by Dr. Richard P.Feynman. But invention of the scanning tunneling microscope in 1981 and the discovery of fullerene (C60) in 1985 actually lead to the emergence of nanotechnology.The term "Nano-technology" had been coined by Norio Taniguchi in 1974. The beginnings of actual commercial applications of nanotechnology was seen in the early 2000s although those were limited to bulks applications of nanotechnology like Silver nano platform for using silver- nanoparticles as an antibacterialagent nanoparticle-based transparent sunscreens, and carbon nanotubes for stain-resistant textiles. Advanced Researches and applications were seen from 2010.
There are several tools used in nanotechnology like Atomic Force Microscope (AFM), Scanning Tunneling Microscope (STM), also various techniques of Nanolithography (optical lithography, X-Ray lithography, Dip pen nanolithography, Electron beam lithography).
Some great inventions using the nanotechnology are,

Carbon Nanotube (CNT): Carbon nanotubes are allotropes of carbon with a cylindrical nanostructure.They have length-to-diameter ratio of upto 132,000,000:1.Nanotubes are members of the fullerene structural family. Their name is derived from their long, hollow structure with the walls formed by one-atom- thick sheets of carbon, called graphene.The properties of these are highest strength to weight ratio, helps in creating light weight spacecrafts, Easily penetrate membranes such as cell walls,Electrical resistance changes significantly when other molecules attach themselves to the carbon atoms. CNT are used in Easton-Bell Sports, making bicycle component, racing bikes, manufacturing of light weight boats, as These are 200 times stronger and 5 times more elastic (i.e. less brittle) than steel with about half the density of aluminum. These impressive properties of CNTs can all be credited to the very particular nanoscale arrangement of carbon atoms in the material and are good reasons for using them in a bike frame. Now-a-days CNTs are replacing transistors from the silicon chips as they are small and emits less heat. These are also used in electric cables and wires, in solar cells and in fabrics.

Nanorods (Quantum Dots): Nanorods are one morphology of nanoscale objects havingdimensions ranging from 1–100 nm.They may be synthesized from metals or semiconducting materials.A combination of ligands act as shape control agents and bond to different facets of the nanorod with different strengths. This allows different faces of the nanorod to grow at different rates, producing an elongated object. Quantum dots are normally used in display technologies, because the reflectivity of the rods can be changed by changing their orientation with an applied electric field, they are also used in microelectromechanical systems (MEMS) and in cancer therapeutics.

Nanobots: It is close to the scale of 10^{-9}. It is largely used in R&D phase. Since nanorobots are microscopic in size, it would they are probably used to perform microscopic and macroscopic taskswhile a very large numbers of them to work together. These will be capable of replication using environmental resources. Nanobots are used for the detection of toxic components in environment, in drug delivery, in biomedical instruments.

There are two types of approaches in nanotechnology,

1. Bottom up: In the bottom up approach different types of materials and and devices are constructed from the molecular component of their own. They chemically assemble themselves by recognizing the molecules of their own breed. Examples of molecular self assembly are Watson crick base pairing, nano-lithoghraphy.

2. Top down: In top down approach nano-objects and materials are created by larger entities without bouncing its atomic reactions usually top down approach is practiced less as compared to the bottom up approach.Solid-state techniques can also be used to create devices known as Nanoelectromechanical Systems or NEMS, which are related to microelectromechanical systems (MEMS).

The overall fields in which nanotechnology is being used is pretty vast. Nanotechnology is being used in drug delivery and delivery for delivering precisely the drugs to the right location in the body, in fabrics to make them spill and dirt resistant, it is also used in manufacturing of bullet proof jackets, it is also being used in mobile manufacturing like MORPH,a nanotechnology concept device developed by Nokia Research Center (NRC) and the University of Cambridge (UK),it will be super hydrophobic and it will charge itself from available light sources using photovoltaic nanowire grass covering it's surface, Nanotechnology is also being used in fabrication of electronic chips, also in manufacturing of nanowire transistors, nanonanotubes are being used in computer chips to make them faster and smaller,

Nanotechnology is also being used now in India, IIT Mumbai is the premier organization in the field of nanotechnology.Starting in 2001 the Government of India launched the Nano Science and Technology Initiative (NSTI). Then in 2007 the Nanoscience and Technology Mission 2007 was initiated with an allocation of Rupees 1000 crores for a period of five years.

Possibilities of nanotechnology is far from our thinking.In future it can be used to make lighter spaceships, aircraft and other vehicles. The future of nanotechnology could very well include the use of nanorobotics. These nanorobots have the potential to take on human tasks as well as tasks that humans could never

complete. The rebuilding of the depleted ozone layer could potentially be able to be performeperformed. In future it will bring revolution to medical science with the concept of nanosurgery. But we should be aware of its pitfalls like nano-cells can damage our skin, lungs and digestion systems which can cause cell damage. One of the most dangerous uses of it can be the the invention of Nano-bomb which can contain self multiplying deadly viruses to wipe out a community, also nanobots for their replicating property can be big threat for GRAY GOO.

Innovativeness of the work

During the year 2000-2002 Nanoparticles, nanotubes, quantum dots, nano-coating technologies have been developed. During 2003-2005 Self- and guided molecular assembling Expands nano-biotechnology and medicine have been discovered. From 2006-2008 focus has been given on nanodevices and developing components of nanosystems. From the year 2008 stresses are given to develop a system of nanotechnology from its components. It is a challenge for the new generation to understand the mechanisms and patterns of system behavior as a function of components, interaction forces and networks at the nanoscale considering the systems with large number of nanocomponents and non-linear interactions .Also it is a challenge to develop tools for measuring, simulation and manufacturing of bio/engineering nanosystems. Young researchers are trying to development of a new framework for risk assessment to address emerging functions of nanosystems with potential use in consumer products, medical treatments, food industry andother areas. Nano radio, Graphene to build electronic systems, Informatics for nanosystem design, Nanolayers for energy conversion, Water filtration using nano membranes are the gifts of modern nanotechnology. Although it has pitfalls, for the extensive amount of applications we must conclude that Nanotechnology is the technology of future that can bring revolution in our lives.

Keywords: Carbon Nanotube; Nanorods; Nanobots; Bottom up approach; Top down approach.

THE EFFECTS OF ZIKA VIRUS

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Abstract

ZIKA VIRUS was first found in the monkeys of Uganda Forest in 1947, and infection cases of Zika virus were first reported in 1952 in the United Republic of Tanzania and Uganda [1]. Between 1969 and 1983, there were few more human infections with the Zika virus in India, Pakistan, and Africa. First, in 2007, a large outbreak is happened in the Yap Islands and the Federated States of Micronesia, then in 2013-2015 in the Pacific Ocean, France Polynesia, Brazil etc. the severe outbreak of the virus was reported [2]. Now, in 2021 many Zika Virus cases has been reported also in Kerala, India. Afterwards, 86 countries were affected by this ZikaVirus [1]. Maternal-fetal transmission of the Zika virus has been reported, and evidence suggests that congenital Zika virus infection is associated with adverse pregnancy and infant outcomes [3]. Symptoms of this disease are Fever, rash, conjunctivitis, joint pain, and headache. From the official report of the World Health Organization (WHO), during pregnancy this viral infection can cause a new born baby with microcephaly (abnormal development of the brain) and other congenital malformations, which is called congenital Zika syndrome. As a result of this disease, few more complications of pregnancy may happen also like premature birth, miscarriage etc [1]. Zika virus is transmitted primarily by Aedesaegypti and Aedesalbopictus. Besides that, during pregnancy this virus can be transmitted from mother to baby through the umbilical cord, and also spread through blood transfusions and sexual intercourse, that cause effect many neurologic complications including Guillain–Barre

syndrome, neuropathy in children and adult also.
Predator–prey dynamics mostly described by Lotka–Volterra model which is composed of ordinary differential equations (ODEs).Holling (1959) mostly considered three types of functional response. We specially used here Type IV functional response, so, in type IV the proportion of prey consumed declines monotonically with prey density. In type IV, consumption rate shows a curvilinear increase. Type IV is the most frequently observed type of functional response [4].
Keywords: Zika; Pregnancy; Neuropathy; Conjunctivitis.

Equilibria and Stability Analysis: There are eight equilibrium points of the system of equations,

(i)The trivial equilibrium point $E_0(0, 0, 0, 0)$, always exists

(ii)The axial equilibrium point $E_1(\frac{\alpha_1}{d_1}, 0, 0, 0)$, always exists

(iii)The axial equilibrium point $E_2(0, 0, \frac{\alpha_2}{d_2}, 0)$, always exists

(iv)The planer equilibrium point $E_3(S^3_h, I^3_h, 0, 0)$; exists if $\beta_1 > (d_1 + \frac{d_1^2 a}{\alpha_1})$, where, $S^3_h = \frac{ad_1}{\beta_1 - d_1}$ and $I^3_h = \frac{\alpha_1(\beta_1 - d_1) - d_1^2 a}{d_1(\beta_1 - d_1)}$.

(v)The disease free equilibrium point $E_4(\frac{\alpha_1}{d_1}, 0, \frac{\alpha_2}{d_2}, 0)$, always exists

(vi)The planer equilibrium point $E_5(S^5_h, I^5_h, S^5_m, 0)$; exists if $\beta_1 > (d_1 + \frac{d_1^2 a}{\alpha_1})$, where, $S^5_h = \frac{ad_1}{\beta_1 - d_1}$, $I^5_h = \frac{\alpha_1(\beta_1 - d_1) - d_1^2 a}{d_1(\beta_1 - d_1)}$ and $S^5_m = \frac{\alpha_2 d_1(\beta_1 - d_1)}{\mu\alpha_1(\beta_1 - d_1) - d_1^2 a + d_1 d_2(\beta_1 - d_1)}$

(vii)The planer equilibrium point $E_6(S_h^6, I_h^6, 0, I_m^6)$, where, $S_h^6 = \frac{\alpha_1 - d_1 I_h^6}{d_1}$ and, S_h^6, I_h^6, I_m^6 satisfies the equation, $\beta_1 \frac{S_h^6 I_h^6}{a + S_h^6} + \beta_2 S_h^6 I_m^6 = d_1 I_h^6$.

(viii)The interior equilibrium point $E^*(S_h^*, \frac{d_2}{\mu}, \frac{\alpha_2}{2d_2}, I_m^*)$, where, $S_h^* = \frac{\mu\alpha_1 - d_1 d_2}{d_1 \mu}$ and, I_m^* satisfies the equation, $I_m^* = \frac{ad_1 I_h^* + S_h^* I_h^* (d_1 - \beta_1)}{\beta_2 S_h^* (a + S_h^*)}$

It exists if $\mu > \frac{d_1 d_2}{\alpha_1}$ and $d_1 > \beta_1$.

S**tability analysis of the system:**

Lemma 1. The trivial equilibrium point $E_0(0, 0, 0, 0)$ is always unstable along x-axis.

Lemma 2. The system around the axial equilibrium point $E_1(\frac{\alpha_1}{d_1}, 0, 0, 0)$ is always unstable along x-axis.

Lemma 3. The system around the axial equilibrium point $E_2(0, 0, \frac{\alpha_2}{d_2}, 0)$ is always unstable along x-axis.

Lemma 4. The system around the planer equilibrium point $E_3(S^3_h, I^3_h, 0, 0)$
is always unstable along x-axis. Where $S^3_h = \frac{ad_1}{\beta_1 - d_1}$ and $I^3_h = \frac{\alpha_1(\beta_1 - d_1) - d_1^2 a}{d_1(\beta_1 - d_1)}$

Lemma 5. The system around the planer equilibrium point $E_4(\frac{\alpha_1}{d_1}, 0, \frac{\alpha_2}{d_2}, 0)$ is always unstable.

Lemma 6. The system around the planer equilibrium point $E_5(S^5_h, I^5_h, S^5_m, 0)$ where, $S^5_h = \frac{ad_1}{\beta_1-d_1}$, $I^5_h = \frac{\alpha_1(\beta_1-d_1)-d_1^2a}{d_1(\beta_1-d_1)}$ and $S^5_m = \frac{\alpha_2 d_1(\beta_1-d_1)}{\mu\alpha_1(\beta_1-d_1)-d_1^2a+d_1d_2(\beta_1-d_1)}$ is LAS if , $(A_{21}^5 - A_{33}^5 - A_{22}^5) > 0$,$(A_{24}^5 A_{43}^5 A_{32}^5 - A_{24}^5 A_{42}^5 A_{33}^5) > 0$ and $(A_{21}^5 - A_{33}^5 - A_{22}^5)*(A_{33}^5 A_{22}^5 - A_{21}^5 A_{33}^5 - A_{24}^5 A_{42}^5)-(A_{24}^5 A_{43}^5 A_{32}^5 - A_{24}^5 A_{42}^5 A_{33}^5)> 0$. Where, $A_{21}^5 = \frac{\beta_1 I_h^5 a}{(a+S_h^5)^2}$, $A_{22}^5 = \frac{\beta 1 S_h^5}{(a+S_h^5)} - d_1$, $A_{24}^5 = \beta_2 S_h^5$, $A_{32}^5 = -\mu S_m^5$, $A_{33}^5 = -\mu I_h^5 - d_2$, $A_{42}^5 = \mu S_m^5$, $A_{43}^5 = \mu I_h^5 - d_2$.

Lemma 7. The system around the planer equilibrium point $E_6(S_h^6, I_h^6, 0, I_m^6)$ is always unstable along x-axis. where, $S_h^6 = \frac{\alpha_1-d_1I_h^6}{d_1}$ and, S_h^6, I_h^6, I_m^6 satisfies the equation, $\beta_1\frac{S_h^6 I_h^6}{a+S_h^6} + \beta_2 S_h^6 I_m^6 = d_1 I_h^6$.

