



PROCEEDINGS OF 2nd NATIONAL CONFERENCE
ON
SCIENCE, TECHNOLOGY AND COMMUNICATION SKILLS
(NCSTCS 2K19)
5 April 2019



**Proceedings of 2NDNational Conference
on
SCIENCE, TECHNOLOGY AND COMMUNICATION SKILLS
(NCSTCS 2K19)**

5th APRIL, 2019

Editors

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Dr. Sarbani Ganguly, Asst. Professor, BS & HU**

Organized by

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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, Polytechnic and JIS University. 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 autonomous Engineering & Management college, located at Agarpara in West Bengal, approved by AICTE and affiliated to MAKAUT formerly known as West Bengal University of Technology. The college offers NBA accredited degree programmes in engineering. The four year B.Tech course is imparted in the streams like CE, CSE, ECE, EE, IT, EIE & ME. The institute provides a brilliant platform for pursuing higher studies through PG courses like M. Tech (, CE- Structural engineering, CSE, ECE in Communication, EE- Power System), MBA and MCA. It has expanded to include diploma programs in CE, EE, and ETCE under the affiliation of West Bengal State Council of Technical Education. The institute is also accredited by National Assessment and Accreditation Council (NAAC). The college has also received ranking in NIRF (Rank Band 101-150 for consecutive three years), MHRD, Govt. of India.

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 organised **2nd National Conference on Science, Technology and Communication Skills (NCSTCS 2K19)**. 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.

October 2019, Kolkata

*Dr. Sumit Nandi
Associate Professor
HOD, Department of BS & HU*

Table of Contents	Page No
MESSAGE FROM CHAIRMAN BOG JIS GROUP	5
MESSAGE FROM MANAGING DIRECTOR JIS GROUP	6
MESSAGE FROM PRINCIPAL	7
MESSAGE FROM PROGRAMME COORDINATOR	8
MESSAGE FROM CONVENER	9
LIST OF COMMITTEE MEMBERS	10
ABSTRACTS	11-86

MESSAGE FROM BOG CHAIRMAN (JIS GROUP)

I am happy to observe that the Department of Basic Science and Humanities Department of NiT organised 2nd “**National Conference on Science, Technology and Communication Skills (NCSTCS 2K19)**” on 5th April, 2019. 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.) S. M. 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 2nd **“National Conference on Science, Technology and Communication Skills (NCSTCS 2K19)”** on 5th April, 2019 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 2K19 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 2nd **“National Conference on Science, Technology and Communication Skills (NCSTCS 2K19)”** held on 5th April, 2019, at the Campus 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 2K19** 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 2K19** 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 HOD- BS & HU (PROGRAMME COORDINATOR)

I consider conducting **NCSTCS 2K19** 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 2K19**.

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 2K19** 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

MESSAGE FROM THE CONVENER

I feel honoured and privileged to get the opportunity to propose a vote of thanks on this grand inaugural occasion of 2nd “**National Conference on Science, Technology and Communication Skills (NCSTCS 2K19)**” held on 5th April, 2019, at Narula Institute of Technology. It is indeed a very memorable day for all the members of the Basic Science & Humanities department. As we usher the opening of the National Conference in the presence of the honourable Principal and the dignitaries. I, on behalf of Organizing Committee convey deep regards and heartfelt thanks to the respected dignitaries, participants and fellow colleagues. I am thankful to all the participants across West Bengal for coming to Narula Institute of Technology to attend the Conference.



I, on behalf of the entire team of organizing committee, wish to extend a very hearty vote of thanks and deep gratitude to our honourable Managing Director Mr. Taranjit Singh for motivating us and giving us such a platform to organize such effective program for teaching and research fraternity. I extend my whole hearted vote of thanks and deep gratitude to our friend, philosopher and guide, our honourable Principal, Prof. (Dr.) M. R. Kanjilal for extending her unfailing support towards our initiative to organize this Conference. I am very much thankful to our HOD, Dr. Sumit Nandi for his continuous support and advices which have greatly helped towards the successful organization of **NCSTCS 2019**. I would like to place on record our hearty thanks to our registrar Ms. Nidhi Singh for her perfect logistic support towards organizing the Conference. I am thankful to the **NCSTCS 2019** steering committee members for their whole hearted support and for working relentlessly for the past few weeks in order to achieve grand success in **NCSTCS 2019**. I thank all the HODs of all the respective departments, the invited speakers, delegates and specially students, reviewers for their enthusiastic participation in this Conference. I also convey my sincere thanks to all the people who have given their precious time in organizing this grand occasion.

Dr. Susmita Karan

LIST OF COMMITTEE MEMBERS

Chief Patron:

- Sardar Taranjit Singh (MD, JIS Group)

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Indian Regional Navigation Satellite System (IRNSS)Banhnisikha Ray^a, Raktim Pratihar^a, Dibyendu Sur^b^aStudent, Electronics and Instrumentation Engineering, Narula Institute of Technology, Kolkata-700109^bAssistant Professor, Electronics and Instrumentation Engineering, Narula Institute of Technology, Kolkata-700109**Abstract**

The Global Positioning System (GPS) is a satellite-based navigation system made up of at least 24 satellites, under the supervision of U.S. Department of Defence (US DOD). The entire modern civilization is benefitted from this system. Recently **Indian Regional Navigation Satellite System (IRNSS)** has been introduced as access those regions which GPS is not guaranteed for accurate position measurement. This project was approved in the year of 2006 by Indian Army. After that Indian Space Research Organisation (ISRO) has started working on it in the campus of Bayalalu, Karnataka. First satellite of this system was launched in the year of 2013 and the last in 2018. Further development was stated in 12th Five Year Plan of India's department of space which is increasing the satellite number from 7 to 11 and introducing **Global Indian Navigational System (GINS)**. This autonomous regional satellite navigation system that provides accurate real-time positioning and timing services is going to take up the charge to make India depend upon its own system, which will be beneficial towards security issues. The system supposed to have a constellation of 24 satellites, positioned 24,000 km (14,913 mi) above Earth. On 2013, the spectrum of GINS satellite orbits in international space was completed. **Navigation with Indian Constellation (NAVIC)** is the name of IRNSS. The signals from NAVIC will be Standard in Positioning Service and also in Precision Service. Both will have the capability of L5 (1176.45 MHz) and S band (2492.028 MHz). The SPS signal contains a 1 MHz BPSK signal. Binary Offset Carrier (BOC 5, 2) is used in The Precision Service. The S-band frequency (2–4 GHz) contains the navigation signal and broadcast through a phased array antenna to maintain required coverage and signal strength. The approximate weight of the satellite 1,330 kg and their solar panels generate 1,400 watts. The system provides an absolute positioning of better than 10 meters throughout the Indian ground and better than 20 meters in the Indian Ocean. Region of accuracy extended approximately 1,500 km (930 mi) around India. A Service area was extended and lies between primary service area and area enclosed by the rectangle from Latitude 30° south to 50° North, Longitude 30° east to 130° east. In 2017, three rubidium atomic clocks on board IRNSS-1A had failed as per announcement. This failure also tracked on the European Union's Galileo constellation. The first failure occurred in July 2016, following which two other clocks also failed. This rendered the satellite somewhat redundant and required replacement. The data from this satellite is not for the public uses, it has been restricted. The system was developed partly because access to foreign government made system is not secured for the country. India's Department of Space in their 12th Five Year Plan stated that they will duly increase the space qualified atomic navigation system. Analysis of the **Global Indian Navigational System (GINS)** has also been initiated on this plan.

Keywords: *Navigation System, Regional service, Real-time positioning, Global Indian Navigational System*

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A Survey on Different Threats and its Remedial of Wireless Sensor Network

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Abstract

Wireless Sensor Network (WSN) has become a spotlight with the advancement of wireless communication and computing, provides economic also lutionsto a diverserangeofreallifechallenges. WirelessSensorNetworkis a self-configured, infrastructure-less wireless network which consists of a number of spatially distributed autonomous sensor nodes and a base station applied in the remote area for surveillance. The function of the base station is to interface user and network. A sensor node integrates hardware and software, the main purpose of which is sensing, data processing and transmitting data. Routing and forwarding data are the main functions of sensor network. In the advancement of wireless technology, Wireless Sensor Network (WSN) has attracted a lot of interests in the research community due to its diversified application domain. WSN has various applications in enemy intrusion in the military application, patient monitoring in the medical field, environmental disaster, agricultural and industrial field. In Wireless sensor network each node is a battery operated low power device and operated in ad-hoc principle, which indicates network power is mainly dependent on rate of energy consumption. Ad-hoc networking nature of WSN allows the attacker for different types of attacks from passive eavesdropping to active attacks. As WSN requires hop by hop routing to transport the packets to the destination, any intermediate node acting maliciously can drop, modify or misguide the traffic traversing through it. Due to resource constraints of sensor nodes, the security mechanism with large overhead of computation is infeasible in WSN. In order to ensure the WSN's application success, security is amongst the biggest concerns, although it becomes really challenging when it comes to establishing more cost and energy efficient computing devices and algorithms of WSN. Security issue includes different types of attacks, identification of malicious nodes, intrusion detection, privacy, key management and network resilience. Confidentiality, authenticity, integrity, data freshness and quality of service (QoS) are the most important issues for wireless sensor nodes. This is why the familiarizing with the security aspects of WSN is very important before designing a WSN system. An attacker may collect sensitive information if the transmission is not properly encrypted. However, avoiding collision and providing cooperation among the nodes during the transmission are done by using medium access control protocols. This paper focuses on the security risks with respect to the resource restricted design and deployment characteristics along with the requirements to design a secured WSN system. In this paper wormhole attacks, black hole attacks, Sybil attacks, hello flood attack, traffic analysis attacks, node replication attacks, denial of service attacks and private attacks are investigated. In this paper attacks in physical layer, data link layer, network layer and transport layer and application layer are also discussed. Not only does this document about the popular attacks in different layers of WSN, but also provides some remedies against these attacks. Finally, this paper also discusses some of the defensive measures of WSN focusing on key management, link layer and routing security.