Lemma 8. The system around the interior equilibrium point $E^*(S_h^*, \frac{d_2}{\mu}, \frac{\alpha_2}{2d_2}, I_m^*)$ where, $S_h^* = \frac{\mu\alpha_1-d_1d_2}{d_1\mu}$ and, I_m^* satisfies the equation, $I_m^* = \frac{ad_1I_h^* + S_h^*I_h^*(d_1-\beta_1)}{\beta_2 S_h^*(a+S_h^*)}$ is locally asymptotically stable if , $(A_{21}^* - A_{33}^* - A_{22}^*)> 0$, $(A_{24}^* A_{43}^* A_{32}^* - A_{24}^* A_{42}^* A_{33}^*)> 0$ and $(A_{21}^* - A_{33}^* - A_{22}^*)*(A_{33}^* A_{22}^* - A_{21}^* A_{33}^* - A_{24}^* A_{42}^*) - (A_{24}^* A_{43}^* A_{32}^* - A_{24}^* A_{42}^* A_{33}^*) > 0$. Where, $A_{21}^* = \frac{\beta_1 d_2 a}{\mu(a+S_h^*)^2} + \beta_2 I_m^*$, $A_{22}^* = \frac{\beta_1 S_h^*}{a+S_h^*} - d_1$, $A_{24}^* = \beta_2 S_h^*$, $A_{32}^* = \frac{-\mu\alpha_2}{2d_2}$, $A_{33}^* = -2d_2$, $A_{42}^* = \frac{\mu\alpha_2}{2d_2}$, $A_{43}^* = 0$.

Innovativeness of the work

In this present study we consider the effect of Zika virus between human and between human and mosquitoes proposed by Rezapour et. al. [2]. We modify the model by introducing the holling type II functional response in the disease transmission among the susceptible human population and infected human population which is more realistic in the biological scenario

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DYNAMICAL BEHAVIOR OF ZIKA VIRUS

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Abstract

ZIKA VIRUS was first detected in 1947 in the monkey species, and one of the very first case of Zika virus infection were reported in 1952 in Uganda state ,the Republic of Tanzania. Between 1960 and 1980.there were few human infections with Zika virus in Asia and Africa, and also in some region of until in 2007 in the Yap Islands, then in 2013 in the France Polynesia , Pacific Ocean, and in 2015 in Brazil and some other countries like east malaysia,Thailand,nigeria- the widespread outbreak of the virus was reported.

Subsequently, it has spread to other 86 countries and the infction rate is very much chaotic [2]. Fever, rash, conjunctivitis, rashes on skins, muscle and joint pain, malaise, or headache are symptoms of this disease. According to the report of WHO. There are also seen the effect of Zika virus infection in the pregnancy periods can cause their child in the time of born with microcephaly and congenital Zika syndrome [1]. Also, as the consequence of the disease, other complexity during pregnancy including gesstaional age and miscarriage or physical disorder may happen. In adults and children and somewhere in the teenagers Zika virus infection is associated with neurological disorder, various time of health complexity including Guillain–Barre syndrome. neuropathy, and myelitis.Despite mild clinical symptoms in the mother, ZIKA infection during pregnancy is deleterious to the fetus and is associated with fetal death, fetal growth restriction, and a spectrum of central nervous system abnormalities [1][3]. It became the first major infectious disease linked to human birth defects to be discovered in more than half a century and created such global alarm that the World Health Organization would declare a Public Health Emergency of International Concern.A low amount of maculopapular rash was the most common type of symptom noted in ZIKA-positive women .There also a huge effect of ZIKA in the pregnency.Zika can be vary from men and women to their sexual partners; most of cases including this type of transmission from symptomatic men to women [2][3].Microsephaly occurs as a result of fetal brain disruption defect.A preliminary report from Brazil shows thatfetal abnormalities found by ultrasonography were present in 30 percentage of women are infected by Zika virus pregnancy. Early fetal loss and fetal death have noticed with maternal infection that occurred between 8 and 32 weeks of gestation.This type of disease can be diagonised by the detection of the viral neuclei acid by RT-PCR [2].Several factors could influence a couple's level of concern about sexual transmission of Zika virus. There is a risk factor acquiring mosquito-bite Zika virus in areas with active disease depends on the period and extent of exposure to infected mosquitoes and the steps taken to prevent mosquito bites [4]. After that this virus the epidermal layer is effected mainly of keratinocytes, we assume that the next cells or the chain of cells can be predicted by ZIKA [3][4]. Primary human epidermal keratinocytes obtained from neonatal foreskin were infected with ZIKV, and intracellular viral RNA was quantified by quantitative PCR at different time points postinfection. Here we used holing type III in functional response for the infected human population and mosquito.

Keywords: Zika, Chaotic; Neuropathy; RT-PCR;

Existence and the Local Stability Analysis of the Equilibrium points:

Existence of the equilibrium points:

There are eight equilibrium points of the system of equations

(1) The trivial equilibrium point E0(0, 0, 0, 0), always exists.

(2) The axial equilibrium point E1($\frac{\alpha 1}{d1}$, 0, 0, 0), always exists.

(3) The axial equilibrium point E2(0, 0, $\frac{\alpha 2}{d2}$, 0), always exists.

(4) The planer equilibrium point E3(S^3h, I^3h, 0, 0) ;exists if β1 >$\frac{(d1 + d^2 1a)}{\alpha 1}$

Where S^3h= ad1/β1−d1, I3h = $\frac{\alpha 1(\beta 1-\mathrm{d}1)+\mathrm{ad}21}{d1(\beta 1-d1)}$

(5) The disease free equilibrium point E4($\frac{\alpha 1}{d1}$, 0, $\frac{\alpha 2}{d2}$, 0), always exists.

(6) The planer equilibrium point E5(S^5h, I^5h, S^5m, 0) ; exists if β1 >$\frac{(d1 + d^2 1a)}{\alpha 1}$

where, S^5h= $\frac{ad1}{\beta 1-d1}$, I^5h= $\frac{\alpha 1(\beta 1-d1)-d^2 1a}{d1(\beta 1-d1)}$and $S^5m = \frac{\alpha 2d1(\beta 1-d1)}{d21a+d1d2(\beta 1-d1)}$

(7) The planer equilibrium point E6(S^6h, I^6h, 0, I^6m), where, S^6h= $\frac{\alpha 1-d1I6h}{d1}$and,

S^6h, I^6h, I^6msatisfies the equation , $\frac{\beta 1S^6h\, I^6h}{a+S6h}$ + $\frac{\beta 2S^6hI^6m}{b+S6h}$= d1$I^6h$

(8) The interior equilibrium point E∗(S^*h, $\frac{d2}{\mu}$,$\frac{\alpha 2}{2d2}$, I^*m), where, S∗h= $\frac{\mu\alpha 1-d1d2}{d1\mu}$

and, I∗msatisfies the equation, I^*m= $\frac{ad1I^*h-S^*hI^*h(\beta 1-d1)}{(a+S*h\ )}$

It exists if μ >$\frac{d1d2}{\alpha 1}$and d1 > β1.

Stability analysis of equilibrium points:

Lemma 1. The trivial equilibrium point E0(0, 0, 0, 0) is always unstable Along x-axis.

Lemma 2. The system around the axial equilibrium point E1(Sh = $\frac{\alpha 1}{d1}$, 0, 0, 0) is always unstable along x-axis.

Lemma 3. The system around the axial equilibrium point E2(0, 0, $\frac{\alpha 2}{d2}$, 0) is always unstable along x-axis.

Lemma 4. The system around the planer equilibrium point E3(S^3h, I^3h, 0, 0) is always unstable along x-axis.where$S^3h = \frac{ad1}{\beta 1-d1}$, $I^3h = \frac{\alpha 1(\beta 1-d1)-d^2 1a}{d1(\beta 1-d1)}$.

Lemma 5. The system around the planer equilibrium point E4($S^4h = \frac{\alpha 1}{d1}$, 0, S^4m= $\frac{\alpha 2}{d2}$, 0) is always unstable.

Lemma 6. The system around the planer equilibrium point E5(S^5h, I^5h, S^5m, 0)

Where, $S^5h = \frac{ad1}{\beta 1-d1}$, $I^5h = \frac{\alpha 1(\beta 1-d1)-d^2 1a}{d1(\beta 1-d1)}$, $S^5m = \frac{\alpha 2d1(\beta 1-d1)}{\mu\alpha 1(\beta 1-d1)-d21a+d1d2(\beta 1-d1)}$

is LAS if , ($A^5$21 − $A^5$33 − $A^5$22) > 0. ($A^5$24$A^5$43$A^5$32 − $A^5$24$A^5$42$A^5$33) > 0 and ($A^5$21−$A^5$33−$A^5$22)∗($A^5$33$A^5$22−$A^5$21$A^5$33−$A^5$24$A^5$42)-($A^5$24$A^5$43$A^5$32−$A^5$24$A^5$42$A^5$33) > 0.

Where $A^5 21 = \frac{\beta 1I5ha}{(a+S5h)^2}$, $A^5 22 = \frac{\beta 1S5h}{a+S5h} - d1$, $A^5 24 = \frac{\beta 2S5h}{b+S5h}$, , $A^5 32 = -\mu S^5 m$, $A_{33}{}^5 = -\mu I_h{}^5 - d_2$,

$A_{42}{}^5 = \mu S_m{}^5$, $A_{43}{}^5 = \mu I_h{}^5 - d_2$.

Lemma 7: The system around the planer equilibrium point $E_6(S_h{}^6, I_h{}^6, 0, I_m{}^6)$ is always unstable along x-axis. where, $S_h{}^6 = \frac{\alpha_1 - d_1 I_h{}^6}{d_1}$ and, $S_h{}^6$, $I_h{}^6$, $I_m{}^6$ satisfies the equation, $\beta_1 \frac{S_h{}^6 I_h{}^6}{a + S_h{}^6} + \frac{\beta 2Sh6\ Im6}{b+S6h} = d_1 I_h{}^6$.

Lemma 8. The system around the interior equilibrium point $E^*(S_h{}^*, \frac{d_2}{\mu}, \frac{\alpha_2}{2d_2}, I_m{}^*)$ where, $S_h{}^* = \frac{\mu\alpha_1 - d_1 d_2}{d_1 \mu}$

and, $I_m{}^*$ satisfies the equation, $I_m{}^* = \frac{ad_1 I_h{}^* + S_h{}^* I_h{}^* (d_1 - \beta_1)}{\beta_2 S_h{}^* (a + S_h{}^*)}$ is locally asymptotically stable if , ($A_{21}{}^* - A_{33}{}^* - A_{22}{}^*$)> 0, ($A_{24}{}^* A_{43}{}^* A_{32}{}^* - A_{24}{}^* A_{42}{}^* A_{33}{}^*$)> 0 and ($A_{21}{}^* - A_{33}{}^* - A_{22}{}^*$)*($A_{33}{}^* A_{22}{}^* - A_{21}{}^* A_{33}{}^* - A_{24}{}^* A_{42}{}^*$) − ($A_{24}{}^* A_{43}{}^* A_{32}{}^* - A_{24}{}^* A_{42}{}^* A_{33}{}^*$) > 0. $A^*21 = \frac{\beta 1d2a}{\mu(a+S*h)2} + \frac{b\ \beta 2I*m}{(b+S*h)2\ ,}$, $A_{32}{}^* = \frac{-\mu\alpha_2}{2d_2}$, $A_{33}{}^* = -2d_2$, $A_{42}{}^* = \frac{\mu\alpha_2}{2d_2}$,

$A_{43}{}^* = 0$, $A_{24}{}^* = \frac{\beta 2Sh*}{b+S*h}$,

$A_{22}{}^* = \frac{\beta_1 S_h{}^*}{a + S_h{}^*} - d_1$.

Innovativeness of the work

In this study we consider the four dimensional epidemiological model of the effect of Zika virus between human and between human and mosquitoes proposed by Rezapour et. al. [5]. We modify the model by introducing the holling type II functional response in the disease transmission among the susceptible human population and infected human population as well as susceptible human population and infected mosquito's population respectively, which is more realistic in the biological scenario.

Proceedings of 4th National Conference on Science, Technology & Communication Skills (NCSTCS2K21)
Date: 24-25 September, 2021 ISBN: 978-93-89817-63-8

THE EFFECTS OF ZIKA VIRUS ON HUMAN POPULATION

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Abstract
ZIKA VIRUS was first detected in monkeys in 1947, and the first cases of Zika virus infection were reported in 1952 in Uganda and the Republic of Tanzania. Between 1960 and 1980, there were few human infections with Zika virus in Asia and Africa, until in 2007 in the Yap Islands, then in 2013 in the France Polynesia and the Pacific Ocean, and in 2015 in Brazil the widespread outbreak of the virus was reported. Subsequently, it has spread to other countries around the world, so far Zika virus infection has been recorded in 86 countries. Fever, rash, conjunctivitis, muscle and joint pain, malaise, or headache are symptoms of this disease. According to the report of World Health Organization (WHO), Zika virus infection during pregnancy can cause infants to be born with microcephaly and other congenital malformations, known as congenital Zika syndrome. Also, at the result of this disease, other complications of pregnancy including preterm birth and miscarriage may happen. In adults and children, Zika virus infection is associated with neurologic complications including Guillain–Barre syndrome, neuropathy, and myelitis. Zika is a virus that is spread mostly by Aedes mosquitoes. Besides that, this virus can be transmitted from mother to baby during pregnancy or around the time of birth. Also, it can spread through blood transfusions and sexual contact.

In our present study, we consider one Prey (Human) and one Predator (Mosquito) population where the prey population is divided into two class one is susceptible (s_h) and the other one is infected (I_h) population and also predator population is divided into two class one is susceptible (s_m) and the other one is infected (I_m) population. Where, S_h = Susceptible Human Population, I_h = Infected Human Population, S_m = Susceptible Mosquito, I_m = Infected Mosquito, Here $N_h = s_h + I_h$
Keywords: Zika; Malaise; Headache; Pregnancy.