Keywords: Wireless Sensor Network, Confidentiality, Authenticity, Security risks, Defensive measures, Key management

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Overview of Navigation Satellite all Over the World

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Abstract

Satellite navigation is a leading-edge technology which allows anyone with a receiver to determine their position very accurately at any time by picking up signals from a constellation of several satellites. The entire modern civilization is benefitted from this system. On that topic the 1st system will come to our mind is the Global Positioning System (GPS). Original name of the GPS is NAVSTAR GPS. GPS does not transmit any data, independent operation is the best feature of it. U S Department of defense launches this project on the year of 1973. The GPS provide different appropriate and critical positions that help from military to the civilization. The gps concept is on the base of the normal positioning system. The receiver also called tracker have a different tracking algorithm. GLONASS is the designed navigation satellite from the Russian government. The Russian Federal space agency is the main developer team. It has three more types named k1, k2 and km .Its bring features like turn by turn, real time traffic data and much more. GPS has a 31 satellites that covering the planets, but in that case GLONASS has only 24. On the Year 2016 European Space agency has also been launched the Galileo, with two ground operation centers. There are completely 30 satellites on those 24 are operational and 6 are active spares. The system intended mainly for the civilian uses. Galileo is intended to be an EU civilian GNSS that allows all users access to it. On the other hand China had also launched their navigation satellite system named Beidou. The second generation of the system is also know as the Compass. It commits to give the service also on the Asia pacific also. The resolution of the BeiDou system was as low as 0.5 meters. The Quasi-Zenith Satellite System is the project of the Japanese government. QZSS has highly inclined three satellites. Their ground traces are asymmetrical. The Quasi-Zenith Satellites transmit signals compatible with the GPS L1C/A signal, as well as the modernized GPS L1C, L2C signal and L5 signals. The combined system of the QZSS and GPS gives the improves location accuracy in the navigation field. First generation QZSS is on the based on the Rb clock. On the other hand India has launched Indian Regional Navigation Satellite System (IRNSS). Its covers India on all over 1400 km. The data from this satellite is not for the public uses, its been restricted. The system was developed partly because access to foreign government made system is not secured for the country. It has the almost 10 mtrs accuracy on the ground and 20 meters on the sea level. In the year 2017 announced that some clock failure occurred on IRNSS-1A, and in the same time Galileo also been failed. India's Department of Space in their 12th Five Year Plan stated that they will duly increasing the space qualified atomic navigation system.

Keywords: *GPS, Glonass, Galileo, Beidou, QZSS, IRNSS*

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Automatic Engine Locking System Through Alcohol Detection

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Abstract

Driving under the influence of alcohol affects and claims countless of people's lives every year. If you drink and drive, not only do you possibly put yourself at a risk, but also your passengers and pedestrians and other people who are on the roads too. Every thirty minutes somewhere around the world someone's life is cut short and families are devastated. So, here we implemented a prototype version Alcohol Detection system in order to control drunk and driving as much as possible. The dissertation examines advancement in that methodology.

Working: The Alcohol Detection system works on a very simple principle. If a person attempting to operate the vehicle has been drinking, the alcohol breath analyser sensor will detect the level of alcohol in the driver's breath and if it crosses a certain threshold as stated by the government of the State, an alert will come and the vehicle engine will stop immediately. This project is designed for the safety of the people both inside and outside the vehicle.

To get a Blood Alcohol Content (BAC) reading, the users simply have to blow into a straw attached to the equipment for a few seconds. From here, the device utilises the vapours in your breath to calculate an estimation of the level of alcohol in a person's body. Alcohol is not digested by the body and is merely absorbed through different parts. These include the mouth, stomach and intestines. As a result, traces of the material can still be identified minutes after drinking, making it possible for the Breath Analyser to get an accurate reading.

Since, the driver is not allowed to operate the vehicle; this might pose a problem for him/her to reach their desired destination. So, we'll be including another feature in which the driver will have to connect their phone with the device using an **USB cable**. After getting the alcohol reading you'll be prompted with various options via an app to call a preset designated driver, or a cab, or send a **text notification** including your location to your nearby friends or a default emergency calling option if the person is not in senses but drunk. The main reason to go for this idea is due to its low cost, automated operation, low power consumption and it also provides an automatic safety system for cars and other vehicle as well.

Application: Drunk Driving is a major threat to Road Safety. Applications of **Automatic Engine Locking System Through Alcohol Detection** can be used anywhere to reduce the probability of road accidents.

- It can be used in various vehicles for detecting whether the driver has consumed alcohol or not.
- This can also be used in various companies, organisations, mines to detect alcohol consumption of employees driving their vehicles.
- With the help of GSM (Global System for mobile communication) technology we can inform the relatives, friends or emergency numbers about the alcohol consumption.

Keywords: *Alcohol detection, Threshold value, Automatic engine locking, USB cable, Text notification.*

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Experimental Study on the Effect of Corrugated Steel Fibre and Different Paste Content in Steel Fibre Reinforced Concrete

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Abstract

Concrete is fairly strong in compression but very weak in tension. Modern age concrete undergoes modification in ordinary Portland cement concrete, to meet the structural and durability requirement as every structure has its own intended purpose. Special reinforcement mechanisms, unlike conventional reinforcement bars, are in practice to amplify the tensile properties of concrete. Use of steel fibre, as especial reinforcement, is an effective technology established in the concrete industry. Steel fibre, distributed randomly throughout the concrete member, is used to enhance the tensile strength and improve the cracking deformation characteristics of concrete. Steel fibre offers greater strength and toughness compared to conventional fibre materials. Earlier research works are shown an augmentation of tensile strength and durability properties resulting the steel fibre reinforced concrete is being used for the applications of precast panels, offshore structures, grade slabs, footing, pavements etc. The steel fibre here used in the steel fibre reinforced concrete is prepared from the locally available steel wire of specific diameter and physical properties and then fabricated into Corrugated Steel Fibre with the aspect ratio of 60 conforming ASTM A820 and BS EN 14889. Concrete with water-cement ratios 0.45 and 0.50 are used with paste content 30% and 20% respectively and the proportions are fixed using the packing density method containing steel fibre with varying percentages of 1% to 5% at an increment of 1% are properly cured for critical investigation. A number of tests have been carried out on 150 mm³ concrete cubes at age of 7 days and 28 days to figure the influence of steel fibres on compressive strength and 75cm x 10cm x 10cm concrete beams of identical age for the tensile strength of concrete. The objective behind this is to compare the behaviour of ordinary concrete and steel fibre reinforced concrete under the application of compressive and flexural load, the generalised representation of maximum strength achieve by the test specimen with incremental age and the strength development for different concrete mix with variable paste content. Investigation shows that the addition of steel fibre has a significant effect on the physical and mechanical properties of concrete as the compressive strength of concrete test specimen increases approximately up to 12% with the addition of 1% steel fibre by volume of cement and the four-point bending test of the concrete beams increases the flexural strength approximately up to 15% to 22% with the addition of 1% steel fibre by volume of cement. It also indicates that at a constant percentage of fibre increment, that is 1% by increasing of paste content and the water-cement ratio of the concrete specimen, the compressive strength is elevated about 6% to 14% and the flexural strength is also increased from 9% to 12%. The effect of steel fibre exhibit 1) The strength of the steel fibre reinforced concrete depends largely on the quantity of fibre added to it, 2) Use of a higher percentage of steel fibre is likely to cause hardness of concrete and mortar with reduced workability, 3) The strength of concrete specimen increases linearly and shows a short increment at a higher percentage of steel fibre. As compared to ordinary concrete the steel fibre reinforced concrete exhibit greater engineering performance and toughness. This research paper is a trail of giving some highlight for the introduction of steel fibres with various types of concrete.

Keyword: Ordinary Portland cement, Fibre reinforced concrete, Steel fibre, Packing Density method, Aspect ratio, Compressive and flexural strength.

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Experimental Study on Influence of Silica Fume under Compressive Load in Structural Concrete

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Abstract

Concrete is a composite material of aggregates and cement pastes that fills in the spaces between aggregate particles and binds them together. Ordinary cement paste is a non-homogeneous and anisotropic matrix composed of irregularly shaped and unevenly distributed pores. The pore structure greatly influences the strength development and permeability of concrete. The significant change to the microstructure characteristics by using mineral admixtures as cement replacement substance in concrete can be feasible and improve the performance of concrete by producing more discontinuous and impermeable pore structures. This study enriches with the microstructure development of cement-silica fume blends and the significant effect to acquire higher permeability of concrete body and durability of concrete. In this paper, a procedure for prediction of the compressive strength of silica fume concrete is developed by considering water to binder ratio and silica fume replacement ratio. Silica fume conforming IS 15388:2003 has been used for the preparation of concrete test samples, however, the low bulk density and high specific surface area of silica fume exhibit challenges in its application. Concrete specimens were fabricated by replacing ordinary Portland cement with Silica fume ranging from 0% to 25% at an increment of 5% replacement level. During the preparation of concrete, incorporated with silica fume, the proportions of aggregated materials and water were assigned by packing density method and the water-binder ratio was fixed at 0.40 for extensive experimentation. The series of concrete blocks of dimensions 150 mm³ were kept under a proper humid condition so that the test sample can accomplish full strength when it is kept under compressive load at an age of 7 days and 28 days. Mechanical behavior of concrete was evaluated by means of compressive strength test. Results of the compressive strength of silica fume concrete are investigated and the generalized presentation shows an increment of 12% to 18% of compressive strength for the cement-silica fume blends ranging from 0% to 15% at a replacement of 5% by weight of cement. This rate of compressive strength development is slightly improving at nearly 2% for the next 5% replacement and the very next value shows a percentage reduction of 9% compressive strength for the last replacement of 25%. Proper exploration shows that replacement of silica fume with binder enhance the mechanical and physical properties of concrete up to a certain limit. Based on the findings of the experimental program following highlights can be drawn 1) Silica fume concrete has a consistency higher compressive strength with respect to ordinary Portland cement concrete, 2) there was a systematic increase in compressive strength with the increase of silica fume content up to an optimum level, and 3) The replacement of 20% ordinary Portland cement with silica fume as matrix significantly shows greater compressive strength, further modification with this replacement level results reduction of compressive strength value. So the optimum silica fume replacement ratios alongside with water-binder ratio that reduced the permeability of concrete reasonably are proposed for durable concrete. This research paper is a trail to endeavor the relationship of optimum silica fume replacement with the binder to the water-cement ratio and prediction of physical and mechanical properties of concrete.

Keyword: Durability, Concrete, Silica fume, Admixtures, Ordinary Portland cement, Water-cement ratio, Compressive strength.

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Empowerment of Villages Through Technologies by Sanitation and Solid Waste Management: A Review

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Abstract

India faces many major challenges by waste generation and inadequate waste collection, treatment and management. Volume of waste generation is increasing day by day in rural areas due to rural population. But main problem is lack of qualified and professional engineers and environmental professionals with the experience to help improved waste management systems in India. Here we will talk about solid and liquid waste. The solid wastes have classified in two types: 1. Non-Hazardous Solid Waste, 2. Hazardous Solid Waste

Waste Management includes Hierarchy of waste management, this hierarchy has three types: 1. Reduce, 2. Reuse, 3. Recycle.

This paper reviews the challenges, barriers, problems and opportunities associated with improving waste management in India. Open cleanliness and enhanced sanitation for its populace is India's most up to date need. To address the issues of absence of toilets in the nation, Ammachi Labs of Amrita University is taking off professional courses. Amma's drives in enabling ladies have taken an imaginative turn with the acquaintance of innovation with convey professional instruction. The Bhoi Sahi ladies are excited to obtain new aptitudes and learn through PCs. One of the understudies, Shantilata clarified that presently the ladies make a trip one kilometer to mitigate themselves in the field. Huge numbers of them travel there in the early mornings and late at evenings to accomplish a type of protection. Inspired by this Vishnu Prasad, the Sarpanch of Bhoisaahi came as a testament of his support for the project. He has sanctioned these women to construct 3,000 toilets for 10,000 Rs per toilet. Any waste other than human excreta, urine and wastewater is called solid waste. Solid waste can be classified into two types: biodegradable and non biodegradable. Broadly, there are two types of liquid waste or wastewater:-

Black water is wastewater from toilets containing fecal matter; and Gray water or sullage is wastewater from bathrooms or kitchens. Gray water generally contains fewer pathogens than black water.

One way of collecting solid wastes is: Bottle Crusher Machine:- plastic waste is a big problem for the national transporter. So the South Western Railway zone of Indian Railways has set up bottle crushers at many railway stations under Bengaluru division namely, KSR city station, Yeshwantpur station, Cantonment station as well as Krishnarajapuram station. Some of the benefits are:

1. Passengers will get cashback on their paytm wallet or talktime for their used bottles.
2. Once the plastic bottle is dropped into the bottle crushing machine, the plastic bottle will be entirely crushed and will be released as fine pieces of plastic.
3. It is eco-friendly.
4. No noise.

The management of waste is one of the earliest of man's branches of knowledge. In some ways it can also be considered as one of the latest. The reason for this seeming paradox is the success which rewarded the efforts of public health specialists and sanitary engineers in overcoming the abysmally unhygienic conditions into which man has allowed his habitations to degenerate at different times in his history.

Keywords: *Hazardous Solid Waste, Wastewater, Plastic waste*

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IoT Based Technological solution for Cattle Area and Energy Conservation

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Abstract

The rural infrastructure of India is not developed compared to urban areas. Cattle areas are generally very poor, dark, and unhygienic. And the major problem is there is no safety of the cattle. There is a huge need of development of rural infrastructure specially cattle areas. A project has been developing to make cattle area SMART and solve the above problems. The authors have also proposed a non-conventional method of power generation which can be used the cattle area smart. There are several ways to make energy such as – “Electricity from steam”, “Hydroelectric Power”, “Energy From Wind”, “Solar Power” etc popularly available worldwide. As reviewed from literature the maximum power generation is preferable by solar energy. Only 10% of awareness is there about energy generation from piezo electric sensor. In our project we have used high sensitive piezoelectric sensor for power generation. The major drawback this method of power generation is not so much popular in India. In present condition the shortage of electricity is the big problem for industrial growth as well as rural developing. Shortage of electricity has its effects on India’s developing growth. To solve such types of problem we need to develop strong electricity generating techniques with the help of wasting human energy for our better future. Generating Electrical Power as Non-Conventional Method by Simply Walking or Running on the Foot Step has been an emerging area of research from few years.. Proposal for the utilization of waste energy foot power with human locomotion is very much relevant and important for highly populated countries like India and china where the roads, railway stations, bus stands, temple, etc. are all over crowded and millions of people move around the clock.

Here we have developed a piezoelectric sensor bed installed the floor of the cattle area. As observed, there is tendency of cattle is move through of the cattle. This movement of cattle create the sufficient pressure in piezoelectric sensor. This sensor works on the principle that when pressure is applied, it generates voltage at the output. Piezo electric sensor is an active sensor. So in our project using this sensor we are unable to store sufficient voltage. The system is IOT enabled therefore we can log the data in the server. Internet of Things (IoT) is one of the more trending topics in the world of technology. IoT and integrated system can enable the people to better understand their energy consumption patterns in real time, which helps to reduce energy bills.. The user can remotely access the data of energy generation by website developed by us. If accessing power generates the user can utilized the power for revenue generation in village area. We have also design an app for monitoring the online data. The project has also help to solved the ensure of safety of the cattle’s. For this GPS enable sensor system is fabricated for tracking the location. The observation and results are found satisfactory and can be used large scale of implementation.

Keywords: *Piezo-electric sensors, IoT, Energy Conservation*

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QualNet and Its Application in UMTS Platform

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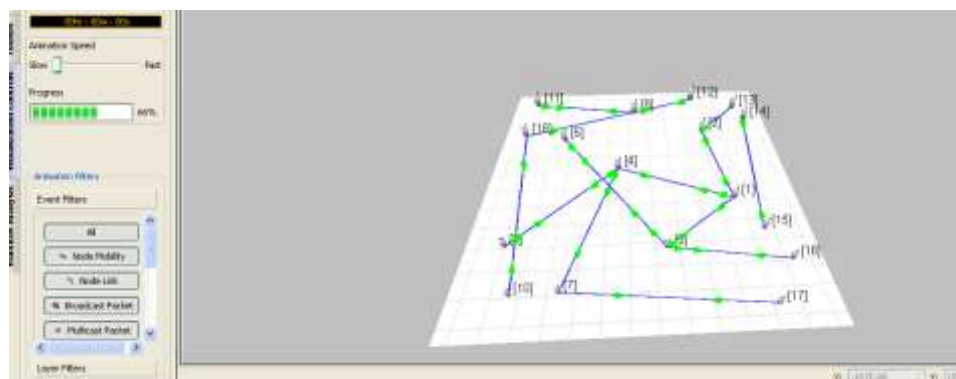
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Abstract

With the increase in mobile, laptop, computer users day by day we need a vast network which can satisfy the users need. So we need a simulation software which can design any complex network without any cost. QualNet is a software which has many comprehensive tools with all network modelling and simulations. It is widely used for creating different models in UMTS platform and we can also analyse the virtual models in this platform. UMTS (Universal Mobile Telecommunication Service) is used for packet switch in mobile networks. We can enhance the speed of the networks by using it. Users using UMTS has got many advantages in QualNet models from other libraries i.e, wireless, advanced wireless (WIMAX). It is also helpful in rural areas where people cannot access internet. Here we design a scenario using many nodes and different UMTS models and connect these nodes with links. We also analyse the graphs in different view points i.e, nodes for different trigger updates sent, number of periodic updates sent, and number of packets received. The high performance quality of the QualNet helps the user to run the simulations smoothly and help them to solve most of the network problems. Whether we use 50, 500 or 5000 nodes we can get same accurate simulation for wireless network.

Scenario 1:



UMTS Scenario using QualNet Simulator



Fig -1

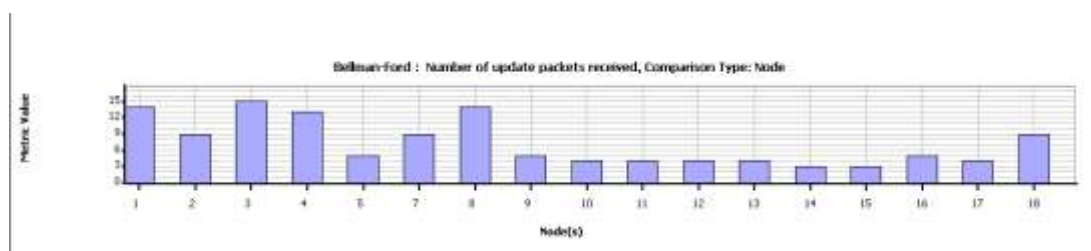


Fig -2

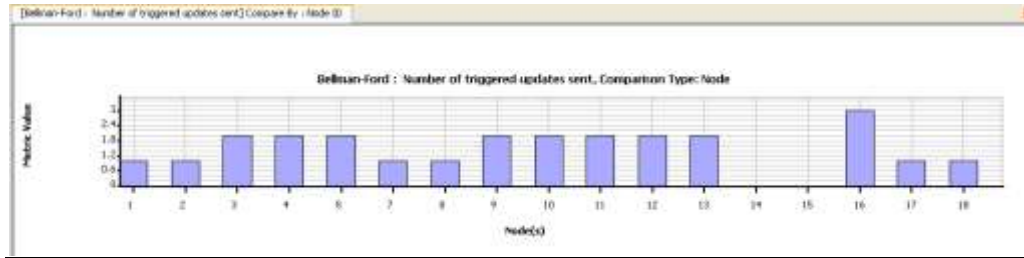


Fig -3

Fig:1 Indicates the periodic updates sent by the corresponding nodes

Fig:2 Indicates the number of update packets received by the corresponding nodes

Fig:3 Indicates the number of trigger updates sent by the corresponding nodes

References:

www.glomosim.com/pdf/umts.pdf

Keywords: *UMTS, RNC, QualNet, WIMAX*

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Scalable Networks with UMTS And Its Performance

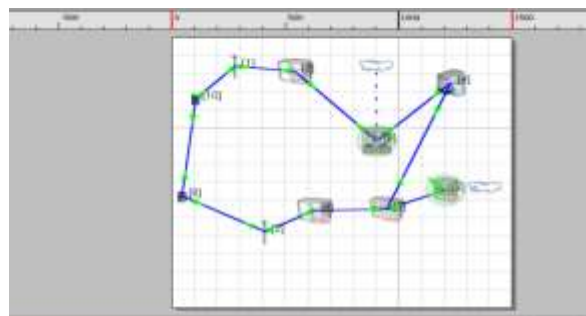
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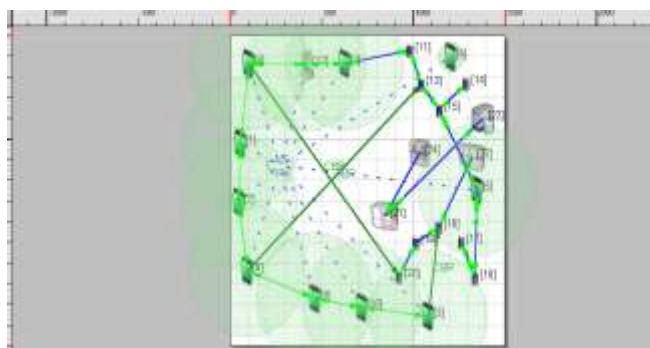
Abstract

With rapid growth in cellular networks and enhancement in wireless communication we need a scalable network which can meet user expectation which is suitably efficient and offers a consistent set of service. UMTS (Universal Mobile Telecommunications Service) is a third-generation (3G) broadband, it uses WCDMA (Wideband Code Division Multiple Access) techniques including radio access network, Air interface & Core network to offer greater Spectral efficiency . It gives packet-based transmission of text, digitized voice, video, and multimedia at data rates up to 2 megabits per second (Mbps). It can support data transfer rates of 42 Mbit/s it offers a efficient set of services to mobile, computer and phone users, no matter where they are located in the world. Once UMTS is readily available every user can always get internet facilities where they travel or go . One of the most benefit use of using UMTS it is very much useful in the rural areas where users many times cannot get attached to internet .Users can access internet through terrestrial Wireless and Satellite transmission. It also provides new Services for users like alternative billing method or different calling plans. Also due to the higher Bandwidth of UMTS it also enables other new services like video conferencing .UMTS system provides improved data rates, better network coverage, also cost effective. So here we are developing different Scenarios of UMTS architecture under different traffic & mobility using QualNet Simulator 5.0 to know the performance of using UMTS network based on different parameters Bit error ratio (BER), Transfer delay, Number of triggered output and also to know its QoS (Quality of Service) Which will describe the overall Performance of the network or service based on its Parameters throughput, average end to end delay, average jitter. Here the performance of every scenario is analysed according to the bits and comparison is also done based on the different parameters so that we can come to the know the set of parameters provides or not the required service . And from the comparison of different parameters we come to know that UMTS network is efficient and due to its cost effectiveness we can create it for the benefit of user.