Existence and the Local Stability Analysis of the Equilibrium points

There are eight equilibrium points of the system of equations,

1. The trivial equilibrium points $E_0(0, 0, 0, 0)$, always exists
2. The axial equilibrium points $E_1(\frac{\alpha_1}{d_1}, 0, 0, 0)$, always exists
3. The axial equilibrium points $E_2(0, 0, \frac{\alpha_2}{d_2}, 0)$, always exists
4. The planar equilibrium point exits $E_3(s_h^3, I_h^3, 0, 0)$ exits if $ß_1 > \frac{d_1}{\pi}$ where, $s_h^3 = \frac{\alpha_1}{ß_1\pi - 2d_1}$ and $I_h^3 = \frac{(ß_1\pi - d_1)\alpha_1}{d_1(ß_1\pi - 2d_1)}$
5. The disease-free equilibrium point $E_4(\frac{\alpha_1}{d_1}, 0, \frac{\alpha_2}{d_2}, 0)$ always exists
6. The planar equilibrium point $E_5(s_h^5, I_h^5, s_m^5, 0)$ exits if $ß_1 > \frac{d_1}{\pi}$ where,

   s_h^5satisfies the equation

$$\frac{ds_h}{dt} = \alpha - \frac{\beta_1 \pi s_h I_h}{N_h} - \beta_2 s_h I_m - d_1 s_h$$

   and, $I_h^5 = \frac{(ß_1\pi - d_1)S_h}{d_1}$, $s_m^5 = \frac{\alpha_1}{\mu I_h + d_2}$

7. The planar equilibrium point $E_6(s_h^6, I_h^6, 0, I_m^6)$ where ,$I_h^6 = \frac{\alpha_1}{d_1} - s_h^6$, $I_m^6 = \frac{\beta_1 \pi s_h^6 d_1}{\alpha_1 ß_2} - \frac{d_1}{ß_2 s_h^6} - \frac{d_1^2}{\alpha_1 ß_2} - \frac{\beta_1 \pi d_1}{\alpha_1 ß_2}$, and s_h^5 satisfies the equation

$$\frac{ds_h}{dt} = \alpha - \frac{\beta_1 \pi s_h I_h}{N_h} - \beta_2 s_h I_m - d_1 s_h$$

8. The interior equilibrium point $E_7(s_h^7, I_h^7, s_m^7, I_m^7)$ which exits if $\mu > \frac{d_1 d_2}{\alpha_1}$ and $\alpha_1 > \frac{ß_1 \pi \alpha_1 d_2}{d_1 \mu}$

   Where $I_h^7 = \frac{d_2}{\mu}$, $s_m^7 = \frac{\alpha_2}{2d_2}$, $s_h^7 = \frac{\alpha_1}{d_1} - \frac{d_2}{\mu}$,$I_m^7 = \frac{\alpha_1(\frac{d_2}{\mu}) - ß_1 \pi(\frac{\alpha_1}{d_1} - \frac{d_2^2}{\mu^2})}{ß_2 \frac{\alpha_1}{d_1}(\frac{\alpha_1}{d_1} - \frac{d_2}{\mu})}$

Stability analysis:

Lemma 1:

The equilibrium points $E_0(0, 0, 0, 0)$ is always unstable along x- axis

Lemma 2:

The equilibrium points $E_1(\frac{\alpha_1}{d_1}, 0, 0, 0)$ is always unstable along x- axis

Lemma 3:

The equilibrium points $E_2(0, 0, \frac{\alpha_2}{d_2}, 0)$ is always unstable along x- axis

Lemma 4:

The equilibrium points $E_3(s_h^3, I_h^3, 0, 0)$ is always unstable along x- axis where $s_h^3 = \frac{\alpha_1}{ß_1 \pi - 2d_1}$ and $I_h^3 = \frac{(ß_1 \pi - d_1)\alpha_1}{d_1(ß_1 \pi - 2d_1)}$

Lemma 5:

The equilibrium points $E_4(\frac{\alpha_1}{d_1}, 0, \frac{\alpha_2}{d_2}, 0)$ is always unstable along x- axis

Lemma 6:

The equilibrium point $E_5(s_h^5, I_h^5, s_m^5, 0)$ exits if $ß_1 > \frac{d_1}{\pi}$ where,

s_h^5satisfies the equation

$$\frac{ds_h}{dt} = \alpha - \frac{\beta_1 \pi s_h I_h}{N_h} - \beta_2 s_h I_m - d_1 s_h$$

and, $I_h^5 = \frac{(ß_1 \pi - d_1) S_h}{d_1}$, $s_m^5 = \frac{\alpha_1}{\mu I_h + d_2}$ is asymptotically stable on the x axis

Lemma 7:

The planar equilibrium point $E_6(s_h^6, I_h^6, 0, I_m^6)$ where ,$I_h^6 = \frac{\alpha_1}{d_1} - s_h^6$, $I_m^6 = \frac{\beta_1 \pi s_h^6 d_1}{\alpha_1 ß_2} - \frac{d_1}{ß_2 s_h^6} - \frac{d_1^2}{\alpha_1 ß_2} - \frac{\beta_1 \pi d_1}{\alpha_1 ß_2}$, and s_h^5 satisfies the equation

$$\frac{ds_h}{dt} = \alpha - \frac{\beta_1 \pi s_h I_h}{N_h} - \beta_2 s_h I_m - d_1 s_h$$

Is not stable along x - axis.

Lemma 8:

The interior equilibrium point $E_7(s_h^7, I_h^7, s_m^7, I_m^7)$ which exits if $\mu > \frac{d_1 d_2}{\alpha_1}$ and $\alpha_1 > \frac{ß_1 \pi \alpha_1 d_2}{d_1 \mu}$

Where $I_h^7 = \frac{d_2}{\mu}$, $s_m^7 = \frac{\alpha_2}{2d_2}$, $s_h^7 = \frac{\alpha_1}{d_1} - \frac{d_2}{\mu}$,$I_m^7 = \frac{\alpha_1(\frac{d_2}{\mu}) - ß_1 \pi(\frac{\alpha_1}{d_1} - \frac{d_2^2}{\mu^2})}{ß_2 \frac{\alpha_1}{d_1}(\frac{\alpha_1}{d_1} - \frac{d_2}{\mu})}$ is asymptotically stable on the x axis

Innovativeness of the work

In this study we consider the four dimensional mathematical model of epidemiology which introduces the effect of Zika virus among human population through sexual contact with the infected human population, blood transmission between the infected and susceptible human population and between human and mosquitoes population proposed by Rezapour et. al.(2017). We modify the model by introducing the probabilistic approach in the disease transmission among the susceptible human population and infected human population which is one of more realistic phenomenon in the biological scenario and use control therapeutic approach such as insect repellents to protect the human population by spraying picaridin and oil of lemon eucalyptus and spraying DEET to places where the vectors live especially from sunrise to sunset when mosquitos are most active.

BASIC CONCEPTS OF CLOUD COMPUTING AND ITS APPLICATIONS

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Abstract

In the 21st century, the entire world is becoming dependent on the various computational networks, applications, features, etc. The complete virtual platform is gradually becoming complex with every passing day. Almost everything including the crucial information, database, etc. are stored in the virtual platforms. Cloud computing has mainly redesigned this entire virtual platform to make it easier for the user or the consumer to store their crucial information in the virtual platforms.This paper precisely deals with the basic knowledge about cloud computing and its applications.Here, we will get to know in details about the main motive behind cloud computing.If a person has recently got to know about the term "cloud computing", this paper will help that person to gain the basic knowledge of the topic "clod computing". We can also term "cloud computing" as "utility computing" or "on-demand computing". Well, this paper will not deal with the higher level explanation of cloud computing but will lay a foundation from where we can focus minutely on the details required for accessing the various applications of cloud computing. This paper is mainly based on the fundamental knowledge of the topic and contains all the necessary concepts which shall be further required for higher level explanation of the entire cloud computing system. In today's world, cloud computing plays a major role in various business related technical fields. So, this entire work will help us to understand the topic accurately.This paper will start with an approach to examine the fundamental concept of the term "cloud" and its use in the computational fields or virtual platforms. Well, here in this paper, we will be portraying some diagrams and flow charts to understand the basic concepts of the entire framework of cloud computing. The body of the paper also explains the three categories of cloud computing services. We will get to know how cloud computing is the way to the future. We will be able to demonstrate the fact that the entire technical field will be depended on cloud computing in the upcoming years. We will also have a briefdiscussion about the characteristics, service models, deployments models, advantages and disadvantages of cloud computing in this paper. There are various companies like, Amazon Web Service, Microsoft Azure, Google Cloud Platform, IBM Cloud, Oracle, VMware, Salesforce, Hewelett Packard Enterprise and many more use cloud computing for increasing the growth of their companies. Recently, few of the well-known companies like, Netflix, Xerox, Instagram, Pinterest, etc. have also moved to the cloud. Here, we will get to know about the minute details of the various operations in cloud computing. We will focus mainly on the fundamental and rudimentary objectives and principles of the topic "Cloud Computing" in depth. We really hope that this paper will be

able to clear the various basic concepts which are still vague for many. This paper is just the gateway or the introduction of our entire work which will further lay the foundation of the higher level technical concepts of cloud computing.

Innovativeness of the work

Concentrating on the topic from a layman's knowledge, we can understand why is it termed as "cloud"? Cloud is nothing but the one which we observe high up in the sky. The term is inspired from the symbol of the clouds that is used to represent the internet in diagrams.

Keywords: Cloud; IaaS; PaaS; SaaS; Deployment; Cloud Security; Advantages and Disadvantages of Cloud Computing.

MACHINE LEARNING: TRENDS, AMENITIES, DRAWBACKS AND PROSPECTS

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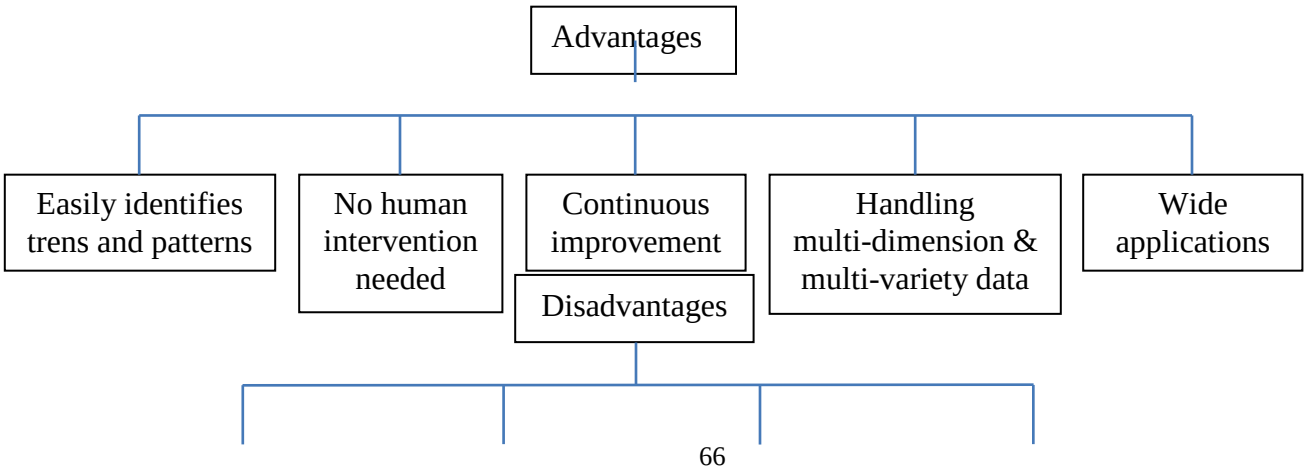
Abstract

The paper basically focuses on the trends, prospective and prospects of machine learning. The paper will not deal with the overall explanation of the topic. Our aim is to lay a foundation from where we can make a reasonable argument. Machine learning is a branch of artificial intelligence and computer science which focuses on the use of data and algorithm to imitate the way that humans learn gradually improving its accuracy. Machine learning addresses the question of how to build computers that improve automatically through experience. It is one of today's most rapidly growing technical fields lying at the intersection of computer science and statistics and at the core of artificial intelligence and Data Science. Recent process in machine learning has been driven both by the development of new learning algorithms and theories and by the ongoing explosion in the availability of online data and low-cost computation. The adoption of data intense machine learning methods can be found throughout science technology and commerce leading to more evidence-based discussion making across many walks of life, including healthcare, manufacturing, and education financial and marketing.

Amidst all the hype around Bigdata we keep hearing the term ML. It not only just if offer a remunerative career, it promises to solve problems and also benefits companies by making prediction and helping make better decisions.

Let's look on some of the advantages and disadvantages-



Data Acquisition	Time & Resources	Interpretation of results	High error susceptibility

As machine learning continues to increase in importance to business operations and AI becomes more practical in enterprise settings, the machine learning platform wars will only intensity. Continued research into deep learning and AI is increasingly focused on developing more general application. Today's AI models require extensive training in order to produce an algorithm that is highly optimized to perform one task, researches are exploring ways to make models more flexible and are seeking techniques that allow a machine to apply context learned from one task to future different task.

Innovativeness of the work

Bringing to the conclusion we understand that ML have progressed in the past decade and it is sure it will make more advances and improvements in the near future. From the trends we can see how machine learning has been used in various technical field and also have helped in the healthcare, manufacturing and marketing industry. We also learned its basic advantages and disadvantages and its functionality in the industry. Lastly how Machine Learning will have its impact in the coming days.

Kyewords: Machine learning; Atificial intelligence.

THE BEAUTY OF GOLDEN RATIO

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Abstract

Few mathematical concepts, if any, have an impact on as many aspects of our visual and intellectual lives as the golden ratio. In the simplest form, the golden ratio refers to the division of a given line segment into a unique ratio that gives us an aesthetically pleasing proportion. This proportion is formed in the following way: The longer segment (L) is to the shorter segment (S) as the entire original segment (L+S) is to the longer segment. Symbolically, this is written as. $\frac{L}{S} = \frac{L+S}{S}$

Let us consider a rectangle whose length is L and whose width is S, and whose dimensions are in the golden ratio. We call this a golden rectangle, which derives its name from the apparent beauty of its shape: a view supported through numerous psychological studies in a variety of cultures. The shape of the golden rectangle can be found in many architectural masterpieces as well as in famous classical works of art. When the golden ratio is viewed in terms of its numerical value, it seems to infiltrate just about every aspect of mathematics. In some cases, our endeavours will open new vistas for the reader; in other cases, they will enrich the reader's understanding and appreciation for areas of mathematics that may not have been considered from this unusual vantage point. For example, the golden ratio is a value, frequently referred to by the Greek letter Φ (phi), which has the unique characteristic in that it differs from its reciprocal by 1, that is, $\Phi - \frac{1}{\Phi} = 1$. This unusual characteristic leads to a plethora of fascinating properties and genuinely connects Φ to such familiar topics as the Fibonacci numbers and the Pythagorean theorem.