UMTS ARCHITECTURE

Scenario 1:



UMTS Simulation Scenario

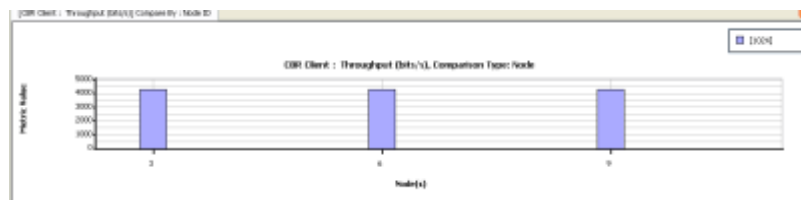


Fig:1

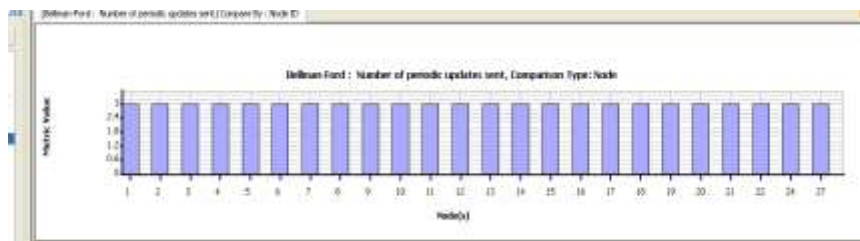


Fig:2



Fig:3

Fig:1 Indicates the throughput (bit/s) where we can see that the 3, 6, 9 nodes deliver the average rate of successful message from the CBR Client

Fig:2 Indicates the number of periodic updates sent by the corresponding nodes

Fig:3 Indicates the number of periodic updates received by the corresponding nodes

References: Analysing Quality of Service in UMTS Dilpreet Kaur, Amanpreet Kaur ITM University, School of Engineering & Tech, Dept. of EECE, Gurgaon (Haryana), India.

Keywords: *UMTS, QoS, RNC, UTRAN, WCDMA*

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Ka Band Microstrip Antenna for Space Applications

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Abstract

In the present age of the technology in many applications, the antennas to be used effectively at a certain frequency which is at Ka band or above. As we are advancing in all the dimensions we need to find better aspects for the communication systems and so we need to find solutions for this type of applications where the Ka band is utilised. Due to the existence of growth in the development of low cost, low weight, highly reliable antenna [1,2] for wireless devices. It poses a new challenge for the design of antennas in wireless communication. This study presents the design of microstrip [3] patch antenna at Ka-band frequencies. In this work the Ka band is chosen as the research works on this band is till now not yet flourished as the lower microwave band or the Wireless Local Area Networks (WLAN). The proposed antenna operates above 35GHz which may be utilized in the Space related applications. The present work is mainly focused on rectangular shape antenna design and this antenna is designed in such a way to support above Ka band frequencies. The microstrip line model [4] method is used and been stimulated by using Ansoft HFSS [5] software. The microstrip patch antenna is very popular now a days for its superior properties. The design aspects were mainly on the patch length, width, shape and size. All relevant calculations has been made using Ansoft HFSS software and found to have a return loss S_{11} of -16.5dB and VSWR less than 2. The simulation study shows that the design frequency is at Ka band and above. The selection of suitable material for the design of the microstrip patch antenna is very sensitive issue. In this design the relative permeability is taken within 4.3 and shows better performance in terms of efficiency and larger bandwidths. The objective of this microstrip antenna design is mainly focused on the space communication. One of the results has been given in the Figure 1 which shows the return loss of the antenna.

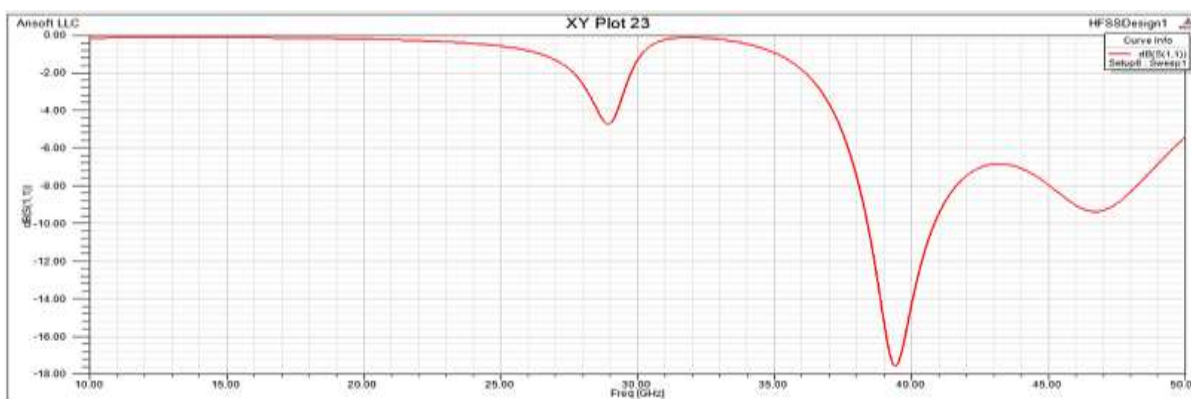


Figure 1: Return loss of the test antenna

The present work corresponds to the utilization of Ka and above ka band of Microwave frequency for Space wave Communication systems. It has also found that the suitable selection of material for the design of Microstrip patch antenna with different values of permeability gives suitable results. For any antenna there are two field possible i.e. near and far field. In this study only the far field is chosen. In the simulation platform the EH plane is set and the far field radiation sphere setup values of Phi starting from 0 to and stop at 90 and with suitable step size is chosen. In this preliminary study this has been found that Ka band Microstrip antenna design is possible and if we further investigate on the design issues. Good simulation results have been observed for the present microstrip antenna.

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- [5] Ansoft Corporation, HFSS User's Guide, version 10 & 12, Ansoft Corporation, Pittsburgh, CA, 20

Keywords: Microstrip patch antenna, Ka-band, HFSS, Space Communication.

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The Neural Controller is Augmented with A PID Compensator to Develop the Controller Design for an Electro-hydraulic Actuation System

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Abstract

The present work attempts to develop a Direct Neural Controller with PID compensation for an electro-hydraulic actuation system. A theoretical formulation has been proposed that ensures the stability of the controller based on an assumed mathematical model of the nonlinear electro-hydraulic actuation system. Electro-hydraulic Actuation Systems or EHAS in short have been used as an effective means of power transmission over a distance to carry out multiple operations – both sequentially as well as parallel. They are preferred because of such factors as positiveness, accuracy, flexibility, high power-to-weight ratio, fast starting, stopping, and reversal with smoothness and precision, ability to apply very large force and torque and simplicity of operations. However, the control of EHAS has attracted attention of researchers over the decades due to high levels of nonlinearities, modelling uncertainties and parameter variations. Several control strategies ranging from linear model based controllers to nonlinear controllers. Most of the model based controllers are linearized. Feedback linearization techniques have been proposed but with associated mathematical complexities. They have the capability to wider range of operating zones compared to linear controllers.

The EHAS used in the present study consists of a positive displacement type pump driven by an electric motor, a non-return valve, a pressure relief valve, a direction control valve or proportional valve actuated by a solenoid or a permanent magnet motor (also called the control system actuator) and a symmetric hydraulic actuator along with connectors, hose, reservoir, strainer and heat exchanger. The control valve is traditionally a four-way spool-type valve, either servo valves or proportional directional control valves. In addition for closed loop performance, there is an LVDT for position feedback which is fed to the input port of a data acquisition and control system (DACS). The control law, residing either in the host computer or embedded in the FPGA panel of the DACS, compares the feedback signal from the displacement transducer with an input demand to determine the position error, and produces a control signal. This signal is routed through the output port of the DACS to the power amplifier card which provides the necessary electrical signal to the solenoid or permanent magnet motor which drives the control valve PV. The control valve adjusts the flow of pressurized oil to move the actuator until the desired position is attained – a condition indicated by the error signal falling to zero.

Artificial neural networks (NNs) are networks constituted by several artificial neurons arranged in layers. It manifests itself as a parallel computational system consisting of many simple processing elements, which are the artificial neurons connected together in a specific way in order to perform a particular task. The neural controller is augmented with a PID compensator. The training algorithm of the NN is based on back propagation. A theoretical formulation for the plant Jacobian is proposed. The real-time experiments has been carried out. Sinusoid demands at different speeds have been tested to assess the effectiveness of the controller.

Keywords: *Electro-hydraulic, Jacobian, back propagation, DNC, PID compensation*

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Development of Plant Communicator: Monitoring the parameters

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Abstract

There is a need of monitoring the parameters of plants for their survival. In this project work, to protect our plants and make sure they survive efforts have been given and real-time monitoring has been done using Arduino.

By monitoring moisture, temperature and light parameters of plant, the status of the plants can be known as they are healthy or not. Since the monitoring has the IoT capability, the device can send emails and graphs on a daily basis and notify you of its needs to the user.

Major Components used:

- TMP36 temperature sensor
- Phototransistor
- DIY moisture sensor
- Arduino MKR IoT bundle 1010

Main Idea:

Initially we have implant sensors in the agriculture area. The sensors are interfaced with Arduino MKR 1010. It can send WIFI signals to the receiver side. Along with that it can send e-mails to notify us about the conditions of our plant. We have used an android application to send emails from our Arduino board. And set it in such a way that it would send an email every day at a certain time by using Real time clock of MKR wifi. Then we had used a soil moisture sensor by taking two wires placed in the soil pot form a variable resistor, whose resistance varies depending on soil moisture. This variable resistor is connected in a voltage divider configuration, and Arduino collects a voltage proportional to resistance between the 2 wires. Meaning that the more humid the soil is, the less voltage will be measured from the Arduino. Using the 1 Mega Ohm resistor and two wires. And after that we are going to connect our Arduino board with the temperature and light sensor. And then fit it in the plant. And after that we had used a platform to show the data as graphs after collecting all the data using LabVIEW or Thing Speak platform. By this way we have got notification any time what's the condition of our plant and it would show a data graph for it. LABVIEW is a very popular platform for data analysis. Here we have used the NI 6009 DAQ card for signal conditioning.