In the field of geometry, the applications of the golden ratio are practically boundless, as are their beauty. To fully appreciate their visual aspects, we will take you through a journey of geometric experiences that will include some rather unusual ways of constructing the golden ratio, as well as exploring the many surprising geometric figures into which the golden ratio is embedded.

Innovativeness of the work

The Golden Ratio is subject which is often overlooked by the academic syllabus. In this paper, we are trying to enlighten the true significance of the golden ration in our daily life and elementary mathematics. The reason it is often overlooked is because it was never proved theoretically but we cannot overlook the experimental values.

Keywords: Ratio; Architectural; Rectangle; Fibonacci.

ARTIFICIAL INTELLIGENCE AND THE FUTURE OF SPACE EXPLORATION

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Abstract

Mankind has always been creative and such creative feature of human brain is the key to AI. Advances and development in AI have allowed us to make progress in all kinds of manner including deep space explorations. From designing missions on different planets to clearing earth's orbit of junk, we've come a long way in handling and advancing artificial intelligence.

As of May 2021, there have been six successful robotically operated mars rover missions and out of six five were administered by National Aeronautics and Space Administration (NASA). The rovers were Sojourner (1997), Opportunity (2004), Spirit (2004), Curiosity (2012), And Perseverance (2021). The sixth mission is Zhurong (2021), launched by the China National Space Administration. Other than rovers there have been number of space missions by various countries that were only possible because of AI.

Today, many companies, such as Google, Tesla and NASA, have already implemented AI in search of new celestial bodies, alien life forms and easing the work of astronauts when they are in space. AI helps in processing satellite images, helps in building personal assistance in space, conducting system monitoring, in building Spatial telescopes which can play crucial role in debugging the mystery of black holes and most importantly the role of AI in the development of satellites and spacecraft.

The meaning of AI and Machine Learning in itself holds the key and hope of future space explorations. In simple AI Refers to the simulation of human intelligence in machines that have been programmed to think like humans and copy their actions. AI aims to solve traditional problems like planning, reasoning, knowledge representation, perception, and the ability to move and manipulate objects on a given situation. AI can be utilized to understand the possible outcomes and result of different scenarios and situations. It can build predictive models based on sample data which can create pattern and can make conclusive decision without being explicitly programmed to do so. We can further use another form of machine learning which is known as Deep learning to copy human capacity of performing classification task directly from image, sound data and text.

We can clearly see that our desire to explore the final frontier and space beyond that seems to be growing and we will continue to plan ambitious missions to satisfy our inherent curiosity as well as to improve the human lives on earth. In our endeavors, Artificial intelligence would be proved path breaker in arena of space exploration over the next couple of year to assist new Deep space missions and many more.

Innovativeness of the work

Use of AI in space explorations can play a crucial role. We can look into deep space, search for Extraterrestrial life, can debug mysteries of black holes. In the 21st Century, we have AI enabled telescopes and star-gazers, that are working non-stop and excellently, rejoicing at the possibilities of using Artificial Intelligence to rediscover the world beyond our expectations. Wonder what Elon Musk might have to say.

Keywords: AI; Space; Rovers; Machine Learning; NASA.

ROLE OF NANO GRAPHENE OXIDE IN SUSTAINABILITY OF PVC

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Abstract

Poly(vinyl chloride) (PVC) is a commodity plastic which is widely used but is endowed with the problems of poor impact strength and difficult processibility. These problems have been overcome to a certain extent by the use of polymeric or non polymeric modifiers which are referred to as impact modifiers and processing aids. With this conception in view, the present study aims at improving the properties of PVC even further by incorporating nano materials within it and study the dynamics of the incorporated system over a range of added nanofiller.PVC is also one of the most significant sustainable polymers which has widespread indoor and outdoor applications. But the problems of poor impact strength, difficult processibility, poor thermal stability poses a hindrance to its applicability. So, several modifiers find their way out to minimize these disadvantages. However, by the usage of the common modifiers, one of the properties of the polymer is enhanced but it induces deterioration in the other properties of the same. Therefore, in order to optimize all the mechanical parameters namely ultimate tensile strength, modulus, elongation at break and toughness, nano graphene oxide is incorporated within PVC. With this endeavor, the present study aims at improving the properties of PVC in terms of the mechanical parameters stated, which are essential for effective environmental stability and sustainability. The study also intends to estimate the dynamics of the stability of PVC when the nanomaterial is incorporated in it. For this purpose, PVC resin was taken in an air tight dry blender and mixed with 30 parts dioctyl phthalate (DOP) plasticizer and 2 parts tribasic lead sulphate (TBLS) heat stabilizer with respect to the amount of PVC resin taken. The graphene oxidenanofiller (2 to 10 parts) is then added and mixed thoroughly in the blender with the PVC mix at a slightly elevated temperature. A number of batches were prepared by varying the dose of the nanofiller (2, 4, 6, 8 and 10 parts). The mix was then compression moulded into sheets under heat and pressure which was then subjected for mechanical testing in Instron Universal tester. The influence of nano graphene oxide is well exhibited in the results wherein the modulus increased from 432 to 469 MPa, the ultimate tensile strength from 25 to 49 MPA. The mechanical parameters like elongation at break and toughness were also modified and their tendency of reduction were well compensated from 119 % to 112 % and 5 to 4.6 MPa respectively.Nano graphene oxide exerts its reinforcing influence to increase the modulus values of PVC. The dispersion of the nanofiller within the PVC matrix induces a modifying influence in the modulus values probably due to its extended surface area owing to its particle size within the nano range. The directing influence of the nanofiller (nano graphene oxide) modifies the ultimate tensile strength of PVC also and gradually raises the parameter values with rising nanofiller incorporation. So, the improvement in the mechanical parameters of poly(vinyl chloride) polymer by the incorporation of a nanomaterial (nano graphene oxide) investigated in the present study is evidently explicit from the achieved values as observed.

Innovativeness of the work

The present study focusses in modifying the mechanical parameters of PVC by incorporating the nanomaterial, nano graphene oxide, in definite proportion. This results in improved environmental stability due to the consequent rise in modulus, ultimate tensile strengthalongwith optimization in the properties like elongation at break and toughness, compared to unmodified PVC.

Keywords: Poly(vinyl chloride); Nano graphene oxide; Mechanical properties; Sustainability.

Proceedings of 4th National Conference on Science, Technology & Communication Skills (NCSTCS2K21)
Date: 24-25 September, 2021 ISBN: 978-93-89817-63-8

LINEAR ALGEBRA AND MODERN CRYPTOGRAPHY

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Abstract

In recent age of digitalization, people are using internet to communicate or share personal information and millions of financial transactions conducted over the Internet daily. So, it is becoming very important today to protect sensitive communications and share information secretly.This is mainly, the objective of Cryptography, the study of techniques to keep communications private by means of data encryption and its subsequent decryption.Encryption is used to transform an original information (plain form) into some incomprehensible form(coded form). Its aim is to ensure privacy by keeping the information hidden from all people exceptthose who have right to read and understand it. Decryption is the reverse of encryption; it is used to transform the encrypted message back into some understandable form (original form).

In 1929, cryptography system was invented by Lester S. Hill, anAmerican mathematician. Hill Cipher was assigned a numerical value to each letter of the words. Cryptography, also known as the Science of secret writing, is a study of Mathematical techniques based on the concept of message security such as confidentiality, authentication of data entry, integrity of data and data origin authentication. Recently, many companies have started to make online transactions more secure by installing encryption software to protect sensitive information such as credit card numbers, UPI pin etc. from the hackers. There are various cryptographic techniques and many of them use mathematics extensively to secure information. Modern cryptography techniques aremassively based on Mathematical Theories and Computer Science.One field of mathematics that is frequently used in Cryptography is Linear Algebra. Modern encryption methods are more complex, often combining several steps or methods to encrypt data so that it will bedifficult to decrypt. Some modern methods include use of matrices for the process of encryption and decryption. Another fields of mathematics such as Number Theory also plays animportant role in modern cryptography.This paper describesone method of encryption by using Linear Algebra, specifically by Matrix operations.

In cryptography, the use of some secret information is required for encryption and decryption which is only known to the sender and the recipient.This secret information is called nothing but a key. The sender can use a non-singular matrix as one process of generation of a key to encrypt a message. The recipientcan decode (decrypt) the messageby using the inverse of the matrix to get back the original message. The matrix which is used for encryption is called encryption matrix (encoding matrix) and the matrixthat is used for decoding is called decryption matrix (decoding matrix).As per the encryption mechanism, the same key can be used for both encryption and decryption, while for other mechanism, the key used for encryption and decryption can be different.

Modern cryptography is widely usedin disciplines of Mathematics, Computer Science, Electrical Engineering and Communication Science etc. Applications of Cryptography includes Electronic Commerce, chip based payment cards, digital currencies, computer passwords and military communications. It also plays a vitalrole in the domain of cellular communications, such as e-commerce, computer password, pay- TV, sending emails, ATM card, security, transmitting funds, and digital signatures.

Innovativeness of the work

Cryptography is a secret way of communication. In 20th century, cryptography was used in military usageto share the confidential messages privately. But in this time of advanced computer age and internet communication, cryptography has taken a major part in communication and in keeping private data secure

in people's daily life. This paperis a review of matrices and its real-life application in modern cryptography.

Keywords: Matrices; Cryptography; Linear algebra

BLOCKCHAIN TECHNOLOGY APPLICATIONS IN EDUCATION

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Abstract

Blockchain is the core technology used to create crypto currencies, like bitcoin but recently, blockchain technology has been gaining considerable attention from researchers and practitioners. This is mainly due to the unique features along with decentralization, security, reliability, and data integrity. Despite this growing interest, little is familiar about the current state of knowledge and practice regarding utilizing blockchain technology in education. This article is a systematic review of research investigating blockchain-based education applications. Blockchain technology, one of the most influential invention in the last decade attract attention for its potential to provide security from supply chain management to shipping and other areas. Education also needs to utilize the benefits that blockchain technology comes up with. Education institutions especially tertiary institutes are now eyeing to employ this application to improve teaching and learning activities and promote collaboration among the stakeholders such as students, teachers, and parents. It will further be used in e-transcripts, digital degrees, and certification, cloud storage, identity management. This progress study discusses the blockchain technology applications that can be maximized by the education sector. It focuses on the three main themes: (1) The educational application that has been advance with blockchain technology, (2) The benefits that blockchain technology could bring to education, and (3) The challenges of adopting blockchain technology in education. Also, blockchain has emerged as an important concept at the interface of ICT and higher education. It is a system in which a record of the transaction is maintained across several computers that are linked in a peer-to-peer network. Hence, it allows the creation of a decentralization environment, where data are not under the control of any third-party organization. This study presents a systematic bibliometric literature review (LRSB in further test) of research on blockchain application in the higher education field. The review integrated 37 articles presenting up-to-data knowledge on current implications about the use of blockchain technology for improving the higher education process. The LRSB findings indicate that blockchain is being used to build up new interventions to improve the prevailing way of sharing, delivering, and securing knowledge data and personal student records. The application of blockchain technology is carrying on conceptual progress in the higher education sector where it has added substantial value by ameliorated efficiency, effectiveness, privacy control, technological improvement, and security of data management mechanisms. The key blockchain-in-education applications discussed are the digitalization and decentralization of educational certifications and the enhancement and motivation for lifelong learning. Some of the key challenges explored are the California consumer protection Act, which poses impediments for application developers and scalability challenges that arise because of slow-speed blockchain transactions and the scaling trilemma. Additionally, market adoption and innovation challenges highlight that blockchain-in-education is a relatively immature innovation that governance bodies in educational institutes often disregard or perceive cautiously., This education mode still focuses on many problems in courses credibility, credit and certificate certification, student privacy and course sharing through literature review and case analysis, this paper discusses the basic technical principles and application features of

blockchain technology and proposes a solution to the problem of online education based on blockchain technology. Blockchain technology can store learning records in a trusted, distributed manner, provide credible digital certificates, realize learning resources sharing with smart contracts, and protect intellectual property through data encryption. The research shows that the integration of blockchain technology is a promising trend in the development of online education.

Innovativeness of the work

Blockchain is being perceived to handle big data maintaining security and transparency enhancing trust and transparency because of the idiosyncratic attribute of records permanence and smart contracts. This technology innovation is considered to be one of the most influential ones, having emerged in the previous decade, which the education sector must use to get benefitted by employing its unique feature for improving the teaching-learning process and collaboration among different stakeholders

Keywords: Blockchain in education; Blockchain application; Online education; Educational technology.

ENERGY EVERYWHERE

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Abstract

This paper is the extension of our previous work "Are black holes just limited to our knowledge or beyond that" and this paper is a kind of setup with some initial observations for our assumed multiversal model .The main objective of the previous paper was to show that our space and time has some strange relations at the Planck level and this idea we had also proved with some known concepts of the black hole. Now , in this paper we had tried to extend our logic with the question that what are the properties of our universe at the time period of Planck epoch and what can be the ideal explanation before the cosmic microwave background (CMB).With this question , we started to set a theoretical explanation of our model which covers the formation of some set of different sections, which we try to relate with different set of dimensions.In this model we are mainly concern with one question that what is beyond Particle horizon ; or simply we can say what was outside of our universe at the early stage of big bang and how does it affect our universe and how this universe started to expand exponentially and how matter , energy and time came into picture and how these all are related to the multiversal concept.

In this paper we are only considering one section of our model "The mid section" as a prioritized topic in this paper and we had tried to come up with some mathematical relations , which we got as a result from our model theory and we had also tried to visualizesome portion of our model , about which we have discussed deeply in this paper and in parallel with that , we also compared our model with some existing theories proposed by various scientists , and there , we are able to observe much similarities between them and we have also used graphs and simulation to validate our initial ideas which we have taken to define our entire model.

From the model proposed, we had tried to derive a set of mathematical relations between various parameters of our proposed model. While deriving the relations we got some condition which some are for the ideal case and some of them are derived considering the real world scenario. We also tried to create some visualization in word as well as by the help of programs which are created on the basis of our model. We also tried to compare our model`s internal working with the big bang theory and we also got some parallel results for that.

With this model, we stepped into the space of our entire work, and with this model we had introduced a new way to define the concept of the spacetime fabric and in the future papers we will try to achieve some

more derivation which we will try to compare with our known real world entities with which we had tried to make our theory, one of the participants of the unified theory of universe.

Innovativeness of the work

In the race of defining all fundamentals of our universe and validating the concept of multiverse, this paper focuses on a mathematical model by which we try to explain some unsolved sections of physics and thus stepping onto the threshold of our actual theory which aims to define all properties of our universe as well as of multiverse.

Keywords: Spacetime; Planck epoch; Particle horizon; model visualization; the big bang theory; black hole.

SIMPLE HARMONIC MOTION AND LISSAJOUS FIGURE

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Abstract

Simple Harmonic Motion is defined as a motion in which the restoring force is directly proportional to the displacement of the body from its mean position. The direction of this restoring force is always towards the mean position. The acceleration of a particle executing simple harmonic motion is given by, $a(t) = -\omega^2 x(t)$. We encounter quite a large number of applications of simple harmonic motion (SHM) in our daily life. Few are as follows:

(i) Torsional Oscillator-Consider a circular disk suspended from a wire fixed to a ceiling. If the disk is rotated, the wire will twist. When the disk is released, the twisted wire exerts a restoring force on the disk, causing it to rotate past its equilibrium point, twisting the wire the other direction. This system is called a torsional oscillator.

(ii) Pendulum-Another common oscillation is that of the simple pendulum. The classical pendulum consists of a particle suspended from a light cord. When the particle is pulled to one side and released, it swings back past the equilibrium point and oscillates between two maximum angular displacements. It is clear that the motion is periodic-If the motion is simple harmonic then the time period of oscillation (T) is given by $T=2\pi\sqrt{L/g}$, L is the effective length of the pendulum and g is the acceleration due to gravity of the place.

Lissajous figure, also known as BOWDITCH CURVE, is a pattern produced by the intersection of two sinusoidal curves the axes of which are at right angles to each other. This figure is first generated by the American mathematician Nathaniel Bowditch.The curves were investigated independently by the French mathematician Jules-Antoine Lissajous. An octopus circuit can be used to demonstrate the waveform images on an oscilloscope. Two phase-shifted sinusoidal inputs are applied to the oscilloscope in X-Y mode and the phase relationship between the signals is presented as a Lissajous figure. Lissajous figures have lots of applications in modern society. In the professional audio world, this method is used for real time analysis of the phase relationship between the left and right channels of a stereo audio signal.On laptops and desktops, the screen saver applications use Lissajousfigures. Space stations and satellites also use Lissajous orbits. Now-a-days large number of innovative and intriguingresearch works on SHM and Lissajous figure are in progress. These involves biophysical Evidence for Simple Harmonic Motion of Tropomyosin in Regulation of Muscle Contraction, revisiting Lissajous figure as a tool to study bi-stable perception, a measurement of electro-optic coefficients using Lissajous figure. It is also known

that oscilloscope has very many functions not limited only to display waveform. The oscilloscope will help us to calculate the phase or the frequency by forming Lissajous figure.

Innovativeness of the work

SHM as a concept is matured and now identified as one of the key enabling technologies to ensure the integrity of future aircraft structures. SHM along with advanced alloys, composites and hybrid materials will revolutionize both airframe and engine structures of future aircrafts. It will help in increasing the structural allowable with higher confidence removing the conservatism in the current designs. This will reduce structural weight leading to reduced acquisition and maintenance costs.In course of recent research activities an innovative method of constructing discrete Lissajous and rectons functions for auto- and cross-correlation functions on a computer screen directly is developed.

Keywords: Simple Harmonic Motion; Lissajous figure; Applications.

OBJECT ORIENTED PROGRAMMING LANGUAGE

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Abstract

In computer science, a program is set of commands, which runs within a computer or an electronic circuit, producing information for users. Computer programming is the process of writing an algorithm and it is also the encoding of the algorithm into a programming language that can produce and provide information to the users. One of the application programming types is the object oriented programming (OOP) which is about how information is represented in human mind. As a computer programming approach, OOP is useful such that it provides easy modelling in designing and developing real entities. OOP allow the programmer to define a class and to create a object under a specific class.By the development of the software industry and the advances of the software engineering, the use of Object Oriented Software Engineering (OOSE) has enhanced day by day in the software complex real world. The origin of the OOSE in evaluation and design of the software has expanded much and is now considered as one of the software integration processes. The OOSE is combination of Object Oriented Analysis (OOA) models, Object Oriented Design (OOD) and the Object Oriented Programming (OOP) which provide a powerful way for development of the software.Software development is a field of engineering that came into existence owing to the various problems that developers of software faced while developing software projects.

The main purpose of this Objected Oriented Programming (OOP) is how the processed data can be isolated from other redundant applications which is known as data hiding, because of this ability it is readily available to the users.Object-oriented programming evenallows the developer to that wraps all the data and function together and works as a single unit which is known as encapsulation. Apparently, OOP is about State, Behaviourand Identity that is in programming language is it known as class, object, variable. Polymorphism or Dynamic Dispatch is a powerful mechanism here which is actuallya method which same name but perform different task.Inheritance is another property of object oriented programming language in which one object contains all the properties and behaviours of the parent class. The inherent properties of OOP, which do not exist in other application programming, can be stated as modularity, extensibility and reusability.Object-oriented programming is one of today's most active research areas. It is especially well suited to the design of very large software projects involving many programmers all working on the same project. Terminology invoking "objects" and "oriented" in the modern sense of object-oriented programming made its first appearance at MIT in the late 1950s and early 1960s. In the environment of the artificial intelligence group, as early as 1960, "object" could refer to identified items with properties.

Superficially the term object oriented means that we organize software as a collection of discrete objects that incorporate both data structure and behaviour. Objects in terms of the programming world, are simply abstractions of code with specified properties Abstraction is a characteristic of object oriented programming language with helps the programmer to abstract the essential attribute and display it to user hiding the unnecessary details. In the real world, objects are items that are in many ways equally identified by properties they possess. Internet become abstracted into data driven models that can be tangibly analyzed, categorized and used to manipulate data in ways never before thought possible.Many developer use object oriented programming language as it provides its main four features that is Inheritance, Encapsulation, Abstraction and Polymorphism. The essence of object-oriented development is the identification and organization of application domain concepts, rather than their final representation in a programming language, object-oriented or not.

Innovativeness of the work

In a sense, the Internet-ready objects we own create a situation where our lives can be abstracted into something very much like an Object Oriented Program state. Such a OOPs language could shed considerable light on deriving the means to make humans and businesses far more productive than ever before.

Keywords: Software industry; Object oriented; Polymorphism; Abstraction; Classencapsulation.

BIOMASS

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Abstract

Biomass is plant or animal material used as fuel to produce electricity or heat. Examples of biomass are wood, energy crops and waste from forests, yards, or farms. Since biomass technically can be used as a fuel directly (e.g. wood logs), some people use the terms biomass and biofuel interchangeably. More often than not, the word biomass simply denotes the biological raw material the fuel is made of. The word biofuel is usually reserved for liquid or gaseous fuels, used for transportation.

Biomass continues to be an important fuel in many countries, especially for cooking and heating in developing countries. The use of biomass fuels for transportation and for electricity generation is increasing in many developed countries as a means of avoiding carbon dioxide emissions from fossil fuel use. In 2020, biomass provided nearly 5 quadrillion British thermal units (Btu) and about 5% of total primary energy use in the United States.

Biomass contains stored chemical energy from the sun. Plants produce biomass through photosynthesis. Biomass can be burnt directly for heat or converted to renewable liquid and gaseous fuels through various processes. Energy can be extracted from biomass from several sources. Wood and wood processing wastes—firewood, wood pellets, and wood chips, lumber and furniture mill sawdust and waste, and black liquor from pulp and paper mills may be the vege resources. Also agricultural crops and waste materials—corn, soybeans, sugar cane, switchgrass, woody plants, and algae, and crop and food processing residues belong to that category. Biogenic materials in municipal solid waste—paper, cotton, and wool products, and food, yard, and wood wastes are also good resources. Other useful resources are animal manure and human sewage. Biomass energy comes from various feedstock sources: trees and other plants like perennial grasses, waste and landfill gases. Forest residues like wood pellets can also be used to generate energy and heat, and potentially even liquid fuels.

Biomass has many benefits, the primary one being that it cannot be depleted like fossil fuels. With an

abundance of plants on Earth, biomass could be a primary source of renewable energy that's used as a sustainable alternative to fossil fuels.

Whereas sustainably managed biomass is considered carbon-neutral, the burning of fossil fuels releases carbon dioxide and other greenhouse gases, trapping heat in the atmosphere. This fuel source has been responsible for dangerous impacts on the environment, from air and water pollution to global warming.

According to Kelley, the pulp and paper industry will still be thriving 20 to 30 years from now, with more efficient uses and more considerable potential to make energy products and a wide variety of sustainable materials from woody biomass.

Innovativeness of the work

In order to find out the sustainable solutions for humans' necessities, clean and safe energy possibilities may be pursued. Sustainable usage of biomass can improve the energy plan of a country. There is also a provision to use biomass as a greenhouse gas emission-reduction option. It becomes a challenge for the researcher to study how the usages of biomass can be a reliable, sustainable and permanent energy source alternate to the traditional ones such as propane gas, naphtha and natural gas for specially textile industries. Researchers are trying to integrate the technology of liquid metal pipelines in the gasification process to produce hydrogen rich product gas from biomass and residues. The product can further be used in microturbine or solid oxide fuel cells (SOFC) system. Researchers are continuously trying to surpass the limits of conventional science in the new and emerging bioenergy market with innovations in fuels, chemicals, and products that can reduce both import of petroleum and also greenhouse gas emissions in the transportation sector. Presently trials are given to prepare jet fuels from industrial waste gases, use algal turf scrubbers to clean the water and also to to be harvest them to produce biofuel or to develop a new technology to produce biofuel from slurry at water treatment plants. Researchers are also engaged in preparing new engineering materials, high added-value products, new bioplastics for the applications in several engineering fields as well as sustainable substitutes for critical raw materials.

FUTURE OF BLOCKCHAIN

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Abstract

Blockchain is a decentralized transaction and data management technology. Blockchain provides security anonymity and data integrity without any third party organisation in control of the transactions. The transactions of currencies between persons or companies are often centralised and controlled by third party organisations. The primary goal of blockchain technology is to create a decentralized environment where no third party is in control of the transactions data. Blockchain distributed database solution maintains a continuously growing list of data records that are confirmed by the nodes that only participate in it. The data recorded includes information of every transaction ever completed in addition to the transactions each block contains a timestamp, the hash value of the previous block which is parent block and nones which is a random number for verifying the hash. This concept ensures the integrity of the entire blockchain through the first block or the parent block. Hash values are unique and fraud can be effectively prevented since change of a block in the chain would immediately change the respective hash value.

In our research we will conduct studies with the goal of collecting all relevant research that was done from the perspective of technical challenges and limitations. Our objective is to understand the current research topics, challenges and find the ways by which we can effectively use blockchain technology in future for

the betterment of the society. We will also conduct case studies on some of the vital failures of blockchain that creates a concern about the loopholes of blockchain technology. The majority of the research is focusing on revealing and improving limitations of the blockchain from privacy and security perspectives but many of the proposed solution lack concrete evaluation on their effectiveness. Over 80% of the papers is on Bitcoin system and less than 20% deals with other blockchain applications including smart contracts and licensing.

Innovativeness of the work

We will also propose our ideas on implementation of a blockchain. The further implementation of the blockchain technology can be introduced in telecommunication services and banking services. And our case studies will also help in figuring out the the challenges that we need to overcome to create a better and effective environment of Bitcoin Technology. On the basis of our study recommendations on future directions are provided for researchers.

Keywords: Blockchain; Nodes, Decentralised data management, Digital currency

WHEN DATABASE MEETS AI: AN INTRODUCTION TO DEEP LEARNING IN DATABASE MANAGEMENT SYSTEM

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Abstract

In the field of science and technology, where different new and old branches of innovation are discussed everyday, AI and database are two really important sections which are prioritized the most. Each have its own value and significance. In today's world all the leading giants of tech industry like Google, Facebook Amazon, Microsoft, IBM etc. their entire work is based on database and thus database management system is one of the most important terms which is discussed everywhere. Now, coming on Artificial Intelligence (AI), so this doesn't need any such explanation as this emerging part of technology is ruling the present world. Wherever there is a scrap of technology Artificial Intelligence is surely present there and so with database management system also. Though, these two fields belong to different paths, but these two fields have a relationship. For any kind of artificial intelligence based model, it needs a set of related data or database, which belongs to the model field, in order to train itself as according to the requirement .On the other hand database is the set of related data and DBMS is a system for managing a database, so is it possible to combine these two fields for creating a new form of these existing technologies. In this paper we will try to answer the same. This paper has been categorized into 5 sections for defining different concepts. The first section begins with introductory part, the second section deals with the application of the idea where some real world applications is being discussed along with the comparison of this concept with its alternatives .Third section describes our working model , i.e. we have tried to implement this concept at a very basic level to create a deep neural network based networked system which can predicts some results which are related to table creation of DBMS.For the implementation of this network , we have taken a real life example of creation of an AI based university database designer system .While describing the model internal structure the flowchart of the model is also added .Along with the flowchart , the internal distribution of the functions and the mechanism is also being discussed.As this model is a very simple , so we have tried to implement every section from scratch , without using external library in our code . Thus , a very little discussion of the neural network internal structure and some matrix operation is also there .The result and analysis are discussed in section four where some suitable images of the outputs is added . The output will be in the probabilistic form .Even if any technology is leading or are at the top of

the list, if we try to experiment with different things, then there will be some limitations and challenges which the idea has to face and so is with this concept too. So the challenges which this concept is facing is discussed in section five.