The application of the work done is specifically for agricultural and irrigation purpose as it would help us to see the condition of plant and by that there required nutrients can be given. By this way it would help to give proper treatments to crops, it would reduce unnecessary death of plants; foster a digital way for cultivation. The user can monitor the health condition of the crops grown in the agriculture area online basis. Some of the crops like : Tea plant, strawberry plant etc requires specific environmental condition to survive. So, This work is a significantly important to grow such type of plants which require proper care.

Keywords: *Arduino MKR 1010, Temperature sensor, soil moisture sensor, Lab View*

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Automatic College Bell Using Arduino

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Abstract

Nowadays the world is automated where all the activities are getting executed through the use of advanced programmable controllers in home automation and industrial automation system. In any college, the classes are organized in periods and beginning of a period or break is alerted to the students and teachers by ringing the college bell. Conventionally, the college bell is rung by a peon or multi-tasking assistant. What if there would be a microcontroller based automatic college bell which rings itself according to a fed timetable. This project is the implementation of same functionality. The importance of time is very essential. Everything should be done in time and accurately so we are here with this project. There are many types of digital clocks in the market readily available with bells but rings only at particular time. It is used in the college and school, during examinations, automatic scheduling, and time editable. The task of ringing of the bell in colleges can be taken over by this Automatic College Bell electrical student project. So the manual switching of the bell in the college will be replaced very soon. The date, time, day are shown in the LCD. When the time equals to the bell ringing time then the relay for the bell is switched on for a predetermined time. The bell ringing time can be edited any time so it can be used at normal class Timings and even at exam times. Here Arduino Uno, RTC module, relay module, LCD display module, Micro SD Card module and some controllers are used. Arduino software is also used for programming purpose by which we can execute the desired results. Voice announcement system is also provided. One commercial speaker is used here. The speaker connected through a female audio jack with the arduino uno board. The sound of the voice and audio is amplified by the speaker. The main goal of this project is rung the college bell in specific time. For that Arduino Uno is used as main controller, but as supporting accessories we used RTC module for uploading the in real time and count every second to ring the bell in correct time. The uploaded time and date can be shown by using LCD Display. When programed time matches with RTC Arduino will send a digital signal to relay and activated it. The bell will start ringing. SD card module is used for play some stored audio as in the uploaded program. The audio will play along with the bell. The volume of the audio is controlled by this speaker. The sound can be amplified by using bigger speaker. They will both stop in a specific time according to the program. This project can be implimented by using PCB in future for general purpose.

Keywords: *Arduino Uno, LCD, Micro SD Card module, RTC module, Relay module, PCB.*

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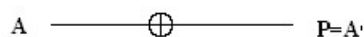
Implementation of Combinational Circuit Using Reversible Quantum Gates

Anirban Basak^a, Arindam Sadhu^b, Kunal Das^c

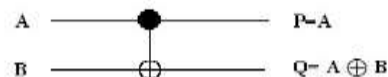
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Abstract

Quantum Computation and Quantum Information can be accomplished using Quantum mechanical systems and is the study of the information processing tasks. Quantum mechanics is a mathematical schema or set of rules for the construction of physical theories. Quantum Computation directed us to think physically about computation, and this approach turns out many new and exciting capabilities for information processing and communication. In this paper we are going to show some of the application of the reversible quantum circuit. In quantum computing, reversible logic plays an important role in quantum circuit design as it dissipates less amount of energy in the form of heat. According to Moore's law, the number of components inside the computing chip will be doubled in eighteen months and the circuit component miniaturization is the reason for huge amount of heat dissipation. In order to overcome this situation Landauer and Bennett have come up with a solution and that is reversible logic circuits. Here we are going to show some of the design of half adder, half subtractor, Multiplexer, De-multiplexer, even and odd parity generator and checker. This design of proposed reversible circuit is appropriate for different quantum ALU and embedded processor.

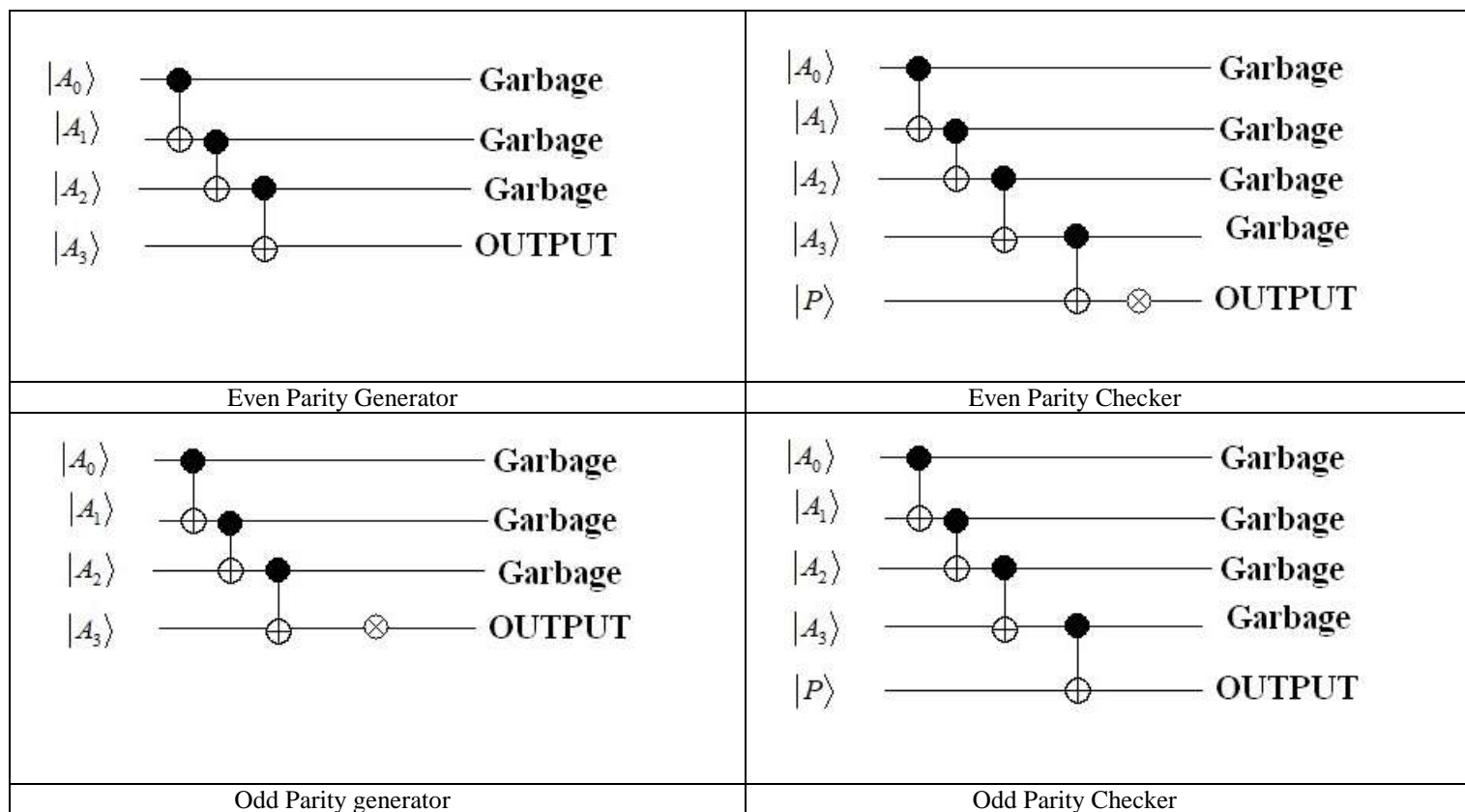


Quantum NOT gate



Quantum CNOT gate

Proposed quantum circuits	
Half Adder	Half Subtractor
Multiplexer	De-multiplexer



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Keywords: CNOT, Reversibility, Quantum Computation, Ancilla, Garbage.

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Design of Portable Single Phase Capacitive Discharge Electronic Welding System

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Abstract

Capacitor discharge welding system is widely used in industry as well as in household purposes. Single-phase capacitor discharge welding machine is capable of supplying sufficient current and generally used for high resistance projection welding. The main focus of this work is to develop a simple efficient single phase capacitor discharge electronic welding system. The proposed design is adapted with a single phase power source to supply the capacitor bank. The basic principle of the circuit conveys the transient characteristics of the capacitor. Due to the transient nature of the capacitor, this design is able to withstand the expected assumption. The variable frequency control has also been employed to make the welding system user-friendly as the user can adjust the required current according to the thickness of the target metals. The sophisticated hardware prototype of our proposed design can increase productivity due to its very short welding time. The electrolytic capacitor has been used in this design, which is excellent for quick charging and even high current discharging as well. The power IGBT IRF 250 has been used to deliver high current from the capacitor bank. This design follows the current controlling method with the microcontroller generated Pulse Width Modulated (PWM) signal in order to fire the power IGBT according to the desired amount of energy needed for the workpiece. This system consists of a parallel combination of 20 capacitors of 4700uF at 35v each. An electrolytic capacitor of specific voltage has been used in this design, so charging of voltage to capacitor bank is fixed. In fig.1 the overall steps of our proposed capacitive discharge welding system have been illustrated. Here the dc power supply is charging the capacitor bank. The rotary encoder enabling to set the duty cycle and fire the IGBT to control the desire current discharge from the capacitor bank. According to the energy required for the material to be welded, the OPAMP comparator blocks charges back the capacitor bank which will prepare it for the next weld in a very short time span.

The proposed design consists of a microcontroller system which enables the user to set the amount of current need to be discharged. Furthermore, its automatic charging and discharging mechanism make it more reliable to use. This proposed welding machine is budget-friendly as it eliminates through-hole preparation, punching, drilling, tapping, and riveting steps. The simulated results of the capacitor discharge welding system evidence that this design is capable to carry out the intended functions within the stipulated timeframes. In this work the proposed single phase capacitive discharge electronic welding system is designed and simulated on Proteus 8.6 Professional platform. Thus our proposed portable low-cost hardware prototype of capacitor discharge welding machine may extensively use in the automobile industry as it delivers high end finished eminence of welding without any weld spatters on the work-piece.