Innovativeness of the work

At present date, if one tells that the amount of data is very next to the size of our universe, then this can be a reasonable statement, and managing such huge amount of data is a very challenging task itself. Above that, if there is the need of finding relations between these huge data, then it is very next to impossible .In such situation, we need something, which is much more efficient than us in finding the relations in the huge dataset, and thus Artificial Intelligence can play a very important role in this field also, and this paper focuses on the very basic implementation of this concept and some discussions of some points, as mentioned in the abstract.

Keywords: Artificial Intelligence; Deep Learning; Database Management system; Datase4t; Relations;

3D FOOD PRINTING: ITS DEVELOPMENT AND FUTURE SCOPE

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Abstract

3D printing is an emerging technology that has the ability to create complex three-dimensional structures or objects from a digital model.Companies are actively using 3D printing technology worldwide. This is an additive manufacturing (AM) process where objects are manufactured layer by layer deposition of materials. Additive manufacturing refers to the technology that constructs three dimensional objects from a digital model or computer aided design model. The advantage of additive manufacturing is to construct complex models without mold, fixtures, cutting tools and coolants.The applications of additive manufacturing can be found in many fields such as architecture, automotive, healthcare and so. Nowadays, 3D printers have become more reliable and affordable. 3D printing has been widely used in different sectors such as manufacturing, industry, medical, sensors, prosthetics etc. Remarkably, 3D printing has received huge attention globally in food industry.3D food printing considers sustainable food source and nutrition. 3D food printing has the ability to produce complex food design by depositing edible food materials layer by layer fashion. Food materials with the consistency of soft paste like soft dough, cheese, puree, jelly or powdery consistency including powder sugar, protein powder etc. are used to print different kind of food. A huge variety of food items such as candy, sugar cookies, chocolate, crackers etc. can be printed by using 3D food printing technology. Furthermore, researchers are also trying to print meat using this technology.Depending on which type of food has to be printed, printing techniques varies. Among all the food printing methods, extrusion-based printing technology is used the most and it uses soft paste like ingredients and a wide range of food materials can be easily processed into extrudable forms.3D food printing can revolutionize food through personalized customization, improved creativity and sustainability. With this emerging technology food can be printed without losing its texture, shapes, and flavorswhich opens the possibilities of utilizing alternative nutrient resources, customization of food according to consumer needs. With the help of food printing technology, food can be also printed with custom nutritional properties according to person's diets. It will be very helpful in different kinds of fields like medicine, military, space and so.One of the advantages of 3D food printing is creating the opportunity to prepare innovative and creative variety of food designs, shapes within less time and effort. This paper deal with the concept of food production using this 3d printing technology. This paper reviews current 3D food printing technologies along with its applications and future scopes. Starting with the basic overview of this

concept about 3D food printing and its introduction, different type of food printing techniques including extrusion-based, binder jetting, selective laser sintering, inkjet is discussed. Section three deals with the detailed explanation of different kind of ingredients which are used in different kind food printing processes. It is followed by some applications which are possible. In the section five, the challenges, which this concept is facing, is being discussed. In the end, the future scope of this emerging technology has been discussed.

Innovativeness of the work

This paper deals with the discussion of a concept which is definitely going to be a part of our future. Today humans are approaching towards colonization in space and by 100 years from now, this is surely going to happen, and at that time this technology can be the most important requirementbecause of various advantages of 3D printed food such as the shelf life of food can be increased with this technology without losing dietary requirements or consumer can customized their meals.Today there are around 7 billion humans on this earth and this value will increase significantly within a few couple of decades, thus the limitations of food will be a great problem then, as the demand might cross the production rate. If this kind of situation, then this technology will be our best alternatives for the production of food.

Keywords: Food printinf; Additive manufacturing; 3DFP; Personalised food.

STABILIZATION OF PVC USING NANOSILICA AS A NANOMATERIAL

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Abstract

Poly (vinyl chloride) is one of the most important commercial plastic materials, but there is a major issue in its thermal and optical stability. Many properties of the PVC polymer such as strength, hardness, fire retardancy, etc. can be tailored by the blending of a wide range of nanofillers to extend the application range of PVC. Several authors have reported about the incorporation of various nanofillers to enhance the properties of PVC. The electrical behavior of PVC is significantly improved by the addition of multiwalled carbon nanotubes. PVC composites containing well dispersed nanoclays exhibits increased hardness and decreased smoke production. Introduction of copper or silver nanoparticles in PVC influences the antimicrobial property and photostability of PVC. In the large field of nanotechnology, polymer matrix based nanocomposites have become a prominent area of current research and development. Nanotechnology strategy was used to improve the properties of PVC in terms of strength, hardness, fire retardancy, etc. For this purpose, a wide range of nano fillers could be employed for enhancing the inherent mechanical properties of PVC. In the present study, an endeavour has been made to estimate the change in mechanical properties of PVC in terms of its ultimate tensile strength, modulus, elongation at break and toughness by using silica nanoparticles as the nanofiller. Nano silica has been introduced within PVC in different proportion to investigate the changes in the mechanical parameters over a range of nanofiller incorporation. For this purpose, PVC resin was taken in an air tight dry blender and mixed with 30 parts dioctylphthalate (DOP) plasticizer and 2 parts tribasic lead sulphate (TBLS) heat stabilizer with respect to the amount of PVC resin taken. The silicananofiller (2 to 10 parts) was then added and mixed thoroughly in the blender with the PVC mix at a slightly elevated temperature. A number of batches were prepared by varying the dose of the nanofiller (2, 4. 6. 8 and 10 parts). The mix was then compression moulded into sheets under heat and pressure which was then subjected for mechanical testing in Instron Universal tester. The influence of nanosilica is well exhibited in the results wherein the modulus increased from 432 to 475 MPa, the ultimate tensile strength from 25 to 50 MPA. The mechanical parameters like elongation at break

and toughness were also modified and their tendency of reduction were well compensated from 119 % to 112 % and 5 to 4.6 MPa respectively. Nano silica exerts its reinforcing influence to increase the modulus values of PVC. The dispersion of the nanofiller within the PVC matrix induces a modifying influence in the modulus values probably due to its extended surface area owing to its particle size within the nano range. The directing influence of the nanofiller (nanosilica) modifies the ultimate tensile strength of PVC also and gradually raises the parameter values with rising nanofiller incorporation. Hence, there is improvement in the mechanical parameters of PVCwhen the nanomaterial nano silica is incorporated as evidenced in the present study.

Innovativeness of the work

Mechanically modified PVC compound has been achieved by incorporating nano silica as the nano filler within it. The strength properties of the polymer such as the modulus and ultimate tensile strength rise not at the compensation of the flexibility parameters like elongation at break and toughness. So mechanically improved PVC compounds have been obtained.

Keywords: Poly(vinyl chloride); Silica nanoparticles; Mechanical properties.

ENACTMENT OF A NEW EXPONENTIAL OPERATIONAL LAW AND ITS OPERATORS

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Abstract

The theory of uncertainty plays an essential role in mathematical modelling, engineering and technical field of research nowadays. Researches from different areas are also interested to study the most recently developed uncertain parameter namely neutrosophic number. The advantage of this parameter is, it can grab the idea of truth, false and hesitation component of an uncertain in a complete way such that any kind of imprecise cases can be tackled logically and effectively. In this current epoch, trapezoidal neutrosophic number (TrNN) is an important tool in neutrosophic set theory. This has been used to end the ambiguity and inaccuracy faced in real-life problems. This paper focuses on exponential operational law for TrNN, where the weight is a TrNN related to a positive real number base. Light has also been thrown upon various algebraic properties of the exponential operational law. The trapezoidal neutrosophic weighted exponential arithmetic operator (TNWEAO) and trapezoidal neutrosophic weighted exponential geometric operator (TNWEGO) have been defined by the use of the exponential operational law and its different algebraic properties. The above two operators are also used to define a new multi-criteria group decision-making (MCGDM) technique. Here these two operational laws have been used to measure pollution attributes in different mega-cities successfully. A rigorous sensitivity analysis has also been done to ensure the use of the new exponential law and the MCGDM problem. Several operational laws and aggregation operators have been brought up by researchers in different environments. This has in turn been used to bring up new MCDM/MCGDM processes and techniques. The weights of existing exponential operational laws of TNNs lie within the interval and are positive real numbers. These laws cannot be used when the bases have crisp values and the exponents are TrNNs. To correct this exponential operation law for TrNNs with exponents being crisp numbers and bases being TrNNs are defined. As mentioned, earlier the two new operators, TNWEAO and TNWEGO are used to create a new MCGDM technique. Here we consider a real-life MCGDM problem where the mathematical aggregation formula is defined by, Z is the gradation value depending upon the choice of the decision-makers. The decision-makers are in a dilemma to put the original value of the powers of the crisp components, in the formulation of a decision matrix. Here the

gradation value comes in the act, which is an uncertain number in this case and the value is considered as a crisp number. If the gradation values are of TrNN type then the exponential operational laws need to be formulated. In the view of understanding this situation, an MCGDM problem involving different polluted megacities is taken into consideration. Decision-makers provide different opinions of the pollution effect on the city, but they are all in a dilemma to measure the exact pollution levels. The gradation value is used here to measure this. The above is a real-life problem on trapezoidal exponential operations this, in turn, leads to the development of the exponential operational law and its aggregation operators, which are rooted in the MCGDM technique.

Innovativeness of the work

Research has already been done in the field of TrNN. This article aims to address the following points which include Verification of exponential operational laws for TrNNs, Origination of two aggregation operators for the said operations law, Introduction of a new MCGDM technique that has helped to measure the pollution levels in different megacities, Computation of the sensitivity analysis of the work to understand the utility, reliability of the method.

Keywords: TNN; Exponential operational law; Aggregation operators; MCGDM;

MASS ENERGY EQUIVALENCE

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Abstract

Mass-energy equivalence implies that, even though the total mass of a system changes, the total energy and momentum remain constant. Consider the collision of an electron and a proton. It destroys the mass of both particles but generates a large amount of energy in the form of photons. The discovery of mass-energy equivalence proved crucial to the development of theories of atomic fusion and fission reactions.

Einstein's Mass-energy Relation

Mass-energy equivalence states that every object possesses certain energy even in a stationary position. A stationary body does not have kinetic energy. It only possesses potential energy and probable chemical and thermal energy. According to the field of applied mechanics, the sum of all these energies is smaller than the product of the mass of the object and square of the speed of light.

Mass-energy equivalence means mass and energy are the same and can be converted into each other. Einstein put this idea forth but he was not the first to bring this into the light. He described the relationship between mass and energy accurately using his theory of relativity. The equation is known as Einstein's mass-energy equation and is expressed as, $E=mc^2$, where E= equivalent kinetic energy of the object, m= mass of the object (Kg) andc= speed of light (approximately = 3 x 10^8 m/s). Einstein's mass-energy equivalence has been used to understand nuclear fission and fusion reaction. This famous equation is applied successfully to find out binding energy in an atomic nucleus whereas measurement of binding energy is used to calculate the energy released during nuclear reactions. Radio activity of various elements is based on the theory of mass energy equivalence. Radioactivity produces x-rays, gamma rays. So in many radiotherapy equipments, the same principle is used. Moreover, this famous equation has been used to understand of the mystery of the universe, its constituents and age of the planets.

This well known theory on mass energy equivalence is successful in explaining several natural phenomenon. It successfully confirms the existence of Higgs boson. The presence of Higgs boson has been predicted theoretically many years ago by the Standard Model. On 4 July 2012,

the ATLAS and CMS experiments at CERN's Large Hadron Collider announced they had each observed a new particle in the mass region around 125 GeV. This particle is consistent with the Higgs boson but it will take further work to determine whether or not it is the Higgs boson predicted by the Standard Model. This out breaking experimental result once again proves the uniqueness of mass energy equivalence. For this novel theoretical prediction of a mechanism that contributes to the understanding of the origin of mass of subatomic particles, François Englert and Peter Higgs have been awarded Nobel prize in physics jointly. In the year 2013.

Innovativeness of the work

As mass and energy are not two independent entities but the different aspects of the same thing, hence their conservation principles are also the single one, namely-conservation of mass-energy. Mass can be created or destroyed with the expense or evaluation of equivalent of energy. Actually, in every chemical reaction that evolves energy, a certain amount of matter disappears but the lost mass is very inappreciable compared to the total mass of the reacting substances. For example, when 1 kg of dynamite explodes then only 6×10^{-11} kg of the matter destroys which is effectively impossible to measure, but more than 5 million joules of energy is released which is hard to avoid noticing.

In a new concept of mass -energy equivalence it is said that $E = mc^2$ and $E = mv^2$ have to be considered as E = mcc and E = mvv respectively. Here velocities (c and v) are used to convert momentum units to energy units. Hence, momentum is the most fundamental entity that gives a clear vision of a moving mass. It is worthy to mention that the concept of mass and energy has been proved to be incorrect in the chemical and nuclear reactions.

In an alternate new approach, non-relativistic mass-energy equivalence can be described can E = mbc, where b is derived universal constant and is equal to 0.603797×10^8 m/s. The ratio of mbc / mc^2 is equal to 0.2014 which gives 41.7 MeV /bc for Total Kinetic Energy (TKE) of fusion fragments of the experimental value ~29-35MeV /bc rather than 200 MeV/c^2 (calculated from the relation $E= mc^2$).

Experimentation is very crucial and mandatory part in the innovation process. It helps in understanding the potential faults early, reinforcing new knowledge and preventing fatal errors later. Experimentation is vital and the must for innovation. Where there is no experiment, there is no innovation. The systematic testing of new ideas enables to establish new approaches as in the present scenerio.

BLENDED FUEL FROM MAHUA OIL (MADHUCA INDICA)

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Abstract

Environmental degradation and scarcity of non-renewable energy sourcescreate a lotof demand for alternative renewable eco-friendly energy sources in the future world. Biodiesel, an alternative eco-friendly energy sources has been recognised as an important diesel substitute for this purpose. Different vegetable oils are used for the production of biodiesel but use of edible oil puts a tremendous pressure on food and also on import of edible oils in our country. So use of non-edible oils for this purpose plays a dual role as it reduces the edible oil dependency for biodiesel production along with solve the scarcity of energy problems. Different non-edible oils like jatrophacurcas oil, karanja oil, neem oil, castor oil, rubber seed oil, mahua oil etc may be used for biodiesel production. In the present research investigation, mahua oil (*MadhucaIndica*) has been identified for the preparation of biodiesel and after that mahua biodiesel has been blended with diesel fuel in different proportions for use as a fuel.

Initially, mahua oil and methanol were reactedtogether for biodiesel preparation and transesterification reaction occurs between these raw materialsin the presence of 8% biocatalyst, Novozyme 40013, an immobilized nonspecific lipase from (*Candida antarctica*), at 6:1 molar ratio of oil to methanol at a reaction temperature of 65°C for 7 hrs of continuous stirring with 550 rpm of mixing intensity.At the end of the reaction, the product was filtrated through separating funnel to remove the enzyme and allowed to separate. The lower layer was then evaporated under vacuum in order to remove excess methanol and the final product was collected. The enzyme was washed with hexane, dried and reused for the next experiment. Biodiesel characterization was done according to the American Standard Testing Method (ASTM).It shows satisfactory results.

Mahua biodiesel was then mixed with diesel fuel in different proportionsat low stirring rate for blended fuel preparation. The mixture wasstirred for 30 min and left to reach equilibrium before analysis. Mahua biodiesel was added in volume percentagesof 20% (B20), 40% (B40), 60% (B60) and 80% (B80). The properties of blended fuel were compared with diesel fuel and acceptable results are obtained. Finally, biodiesel-dieselblends have the potential to be a good alternative of fossil fuels in the near future.

Table 1: Characteristics of mahua biodiesel

Properties	Diesel fuel	Mahua biodiesel	ASTM D6751
Density at 15^{o}C(Kg/m3)	841	874±0.201	860-900
Calorific value (MJ/Kg)	45	36±0.009	-----
Kinematic viscosity at 40^{o}C (mm2/s)	3.17	4.19±0.009	1.9-6.0
Flash point (^{o}C)	63	217±0.111	Min 130
Carbon residue (%)	0.1	0.2	-----
Cetane number	53	67±0.103	------
Fire point (^{o}C)	101	210±0.119	Min 145
Ash content (%)	0.01	0.02	<0.02

Table 2: Properties of blended fuel

Properties	Density at 15^{o}C(Kg/m3)	Kinematic viscosity at 40^{o}C (mm2/s)	Cetane number	Acid value (mg KOH/gm)	Flash point (^{0}C)
Diesel fuel	841	3.17	53	0.19	63
B100	874	4.19	67.32	0.27	167
B80	867	4.01	64.12	0.26	146
B60	859	3.89	61.07	0.25	129
B40	851	3.72	58.19	0.23	101
B20	843	3.47	55.27	0.21	81

Innovativeness of the work

Present work shows thata cheap raw material like Mahua oil has been utilised for the preparation of biodiesel, an alternative renewable energy sources. Blended fuel prepared from mahua biodiesel and diesel fuel also has significant characterises with regard to different properties and it can be safely used in different dieselengines without modification which can mitigate the environmental problems in near future.

Keywords: Biodiesel; Mahua oil; *Candida Antarctica;* Blended fuel.

Proceedings of 4th National Conference on Science, Technology & Communication Skills (NCSTCS2K21)
Date: 24-25 September, 2021 **ISBN: 978-93-89817-63-8**

ANALYSIS OF STIRRING FOR TRANSESTERIFICATION REACTION

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Abstract
Stirring or mixing of the reactants in a transesterification reaction plays a significant role for the maximum conversion of product. In our study, effect of stirring has analysed for the transesterification reaction between waste cooking oil and methanol for the production of biodiesel. Analysis of mixing intensity was done by varying the stirring from400 to 800 rpm at a temperature of 60^0C using 6:1 molar ratio of methanol and waste cooking oil for 8 hours of reaction in the presence of 10% enzyme Novozyme 40013 (*Candida antarctica*). Stirring effect has been studied w.r.t. molar ratio, duration of reaction and enzyme concentration for the reaction system. Study shows that 700 rpm is the optimum stirring for this transesterification reaction and maximum biodiesel has been obtained at these reaction conditions. Finally 92.36% conversion has been achieved.

Table 1: Characteristics of waste cooking oil

Characteristics	Values	Test methods
Density at 15 ^{0}C (kg/m3)	910	ASTMD 1298
Acid value mg KOH/g	8.43	ISO 660-2009
Saponification value	181	ASTM D558
Humidity	0.96	Gravimetry
Iodine value	97.34	ISO 3961-2009
Sediments content	1.37	Gravimetry
Kinematic Viscosity(mm2/s at 40 ^{0}C)	34.82	ASTM-D445

Table 1 shows the characteristics of waste cooking oil. It has been observed from Table 1 that the density, viscosity and saponification value of waste cooking oil are quite high. As the oil has been collected from different cafeterias, fast-food centres and restaurants, so the oil contained some sediments.

Table 2: Effect of stirring w.r.t molar ratiofor transesterification reaction

Stirring rate→ Molar ratio ↓	400 rpm	500 rpm	600 rpm	700 rpm	800 rpm
4:1	41.27%	53.78%	61.08%	73.11%	71.21%
5:1	50.56%	61.28%	71.07%	81.21%	80.05%
6:1	61.23%	72.80%	83.09%	92.36%	92.33%
7:1	60.78%	71.26%	81.34%	91.11%	90.56%

Table 2 shows the effect of stirring w.r.t different molar ratios of alcohol to oil for the conversion achieved. The analysed stirring rate was 400 to 800 rpm. At 700 rpm, maximum conversion (92.36%) has been achieved. Beyond that no enhancement of conversion has been found.

Table 3: Effect of stirring w.r.t duration of reaction for transesterification reaction

Stirring rate→ Time ↓	**400 rpm**	**500 rpm**	**600 rpm**	**700 rpm**	**800 rpm**
6 hrs	39.17%	51.67%	61.26%	72.33%	70.72%
7 hrs	53.84%	63.78%	71.54%	79.91%	79.01%
8 hrs	61.23%	72.80%	83.09%	92.36%	92.33%
9 hrs	58.12%	71.13%	80.44%	91.01%	90.59%

Table 3 shows the effect of stirring w.r.t duration of reaction for the conversion achieved. Here, analysis has been done by varying the stirring rate from 400 to 800 rpm w.r.t. changing the duration of transesterification reaction. Reaction time analysed was 6-9 hrs where it has been observed that 8 hrs was the optimum time with 700 rpm stirring rate. Enhancing the time to 9 hrs did not enhance the conversion further.

Table 4: Effect of stirring w.r.t enzyme concentration for transesterification reaction

Stirring rate→ Enzyme concentration ↓	**400 rpm**	**500 rpm**	**600 rpm**	**700 rpm**	**800 rpm**
6 %	33.27%	41.59%	50.39%	61.37%	60.12%
8%	46.38%	59.34%	70.45%	78.34%	76.94%
10%	61.23%	72.80%	83.09%	92.36%	92.33%
12%	59.32%	70.19%	80.14%	89.37%	88.35%

Table 4 shows the effect of stirring rate w.r.t. enzyme concentration for the conversion achieved. It has been observed from Table 4 that 10% was the optimum concentration for transesterification reaction and maximum conversion has been achieved at 700 rpm of stirring. Beyond that no significant observation has been achieved regarding conversion. So stirring has animportant effect for the transesterification reaction for the production of biodiesel from waste cooking oil and methanol.

Innovativeness of the work

Present research work shows that stirring plays a big role for transesterification reaction between waste cooking oil and methanol and it directs the optimum conversion for the production of biodiesel maintaining other reaction parameters. Molar ratio of alcohol to oil, duration of reaction and enzyme concentration have a significant correlation with stirring rate for the maximum conversion which has been established form the work.

Keywords: Biodiesel; Waste cooking oil; *Candida Antarctica;* Stirring.

A LITERATURE SURVEY ON ARTIFICIAL INTELLIGENCE

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Abstract

Artificial Intelligence is the type of intelligence where actions are demonstrated by machines, as opposed to the natural intelligence displayed by humans or animals. AI was first created by Alan Mathison Turing who was the British Logician and Computer Pioneer in the mid-20th century. For example the computer systems are the real examples of AI or Artificial Intelligence. Specific applications of AI include: Machine learning, Data Security, Gaming, Social Media. Ohn McCarthy is considered as the father of AI, in 2006, five years before his death. The future father of AI tried to study while also working as a carpenter , fisherman as well as an inventor(he devised a hydraulic organce-squeezer) in order to help his family .Now , there are mainly 4 types of AI as follows :Reactive Machines , Limited Memory, Mind Theory and Self-Awareness.AI is so important nowadays , because it enables human capabilities like understanding , modifications, reasoning , planning , communication and perception . Main goals of AI: To enable computers to perform tasks like:-Decision Making, Understanding Communication, Problem Solving, Perception. The domains of AI are: Formal tasks, mundane tasks, Expert tasks. Therefore, use of AI is highly demanding in the upcoming generation. There would be a time where everything around would be getting demonstrated and prevailed by AI. So, AI is considered as a smart system to be considered for our future .Examples of AI that we are using in daily life: Smart phones, Social Media Feeds, Music and Media Streaming Services, Video Games, Online Ads Network, Navigation and Travel, Banking and Finance. In the 1960s, researchers emphasized the development of algorithms for solving geometrical theorems and mathematical problems and providing the solution. In the late 1960s, computer scientists worked on Machine Vision Learning and developing machine in robots. The first intelligent humanoid robot was built in Japan in 1972 and its name was "WABOT-1". AI requires coding, as it is required to understand and develop solutions using AI. AI-based algorithms are used to create solutions that are easily able to be detected by humans .The top 5 languages that help with the work of AI are :Python, LISP, Prolog, C++and Java. The main purpose of AI is to provide software that can provide the estimated output with respect to the reasonable input. Coming to talk about the most frequently used language for AI then it's definitely none other than the machine language Python that is really swift for web and app development nowadays. Python can also be considered as the language that lives the umbrella of Python. One of the main reasons to make it clear that why Python is so popular with AI development is that it was created as a powerful data analysis tool and has always been much popular within the big data field. The full power of AI and data analytics can be harnessed throughout the complete data pipeline with the help of code, code-ready interface, by delivering the power capabilities to the organizations readily stated.

Innovativeness of the work

AI is being used to modify the technology and make it possible to harness the actions of the machines using intelligence artificially. In the future AI is all set to show massive improvements and faster and smarter techniques getting used which will be able to show the impact on human's life and the industry too.

Keywords: AI; Machine language; Python; Network; Big data; Data analysis tool;

STUDIES OF CYCLIC COMBINATION CIRCUIT

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Abstract

Combinational circuit are generally acyclic in nature. Cyclic circuit can be Combinational. Cycles sometimes occur in design synthesized from high level descriptions. Feedback in such cases is carefully contrived, typically occur-ring when functional units are connected in a cyclic topology. We propose a

general methodology for the design of combinational circuit with cyclic topology.

A collection of logic gates connected in a acyclic (i.e, loop-free) topology is clearly combinational. Regardless of the initial values on the wires, once the values of the inputs are axed, the signals propagate to the outputs. There is a clear correspondence between the electrical behaviour of the circuit and the abstract notion of the Boolean functions that it implements. The behaviour of the circuit with feedback is generally more complicated. Such a circuit may exhibit timing-dependent behaviour (as in the case of R-S Latch) and it may be unstable (as in the case of an Oscillator) A collection of logic gates forms a combinational circuit if the outputs can be described as Boolean functions of the current input values only. Optimizing combinational circuitry, for instance by reducing the number of gates (the area) or by reducing the length of the signal paths (the delay) is an overriding concern in the design of digital integrated circuits. And yet, cyclic circuit can be combinational.

A combinational circuit has output values that depend only on the current values applied to the inputs. A combinational circuit consists of an acyclic congruence of logic gates, i.e it contains only feed-forward paths , i.e it contains only feed-forward paths.

In different K-map on different functions must be some position identity. After creation, we find the dependency on one function to other. Now change the literals value and construct the cyclic network. If we proceed in this way we may get a general function

$$f_1 = f(a_i, f_0), f_2 = f\left(a_j, f_1\right), f_3 = f(a_k, f_2) \dots\dots\dots.. f_n = f(a_p, f_{n-1})$$

From this above functions we may propose a circuit which is cyclic combinational. This type of cyclic combinational circuit can be used in Quantum circuit.

Innovativeness of the work

Cyclic circuit with cyclic topology has been established and analysed in the present study. Relationship between the electrical behaviour of the circuit and the abstract notion of theBoolean functions is critically studied in the present research investigation.

Keywords: Combinational circuits; Boolean functions; Acyclic topology.

A GENERATIVE MODEL BASED VISUAL RECOGNITION USING ZERO SHOT LEARNING

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Abstract

The recent developments in Deep Learning have extensively helped us analyze complicated distributions of data and made great achievements in the field of image classification after training with a large number of labeled samples. However, there are many categories that have no labeled training samples or a few labeled training samples. In traditional Deep Learning approaches, we can only predict target classes accurately if the trained model has seen the target samples at least once. However, Zero-shot Learning (ZSL) is a transfer learning technique that transfers knowledge from familiar sample classes to unfamiliar sample classes that were not observed while training the model via semantic knowledge space and predicts the category they belong to. The key to dealing with the unfamiliar or novel category is to transfer knowledge obtained from familiar classes to describe the unfamiliar class which is possible because of underlying semantic space which is common to familiar and unfamiliar classes. Most Zero-shot Learning approaches use embedding-based approach, where the main goal is to map the image features and semantic attributes into a common embedding space using a projection function, which is learned using deep neural networks. The embedding-based approach during training aims to find a projection function using labeled familiar

class data which maps visual data to semantic data. Since neural networks are used as function approximators, the projection function is learned as a deep neural network and while testing the unfamiliar category image feature data are put in as input to the trained model, and we get the relative semantic embedding as a result. After which it applies nearest neighbor search in the semantic attribute space to find the best similar result to the output of the network. The category corresponding to the nearest semantic embedding is predicted as the final category of the input image feature. However, the main drawback with embedding-based methods is that they suffer from the issue of bias and domain shift which means that since the projection function is learned using only seen classes during training, it will be biased towards predicting seen category labels as a result as there is no guarantee that the trained projection function will rightly map unfamiliar category image features to the corresponding semantic space correctly at the testing phase. A domain shift is a change in the data distribution between an algorithm's training dataset, and a dataset it encounters when deployed. To overcome this drawback, it is important that our Zero-shot model is trained on both familiar and unfamiliar category images at training time. The proposed generative model-based Zero-shot learning approach will be able to reduce the effect of the domain shift as it utilizes unlabeled visual data from unfamiliar classes to generate corresponding semantic features for unfamiliar class visual samples. The generative model-based approach during training aims to generate image features for unfamiliar categories using semantic attributes by using Generative Adversarial Network (GAN) that generates image features conditioned on the semantic attribute of a given category improving the projection function than the previously mentioned method.