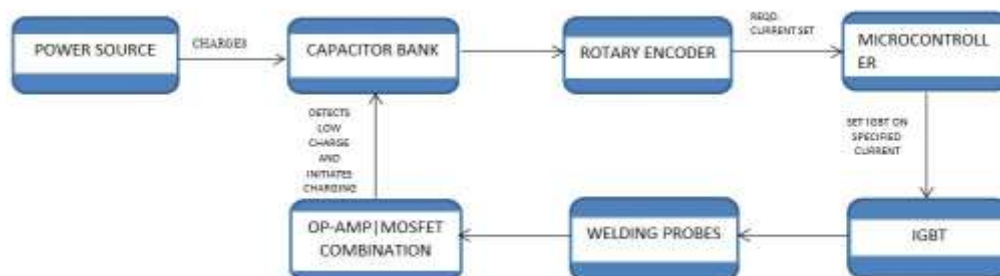


Fig.1. Block diagram of working of capacitor discharge welding machine.

Keywords: Capacitor Discharge, Welding, IGBT, Proteus 8.6 Professional.

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Realization of Universal Gates in QCA

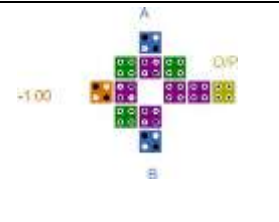

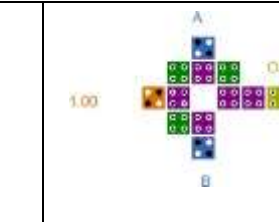
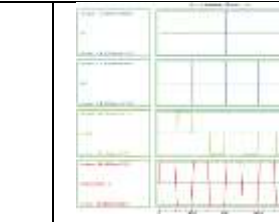

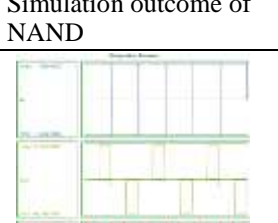
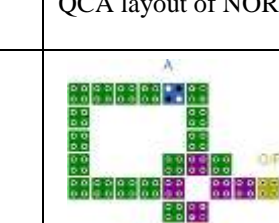

Rimpa Dey Sarkar, Arindam Sadhu and Kunal Das




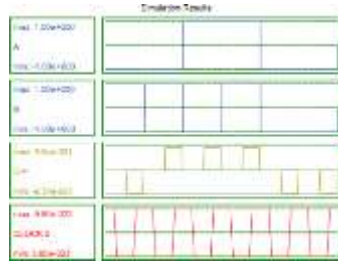
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Abstract

In this paper, the main motivation of our work is to design the two universal gates of the logic circuit. With the ease of application of these universal gates, any Boolean function can be implemented without the overhead of the requirement for any other gate. Quantum-dot Cellular Automata (QCA) has been an emerging technology which restrains the demarcation of conventional CMOS technology. Henceforth, we have proposed our work based on the next generation QCA technology with its benefit of fabrication being pertinent at nanoscale. The proposed work consist the design of the universal gates: NAND gate and NOR gate. Implementations of other combinational logic gates have been illustrated using the foresaid universal gates, along with the proofs. QCA designer has been equipped for the purpose. We have implemented NAND gate in QCA with minimum 12 QCA cells, with an area of $0.295\mu\text{m}^2$, without any inverter and with a delay of 0.5 QCA clock cycle, in contrast to the normal NAND gate which occupies 13 cells, area of μm^2 and delay of 0.5 QCA clock cycle and using one inverter. Average leakage dissipation, switching dissipation, maximum energy dissipation, minimum energy dissipation and average energy dissipation for the energy ratio of 0.5, 1.0 and 1.5 for proposed NAND gate and NOR gate has been computed and illustrated the following tables in contrast to the normal NAND gate.

Table 1: Layout and Simulation Outcomes of different Quantum Gates

			
QCA layout of NAND	Simulation outcome of NAND	QCA layout of NOR	Simulation outcome of NOR
			
QCA layout of INVERTER using NOR	Simulation outcome of INVERTER using NOR	QCA layout of INVERTER using NAND	Simulation outcome of INVERTER using NAND

 <p>A QCA layout diagram for an AND gate implemented using NOR gates. It shows two input nodes 'A' and 'B' connected to a central output node 'C'. The layout consists of several colored dots (blue, green, purple, orange) representing the quantum cells.</p>	 <p>A screenshot of a simulation tool showing the output of the AND gate implemented with NOR gates. The simulation results are displayed in a grid format with time intervals and corresponding signal levels.</p>	 <p>A QCA layout diagram for an OR gate implemented using NAND gates. It shows two input nodes 'A' and 'B' connected to a central output node 'C'. The layout consists of several colored dots (blue, green, purple, orange) representing the quantum cells.</p>	 <p>A screenshot of a simulation tool showing the output of the OR gate implemented with NAND gates. The simulation results are displayed in a grid format with time intervals and corresponding signal levels.</p>
<p>QCA layout of AND using NOR</p>	<p>Simulation outcome of AND using NOR</p>	<p>QCA layout of OR using NAND</p>	<p>Simulation outcome of OR using NAND</p>




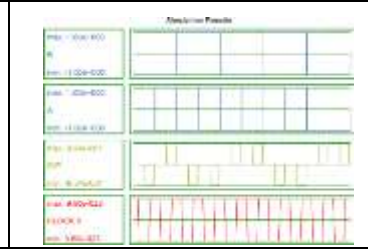
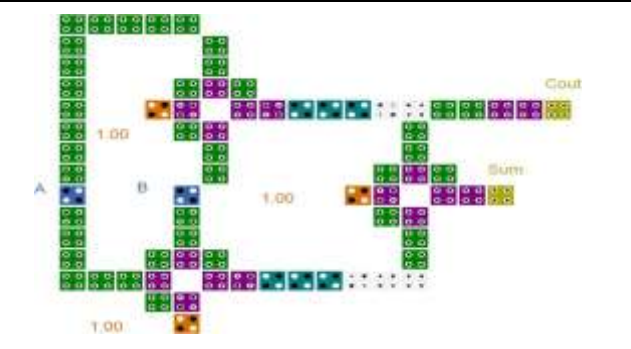
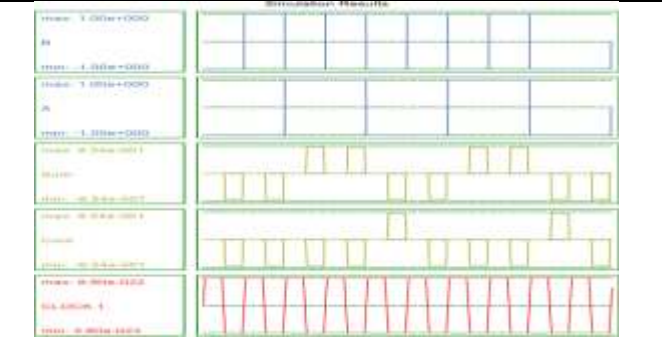
			
QCA layout of XOR	Simulation outcome of XOR	QCA layout of XNOR	Simulation outcome of XNOR
			
QCA layout of HALF-ADDER		Simulation outcome of HALF-ADDER	

Table 2: ENERGY DISSIPATION CALCULATION FOR NAND GATE

	NORMAL NAND GATE			PROPOSED NAND GATE		
	0.5	1.0	1.5	0.5	1.0	1.5
Energy ratio	0.5	1.0	1.5	0.5	1.0	1.5
Maximum energy dissipation (in meV)	40.74	41.52	44.05	29.78	31.93	35.86
Minimum energy dissipation (in meV)	3	9.13	16.34	4.17	10.77	18.18
Average energy dissipation (in meV)	13.63	18.79	25.02	13.29	18.88	25.26
Average leakage dissipation (in meV)	3.44	10.26	17.93	4.80	12.05	19.70
Avg. Switching dissipation (in meV)	10.19	8.53	7.09	8.49	6.83	5.05

Reference

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Keywords: Universal gate, QCA, Energy Ratio, Switching dissipation, Average leakage dissipation

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Development of Alcohol Detection System

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Abstract

There is a need of monitoring the parameters of plants for their survival. In this project work, to protect our plants and make sure they survive efforts have been given and real-time monitoring has been done using Arduino.

By monitoring moisture, temperature and light parameters of plant, the status of the plants can be known as they are healthy or not.

Since the monitoring has the IoT capability, the device can send emails and graphs on a daily basis and notify you of its needs to the user.

The system is aimed at making vehicle driving safer than before. This is implemented using Arduino. We have derive the driver's condition in real time environment and we propose the detection of alcohol using alcohol detector connected to Arduino such that when the level of alcohol crosses a permissible limit, the vehicle ignition system will not start and until the level of the blood alcohol content (BAS) decrease to its limits, till then the driver is unfit for driving and the ignition of the car will not take risk. The main aim of this project is to design and electronics system for implementing an efficient alcohol detection system that will be useful to avoid accidents. Accidents may cause due to many reasons it may be due to brake fail but most often accidents occur due to drunken state of the person. So there is a need for an efficient system to check drunken drivers. Therefore in order to avoid these accidents be have implemented a prototype project. In our project, initially we check whether the person is drunk or not by using the MQ3 gas sensor. In this system, sensors circuit is used to detect whether the alcohol was consumed by the driver or not, hence depending on the state of the driver, the ignition of the car will be locked or accessible. By the end of this project we have designed such a system that when alcohol concentration is detected, alarm is raised and the ignition of the car will not take place. Testes found that the system is highly effective and its efficiency in testing the alcohol percentage in a human being and if it cross the threshold value the DC motor will stop working. It is practically implemented in some cars example: Nissan N90. This is just not implemented at the time of igniting the car but also after few minutes because there is a chance of consuming alcohol at the time of driving. So this project is highly useful for safe and secure driving. This is a sensor based project idea. The alcohol detection is done by the MQ3 gas sensor, the sensor passes signal to the comparator IC. The output of the comparator is connected to the microcontroller. Microcontroller in return gives high pulse to the buzzer circuit and the buzzer is turned on, here the buzzer is acting as the alarm for the condition. At the same time the relay will be turned off. Due to this the ignition of the car is deactivated. Comparator has a potentiometer which gives a constant voltage at inverting terminal of the comparator. Then at the non-inverting terminal the output of the alcohol sensor is given. It gives low pulse when alcohol level increases. At this alcohol detection system in cars is a educational project we have to use a LCD display to show the message and also LED lights of different colours to showcase according to the condition. LCD also helps to find out the false in the project and we can put various break points in the program.

Keywords: *Arduino, Alcohol Detection*

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Origin of Robotics

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Abstract

Although the science of robotics has been emerged since 20th century, the history of human-invented automation has a memorable past. Ancient Greek engineer of Alexandria, incorporated 2 words, “Pneumatica” and “Automata”. The word ‘Robotics’ was in advertently coined by sci-fi author Isaac Asimov in his 1941 story “Liar!”. Essentially, a robot is a re-programmable machine that is capable of movement in the completion of a task. Robots use special coding and algorithm that differentiates them from other machines and machine tools, such as CNC. Robots have found uses in a wide variety of industries due to their robust resistance capabilities and precision function.

The Industrial Revolution and the increased focus on mathematics, engineering and science in England in the Victorian age added to the momentum towards actual robotics. Charles Babbage (1791-1871) worked to develop the foundations of computer science in the early-to-mid nineteenth century, his most successful projects being ‘difference engine’ and ‘analytical engine’. These two machines expanded the way of robotics. Factories began to employ machines to either increase workloads or precision in the production of many products. In 1920, Karel Capek published his play ‘R.U.R.’ (Rossum’s Universal Robots), which introduced the word “Robot”. It was taken from an old Slavic word that meant something related to “monotonous”. Robotics became a burgeoning science and more money was invested. Robots spread to Japan, South Korea and many parts of Europe over the last half century. To the extent that projections for the 2011 population of industrial robots are around 1.2 million. In 1951, Walter published the paper “*A Machine that learns*”, documenting how his more advanced mechanical robots acted as intelligent agent by demonstrating conditioned reflex learning. The first digitally operated and programmable robot was invented by George Devol in 1954 and was called the “Unimate”. This later laid the foundations of the modern robotics industry. In Japan robots became popular in comic book characters. Robots became cultural icons and the Japanese government was spurred into funding research into robotics. Among the most iconic characters was the ‘Astro boy’, who is taught human feelings such as love, courage and self-doubt. Culturally, robots in Japan became regarded as helpmates to their human counterparts. In the early 1970s, precision munitions and smart weapons were developed. Weapons became robotic by implementing terminal guidance. At the end of the Vietnam War the first laser-guided bombs were deployed, which could find their target by following a laser beam that was pointed at the target.

Additionally, robots have found a place in other spheres, as toys and entertainment, military weapons, search and rescue assistants, and many other jobs. Essentially, as programming and technology improve, robots find their way into many jobs that in the past have been too dangerous, dull or impossible for humans to achieve. Indeed, robots are being launched into space to complete the next stages of ‘extraterrestrial’ and ‘extrasolar’ research.

Keywords: *Robotics, Automation, Machine, Re-programmable.*

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A Kinetic Study for Biodiesel Production from Rice Bran Oil Fatty Acid Distillate

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Abstract

The search for eco friendly, cost effective and renewable raw materials that have potential to substitute non renewable fuels in various industrial and domestic applications is currently being considered a major research area in the fuel and energy sector. This is largely due to the rapid depletion of world fossil fuel reserves along with the increasing environmental degradation. Different raw materials have been studied to identify as alternative energy fuels for this purpose. In our study, rice bran oil fatty acid distillate (RBOFAD), a refinery by products from vegetable oil refinery industry, has been identified as a cheap and environment friendly raw material for alternative renewable sources of energy. Biodiesel is produced from RBOFAD in the presence of biocatalyst Novozyme 40013 (lipase from *Candida antarctica*) with methanol. Enzyme catalysis reaction is more advantageous than chemical catalysis due to its ecofriendly nature, reusability, easier separation of product, minimization of by product and low energy consumption.

Reaction kinetics of esterification reaction between RBOFAD and methanol has been studied with a view to identify optimum reaction parameters like molar ratio of alcohol to FAD, temperature, stirring rate and reaction time. The equilibrium conversion of RBOFAD to biodiesel is affected by these various reaction parameters identified in the present research work. Optimum parameters identified are 5:1 molar ratio of alcohol to RFOFAD, 60^oC temperature, 500 rpm mixing intensity and 4 hrs of reaction duration. At the optimum condition, the achieved conversion is 87.24%.

Pseudo homogeneous kinetic model has been used to fit the experimental data and results have been analysed on the basis of model data. Activation energy and equilibrium constants have also been evaluated through this kinetic model. The temperature dependency of the reaction kinetics of RBOFAD and methanol has also been obtained through this kinetic model. By fitting the experimental data and the kinetic model, the pre exponential factor 4.72×10^{18} and the activation energy 128.6858 kJ/mol were achieved. The physical properties of biodiesel such as density, flashpoint, kinematic viscosity, cloud point, pour point etc. have been compared with diesel fuel and showed good results.

Keywords: *Biodiesel, Candida Antarctica, Kinetic model, RBOFAD.*

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Different form of Bipolar Neutrosophic Numbers, De-Polarization Technique and Application in Engineering Problem

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Abstract

This research paper actually deals with the conception of general Neutrosophic number from a distinctive frame of reference. It is known to all that the concept of neutrosophic number is generally related with the conception of positive, indeterminacy and non-belongingness membership functions. Now all the membership functions are always lie in between 0 to 1. But we introduced one concept such that the membership values are lie in between -1 to 0 and 0 to 1 that is it will contain both positive as well as negative part. This kind of neutrosophic numbers is called bipolar neutrosophic number. We shall describe different structures of general bipolar triangular neutrosophic numbers like Type-1, Type-2, and Type-3 according as the membership functions will contain dependency or independency with each other. This paper will also give us the concept of algebraic operation for each distinct Type-1, Type-2 and Type-3 cases.

Neutrosophic numbers are always played an important role in hesitation theory. Researchers from different fields always want to observe the co-relationship in between the fuzzy numbers and crisp numbers. In this platform, we also create the perception of De-polarization for triangular bipolar neutrosophic number with the help of well known techniques such that any bipolar neutrosophic fuzzy number are of any type can be smoothly converted into a real number instantly.

Bipolar Neutrosophic fuzzy numbers are always needful for solving any kind of real life problem in engineering or science domain. In case of general fuzzy number we always consider the belongingness part of the function but ignore the negative and indeterminacy concept. Creation of a problem using bipolar neutrosophic perception is more reliable rather than others. In this paper we also consider a multi criterion decision making problem for different users in bipolar neutrosophic domain. In case decision making we need to use some mathematical operator connected with the relative matrix. Thus logical decision making matrix will help us to make prominent decision in case of multi alternative and multi attribute.

In this article, we also used this result in assignment problem area where we always want to minimize the cost. The idea of converting a bipolar triangular neutrosophic fuzzy number into a crisp is very much useful to solve any optimization problem. This article also makes a comparison table with the other methods.

Keywords: *Bipolar Neutrosophic number, De-polarization*

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Sphere Involving Neutrosophic Number, Logical Score and Accuracy Values and Application in Networking and Graph Domain

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Abstract

In this research domain, we will introduce a new perception on neutrosophic set. It is known to us that the concept of neutrosophic number is fully deals with the theory of positive, hesitation and negative membership functions. We can characterize different structures of well known neutrosophic numbers like Type-1, Type-2, and Type-3 due to the presence of the dependency and independency among the membership function. It is observed that in case of Type-2 and Type-3 neutrosophic number some membership values actually violate its results although they are logical and satisfy all the properties of neutrosophic number. To tackle this kind problem we introduce a new concept of sphere involving neutrosophic number. Any kind of Type-2 Type-3 membership function can be easily captured with this new concept. In this paper we also developed the perception of algebraic operations for sphere involving neutrosophic structure.

Neutrosophic numbers are constantly played an important role in case of fuzzy theory. Scientists from numerous backgrounds are continuously wanted to build up a path between the general fuzzy numbers and normal crisp numbers in a logical way. In this research article we developed a new score function and accuracy function in spherical domain. This conception will help us to convert a neutrosophic number in spherical domain into a crisp domain. We can apply this advantage into different kinds of problem in various field of applied mathematics.

The use of neutrosophic number make the solving of real life problems in engineering or science background easy. We normally look at the truth portion passing over the hesitation and falsity idea while the case is of general crisp fuzzy number. Assembling a problem using other idea than neutrosophic one will be more difficult. This article actually deals with one problem in networking domain where the inputs are all spherical neutrosophic nature. To find out the critical path we shall apply the score/accuracy techniques here and at the end of our work we find out the longest path in spherical neutrosophic arena.

We also apply this result in graph related problem where we always want to minimize the weight of the graph using different algorithm. The perception of converting a spherical neutrosophic fuzzy number into a crisp has a good impact for solving cluster type problem. This article will also draw a comparison in between old methods and new one such that we can conclude that our proposal method is better than the previous invented methods in this arena.

Keywords: *Neutrosophic number, Score and accuracy function.*

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Emphasizing Foundational Research Challenges and Issues of Theoretical Computer Science and Computing Systems for the Trusted Future Computing Environment

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Abstract

The concepts involving the theoretical aspect of computer science have now become implanted in computing systems that must penetrate the thought process of each and every computer scientist. Theoretical computer science provides a hands-on tool to understand and dive deeper into technology. This theoretical computer science and computing systems will straightaway modify drastically the way of studying science in the future. The extent to which the new technology will be successful in solving the difficult scientific and societal problems depends on the progress in theoretical research in computing. Theoretical, fundamental and unpredictable discoveries and innovation will modify the field of computer science. It addresses risky, unpredictable problems and provides the base for innovations in technology in the future. There is a need for a more basic research that is high risk/high return research. This will give rise to new ideas and methods for new applications development. In our paper we are emphasizing on the challenges existing in theoretical computer science and computing systems that were recorded in its chronological order of significance. The challenges and problems were discussed critically and the loop holes in the research were depicted. The requirement for future research is highlighted for the betterment of future of computing environment. These problems are categorised under cognitive science, biomedicine, polynomial, bioinformatics, application development and many other new age technologies. The primary purpose of this paper is to solve the fundamental theoretical questions and to grow interest that will become the pivot of intellectual pursuits all over the world.

The social lifestyle is being changed by the modern sciences. The concepts revolving computers have gained momentum after World War II. There have been many radical changes, products and systems that have immensely affected the business and lifestyle of people for years and it is still doing so. But even today there lies many issues in the computing world. Once these problems are solved the society will be benefitted with automated, enhanced and trusted services through the computing world.

Computer science is the study of theory, experimentation and engineering that forms the building block for the design and use of computers. Also, it is a science that explores automated algorithmic procedure to perform a particular computation or task. A researcher of computer who is working in this field separates the problems into theoretical and practical subsets. Researchers from all over the world have recorded their challenges and problems. Even after the immense growth of this field the problems remain unsolved. To increase the understanding of the prevailing problems this review has been undertaken. This may come to a help to the researchers who can formulate suitable research projects for the current problems. This paper lists some of the vital challenges that are prevailing in the field today.