Innovativeness of the work

Most of the deep learning techniques use multi-shot or few-shot learning approaches using a large number of labeled data samples for image classification. However, the proposed deep learning technique uses a variant of transfer learning method i.e. Zero-shot Learning which does not require labeled data samples in the training phase.

Keywords: zero-shot learning; deep learning; generative adversarial networks; neural networks

LIMITATIONS OF AIR TRAFFIC CONTROL USING RADAR

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Abstract

Safe navigation, the fixed distance between the aircrafts and efficient management of the airspace depends on the information given by the Communication, Navigation and Surveillance systems.Today's Air Traffic Control(ATC) systems has evolved over several decades from the one that was first put in place in the 1930's. For better air traffic management (ATM), surveillance radars, Air Traffic Control Radar Beacon System transponders, microwave relays and data processing are used due to the increased demand. To combat with the challenges of ATC services and to provide the information needed to make the decisions required for the safe and efficient movement of aircrafts, advanced data-processing and communication technologies have been introduced. These technologies have improved the acquisition, integration, and display of information for ATC facilities.

For ATC, the real time information is necessary, but the radars are having limitations. The air traffic management becomes critical over oceanic areas as well as in low altitude regions due to the limited services availability. The extreme weather conditions and outdated equipment with limited availability of spare parts to support system operation are mainly responsible for limited services over these regions.During the extreme weather conditions like temperature inversions, heavy clouds, precipitations,

mountains and other obstacles the radio waves from radar bent towards ground or in upward direction. This anomalous propagation can cause many extraneous blips to appear on the radar operator's display if the beam is bent towards the ground or can decrease the range of detection if the wave is bent in upward direction. This problem of ducting can be solved using Beacon Radar and eliminating electronically the stationary and slow moving targets by MTI (moving target indicator) method. Sometimes aircrafts at low altitude are not seen if they are screened by mountains or they are below the radar beam due to the earth curvature. This problem is solved by installing multiple radars in some areas. Now a days Automatic Dependent Surveillance Broadcast (ADS-B) gives better surveillance where multiple radar installations are not practically possible. If the radio waves from radar energy strikes the dense materials, then itis reflected back and displays on the operator's scope results in blocking out aircraft at the same range and weakening or sometimes completely eliminating the display of targets at a greater range. This is also solved by radar beacon and MTI. The reflected beam of the radar from the aircraft decides the amount of reflective surface of aircraft. So a small and lighter plane will be less visible than a large commercial jet or military bomber on primary radar. Again ADS-B becomes indispensable tool to overcome this problem. Gap filler radar systems are deployed for lower altitude radar coverage between two larger radar systems, each of which provides both primary and secondary radar coverage at some locations. This role is served by ADS-B. So, ADS-B is used to solve many of the ATC problems and ATM can be done easily.

Innovativeness of the work

In this paper, to combat with the challenges of ATC services and to provide the information needed to make the decisions required for the safe and efficient movement of aircrafts, advanced data-processing and communication technologies are discussed.

Key-words: Air Traffic Control, Moving target indicator, Automatic Dependent Surveillance Broadcast and Air Traffic Control Radar Beacon System transponders.

EFFECTS OF SPACE WEATHER ON MODERN COMMUNICATION SYSTEMS

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Abstract

Coronal mass ejections and solar flare effects are mainly responsible for change in the state of Sun-Earth environment. During these events enormous amount of charged particles is spew out by sun towards the earth which alters the density of charge particles in interplanetary space and the earth's ionosphere. These energetic particles interact with earth's magnetic field produces the magnetic disturbances and also increases the ionization in ionosphere results in misoperation or sometimes failure of modern communication system. The satellite, spaceship and radar operations, GPS navigation and all the HF, VHF and UHF communications are affected by the increased ionization due to space weather effect. There is various proof of grid failure, frying out of circuitry of spacecraft, equipment damage of the satellite, effect on wireless communication, effects on submarine and optical fiber cables and many more due to space weather. The increased ionization of ionospheric D layer along with higher density of neutral particles leads absorption of signal in the D layer which ultimately affects the high frequency (HF) communication. This short-wave fadeout follows the pattern of solar flare. The satellite communication is affected by space weather in many ways. The entry of charged particles with high speed from Sun in the semiconductor devices of the satellite results in production of high amount of electron –hole pairs. The high current due to the production of electron-hole pairs results in change of information which ultimately affects the control systems. There is high chance of charging of the surface of the spacecraft due to the beams of electrons as a

result of space weather effect which affects the satellite operations. These relativistic electrons can cause the internal charging of satellite components which may result in complete failure of the satellite. The radar communication is also affected by space weather conditions. On Nov 4, 2015 the Secondary air traffic control radar was strongly disturbed in Sweden and some other European countries due to strong solar radio burst in a relatively narrow frequency range around 1 GHz.

The mobile communication which operates in UHF band can be affected by solar radio bursts associated with solar flares. The modulation of GPS signal due to space weather results in increased interference in mobile communication. Some 5G networks use multiple GPS satellites at a time, hence they are more susceptible to space weather than earlier generations.Long distance underwater communication using optical fiber is also affected by geomagneticallyinduced current due to geomagnetic storms. In 1989 storm, optical fiber was used to transmit the signal in submarine, but to carry power to the repeaters a conductor was used in which large induced voltage was observed in the power supply cables. All these losses and failures can be minimized by early warning using enhanced technology.

Innovativeness of the work

In this paper the satellite, spaceship and radar operations, GPS navigation and all the HF, VHF and UHF communications are affected by the increased ionization due to space weather effect is reviewed. The increased ionization of ionospheric D layer along with higher density of neutral particles leads absorption of signal in the D layer which ultimately affects the high frequency (HF) communication is also reviewed.

Key-words: Space weather, Geomagnetic storm, Solar flares and GPS navigation.

COMMUNICATION IN ANTARCTICA USING ANARESAT: A REVIEW

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Abstract

Telecommunications is a major course of the research operation of Australia in Antarctica. From 1911 to 1914, the Australian Antarctic Expedition led by Douglas Mawsonwas responsible for establishing a transmitter in the Commonwealth Bay and a relay station on Mcavery Island. During this period, Rotary-arc transmitters and Morse code were used for transfer of weather information and personal messages to Hobart. The introduction of permanent satellite communication in the late 1980s revolutionized communication between Australia and its four Antarctic stations. ANARESAT uses Intelsat Geostationary Communication Satellite to provide telecommunication syllables between Australia and the stations.The first satellite earth-station has a 7.302 m parabolic antenna which was installed and commissioned on the 1st island of operation, named as Davis Station on March 1987. ANARESAT is a system that operates over Intelsat satellites system to provide a major communications link between Australia and the Antarctic stations. All the communication station in Antarctic is provided with a C-Band Intelsat Standard-F2 earth station and other required equipment. From the beginning when the satellite was installed, equipment and bandwidth has always been upgrading regularly to meet the changing needs of the Australian Antarctic programme. The current capacity to Casey and Davis is 1.2Mbps and they are powered by 4 Caterpillar 3306, turbocharged generator sets and each of them has 125 kW capacity. In the initial phase, ANARESAT worked on a phone line and a modem line of 4802 bits per second. In comparison to the rad phone, the clarity of the phone line was incredible due to which communication becomes very much accessible and reliable. In 1992, the Digital Data Service replaced the cognate system modem line, which thus resulted in the escalation of data capacity to 64 Kbps. ANARESAT was the first geostationary satellite to be placed in a place which has been the least explored by human being and the most prohibited Continent. ANARESAT

is based on a technology named INTELSAT. It is a technology which is a highspeed microwave level communicator and gives a speed of 121mbps. This technology has been founded itself to be very useful and cost efficient. This technology is used by several other nations like USA, South Korea, Australia. INDIA is to set foot on this technology by 2028 according to reports. The late arrival of Aurora Borealis may be due to ANARESAT. This is also postulated that sometimes the connection between two satellite between Antarctica and Australia are blocked due to some unknown waves which have the frequency enough to block transmitted waves. Thus it can be concluded that ANARESAT is the oldest INTELSAT based communication system which is still in use and beating others in the field of transmission.

Innovativeness of the work

In this paper ANARESAT system is reviewed. This system uses Intelsat Geostationary Communication Satellite to provide telecommunication syllables between Australia and the stations. From the beginning when the satellite was installed, equipment and bandwidth has always been upgrading regularly to meet the changing needs of the Australian Antarctic programme.

Key-words: ANARESAT, INTELSAT, Geostationary satellite and Communication.

A MATHEMATICAL APPROACH TO CONTROL FILARIASIS THROUGH INSECTICIDE SPRAYING

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Abstract

Lymphatic filariasis impairs the lymphatic system and can lead to the abnormal enlargement of body parts, causing pain, severe disability and social stigma. In this article, we consider a simple mathematical model to analyze the disease dynamics of Filariasis consisting of susceptible and infected population of human and female mosquito.

Lymphatic filariasis (LF) is caused by infection with threadlike worms called nematodes of the family Filarioidea. Lymphatic filariasis, commonly known as elephantiasis, is a neglected tropical disease. Infection occurs when filarial parasites are transmitted to humans through mosquitoes. Infection is usually acquired in childhood causing hidden damage to the lymphatic system. Ninety percent of infections are caused by Wuchereria bancrofti and the remainder by Brugia spp. Humans are the exclusive host of infection with W. bancrofti. Although certain strains of B. malayi can also infect some animal species (felines and monkeys), the life cycle in these animals is perceived as epidemiologically distinct from human.

Lymphatic filariasis, considered globally as a neglected tropical disease, is a parasitic disease caused by microscopic, thread-like worms. The adult worms only live in the human lymph system. The lymph system maintains the body's fluid balance and fights infections. Lymphatic filariasis is spread from person to person by mosquitoes. People with the disease can suffer from lymphedema and elephantiasis and in men, swelling of the scrotum, called hydrocele. Lymphatic filariasis is a leading cause of permanent disability worldwide. Communities frequently avoid and reject women and men disfigured by the disease. Affected people frequently are unable to work because of their disability, and this harms their families and their communities.

Mathematical studies on the disease dynamics of filariasis is not yet been explored in large scale. Our study is based on the work of Nicolas through deterministic version and we recommend a customized deterministic version using impulsive differential equations appropriately for the estimated of adherence

behaviour of insecticide to restrict the vectors. Control of the vectors is one of the most efficient approaches to exterminate the disease filariasis. In this connection, spraying of insecticide performs a momentous function for controlling the said disease.

Based on the assumptions, we have formulated the mathematical model of the transmission dynamics of filariasis through vector. From that point of view, we have investigated in absence of insecticide spraying that, the disease free situation exists if $R_0 < 1$. On the other hand, if $R_0 > 1$, the disease free state drops its stability and the system tends toward the endemic condition. Here, our focus is to reduce the vector (mosquito) population so that the disease may be controlled. Here we explore the effect of insecticide for controlling the vector population through control approach. We have studied the efficiency of the insecticide spraying, which contributes a greater impact on the dynamics to move the system towards disease free situation.

Innovativeness of the work

The utilize of insecticide-treated nets in zones where Anopheles is the essential vector for filariasis upgrades the effect on transmission amid and after MDA. Vector control has in select settings contributed to the disposal of lymphatic filariasis within the nonappearance of large-scale preventive chemotherapy.

Anti-Wolbachia therapy employs antibiotics and may be a promising approach appearing powerful macrofilaricidal movement additionally anticipates embryogenesis. Doxycycline appears potential as an anti-Wolbachia treatment, driving to the passing of grown-up parasitic worms. Other than doxycycline, a few other potential anti-microbials are moreover being investigated for the treatment of LF. This think about points to examine the later improvements within the utilize of anti-Wolbachia drugs for treatment of LF.

Key words: Vector; Lymphatic filariasis (LF); Transmission Probability; Insecticide spray; Insecticide-treated nets.

ABOUT EDITOR

Dr.Sumit Nandi did B.Sc. (Hons.) in Chemistry, B.Tech. (Chemical Technology), M.Tech. (1st class 1st& Gold Medalist) in Chemical Technology and Ph.D. (Tech.) from Calcutta University. After that he completed MBA with dual specialization in finance and marketing. He also completed one year Post Graduate Diploma in Environmental Management from Kalyani University. Dr. Nandi has been teaching for the last seventeen years at Narula Institute of Technology under JIS Group and presently working as Head and Associate Professor, Dept. of Basic Science of Humanities in the same institute. Dr. Nandi has been teaching as a Visiting faculty in the Department of Chemical Technology, Calcutta University for the last twenty one years. He has several years industrial experience also. His main research area is enzyme kinetics, environment friendly biofuels, mathematical modeling in environmental issues, characterization of blended polymers etc. Several prestigious projects from DBT and UGC have also added many feathers in his cap. He has two patents and published one book on "Engineering Chemistry Simplified" for the B.Tech. students. He guided several research scholars also. He has got best paper presentation award several times in different international conferences in India and abroad. Dr. Nandi contributes more than 100 research publications in reputed international journals and conferences. He visited different countries like Germany, China, Poland, Czec Republic, Hungary, Bulgaria and Lithuania for invited talk and attending international conferences.

ISBN:978-93-89817-63-8