There are numerous major closed form problems in computer science, the theoretical computer science problems are such as Computational Complexity theory, Polynomial (P) vs. Non-deterministic Polynomial (NP), Cryptography, Integer Factorization, Clustered Planar, Multiplication Algorithm, Fourier Transform, Tree Rotation, Integer Multiplication and Matrix Multiplication Algorithm. The computing system problems are Big-data Applications and Analysis, Artificial Intelligence and Robotics, System Biology, Computational Biophysics, Computational Cognitive Science, Computational Neurobiology, Natural Language Processing, Human Computer Interaction, Space Communication and Networking and Internet Security. Hence, if the computing world finds the acceptable solutions for these problems then the society will enjoy a trusted and better computing service.

Keywords: *Theoretical Computer Science, Computing System, Computational Complexity, Polynomial, Communication.*

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From by products to bio fuel through bioprocess technologySumit Nandi^{a*}, Rupa Bhattacharyya^b and Spandan Sarkar^{a,b} Department of Basic Science and Humanities, Narula Institute of Technology, Kolkata-700109^c Student, Department of ECE, Narula Institute of Technology, Kolkata - 700109

Abstract

Vegetable oil refinery by products are one of the important sources for renewable and ecofriendly fuel which attract considerable attention for the last few decades. Due to enhancement of depleting non-renewable fossil fuels and also environmental tribulations, researchers and academicians are compelled to think about ecofriendly fuels. In this regard, palm fatty acid distillate, soybean oil deodoriser distillate, rice bran oil fatty acid distillate, the by products of vegetable oil refinery industry, have been utilised as cheap raw materials for the production of biodiesel. All these by products are initially dried at 80-90^oC for removal of moisture. After that the dried raw material is esterified with alcohol, methanol or ethanol maintaining some reaction parameters like molar ratio of alcohol to fatty acid distillate, temperature, mixing intensity and concentration of catalyst. The optimum reaction parameters which have been identified are 4/5:1 molar ratio of alcohol to distillate, 55-60^oC temperature, 500-600 rpm mixing intensity and 4-5% concentration of enzyme depending on raw materials and enzyme. The catalyst used is immobilised lipase enzyme, a biocatalyst like *Candida antarctica*, *Rhizomucor miehei* or *Thermomyces lanuginosus*. There are many advantages for using enzyme as catalyst like less process hazards, easier separation of product, no by product and reusing nature. An enzyme can be recycled 40-50 times for the same esterification reaction with almost same productivity. The recycling nature of enzyme helps to reduce the process cost. The physical properties of biodiesel such as density, flashpoint, kinematic viscosity, cloud point, pour point etc. have been compared with diesel fuel and showed good results. So the bioprocess technology for the production of bio fuel like biodiesel in the presence of biocatalyst not only shows a novel process technology but also helps the future researchers to encourage about the production of alternative ecofriendly fuel from cheap sources.

Keywords: *Biodiesel*, *Candida Antarctica*, *Rhizomucor miehei*, *Thermomyces lanuginosus*.

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Distinct Framework of Trapezoidal Neutrosophic Numbers, De-Neutrosophical Value Creation and Application in Operation Research Arena

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Abstract

In this research paper, we will try to build up the conception of general trapezoidal Neutrosophic number from distinct frame of reference. It is known to all that the perception of neutrosophic number is generally involves with the idea of belongingness, indeterminacy and falsity membership functions. We will generate different approach of general trapezoidal neutrosophic numbers namely Type-1, Type-2, and Type-3 according as the membership functions have dependency or independency among each other. This item will also establish the theoretical background of algebraic structures for each distinctive Type-1, Type-2 and Type-3 cases.

Neutrosophic numbers are sometimes playing a key role in vagueness theory. Researchers from different kind of area in this planet are generally interested to study the connection in between the fuzzy numbers and non-fuzzy numbers. In this paper, we also introduced the idea of De-Neutrosophication techniques for trapezoidal neutrosophic number with the support of removal area technique and centroid measurement technique such that any neutrosophic fuzzy number are of any type can be easily converted into a crisp number at once.

Neutrosophic fuzzy numbers are consistently useful to solve any kind of realistic problem in engineering or science research problem. In case of usual crisp fuzzy number we mainly construct the belongingness part of the function but ignore the falsity and hesitation perception. Considering a problem using neutrosophic idea is more authentic rather than others. In this article we consider a time-cost optimization crash model problem in neutrosophic environment. To find out the critical path and project duration we utilize the De-Neutrosophication techniques here and finally we find out the longest path and project duration in neutrosophic arena.

We also utilized this result in a job-sequencing problem area where we always want to make a sequence of job related with the machines. The convention of converting a trapezoidal neutrosophic fuzzy number into a crisp is very much useful to solve any complex problem. This paper will also make a comparison the final results with general problem and other neutrosophic problem. But we examine that; our invented method will give best output among all other methods related in this arena, those which are invented till now.

Keywords: *Linear and non linear Neutrosophic number, Trapezoidal Neutrosophic Number, De-neutrosophication.*

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Distinctive Structure of Triangular Neutrosophic Numbers, De-Neutrosophical Value Computation and Application in Operation Research Domain

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Abstract

In this research article, we will try to frame the perception of general Neutrosophic number from distinct frame of reference. We know that the concept of neutrosophic number is fully related with the conception of truthiness, hesitation and non- belongingness membership functions. We shall define various structures of general triangular neutrosophic numbers like Type-1, Type-2, and Type-3 according as the membership functions are dependent or independent with each other. This article will also contribute the concept of algebraic formulation for each different Type-1, Type-2 and Type-3 cases.

Neutrosophic numbers always play a key role in uncertainty theory. Researchers from various backgrounds always want to study the relationship between the fuzzy numbers and crisp numbers. In this article, we also build up the conception of De-Neutrosophication for triangular neutrosophic number with the help of removal area techniques such that any neutrosophic fuzzy number are of any type can be easily converted into a crisp number instantly.

Neutrosophic fuzzy numbers are always helpful for solving any kind of real life problem in engineering or science domain. In case of general crisp fuzzy number we actually consider the truth part of the function but ignore the falsity and hesitation concept. Constructing a problem using neutrosophic conception is more scientific rather than others. In this article we also create a networking problem in neutrosophic environment. To find out the critical path we shall apply the De-Neutrosophication techniques here and lastly we find out the longest path in neutrosophic arena.

We also apply this result in assignment problem area where we always want to minimize the cost. The idea of converting a triangular neutrosophic fuzzy number into a crisp is very much essential for solving complex problem. This article also compares the final results with general problem and other neutrosophic problem. But we show that, our formulated method is the best output method among all other methods related in this arena, those which are invented till now.

Keywords: Linear and non linear Neutrosophic number, De-neutrosophication.

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Anticancer And Normal Cell Activity of Pt(II) Complexes with (N,N) Bidentate Carrier Ligand: DNA/Protein Binding, Cell Cycle Arrest and Apoptosis Study

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Abstract

In the past few decades, bioinorganic complexes of platinum have been a fascinating area of research in medicinal chemistry after the discovery of anticancer activity of Cisplatin and the other next generation drugs like carboplatin and oxaliplatin. However, various side-effects curtailed their wider applications in chemotherapy [1]. Hence, more focus has been paid towards the development of new Pt(II) complexes with improved pharmacological effect and lower toxicity.

In the present study, our aim was to synthesise Pt(II) complexes [Pt(MAMP)Cl₂], **C1**; [Pt(MAMP)(H₂O)₂](NO₃)₂, **C2**; [Pt(MAMP)(GS)], **C3**; [Pt(MAMP)(TG)], **C4**; [Pt(MAMP)(cbdc)], **C5** and [Pt(MAMP)(ox)], **C6** having a fixed carrier ligand 2-[(Methylamino)methyl]pyridine (MAMP) and variable leaving groups like Cl⁻, H₂O, glutathionate (GS), thioglycolate (TG), cyclobutanedicarboxylate (cbdc) and oxalate (ox) respectively [2]. All the complexes have been characterised through different available spectroscopic and spectrometric techniques. MAMP has been selected as the carrier ligand owing to the fact that it is σ donor and π acceptor in nature which can form strong bonds with Pt(II) and will not be substituted by any other species present inside the cell. Most importantly MAMP is a π electron rich moiety which will assist its Pt(II) complexes to undergo intercalation or groove binding with DNA and reduce its toxicity [3]. DNA binding ability of the aforementioned complexes has been investigated with Calf thymus DNA (CT-DNA) through absorption, emission and viscosity titration as well as gel electrophoresis. Bovine serum albumin (BSA) binding property has been explored through fluorometric titration. Different binding parameters for their interaction with DNA as well as BSA have been evaluated. DNA as well as protein (BSA) binding experiments have shown all the studied complexes **C1–C6** bind strongly with CT-DNA and BSA which is also reflected from their different binding constant values (K_b , K_{SV} , K_{app} , K_F) and the number of binding sites per nucleophile (n). All of the complexes interact with DNA in a different manner in comparison to cisplatin, carboplatin and oxaliplatin. Cytotoxicity of all the studied complexes are investigated on three different cancer cell lines A549, MCF7, MDA-MB-231 as well as normal cell line *i.e.*, rat skeletal muscle cells (L6 myotubes) and human embryonic kidney cells (HEK 293) through MTT assay. All the complexes have shown comparable anticancer activity with cisplatin, carboplatin and oxaliplatin. On the other hand, these complexes display less cytotoxicity on normal cell lines L6 myotubes and HEK 293 in comparison to the above mentioned anticancer drugs. Results of ROS generation and degree of lipid peroxidation (LPO) study indicate that all the studied complexes are almost devoid of toxicity which makes them most interesting. Study of cell cycle arrest by the complexes on A549 has also been performed through flow cytometry where the complexes are found to arrest the cell cycle at S and G2/M phase as concentration dependent manner. Finally, in order to understand the underlying mechanism of cancer cell death, degree of apoptosis has been studied through immunoblot and immunofluorescence to measure the activated caspase 3 by the studied complexes. These findings indicate a remarkable apoptotic induction in A549 cells treated with the Pt(II) complexes. The complexes under study have good prospect to be the anticancer drugs after further investigation of physiological processing and pharmacological effects on living systems.

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Keywords: Pt(II) complexes, DNA and BSA binding, Anticancer activity, Cell cycle arrest; Apoptosis

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First Order Quantum Phase Transition Of Two Electron Systems Under Debye Plasma

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Abstract

The quantum phase transitions (QPT) and related critical behaviour is becoming an important topic in the field of atomic and molecular physics [1-5]. The possibility of first order QPT has been investigated in case of model three-body Zee system, where Z is the nuclear charge and e stands for the electrons. The inter-particle interactions are assumed to be of Screened-Coulomb or Yukawa type in nature. This type of potentials are used to mimic mainly the weakly coupled plasma condition *i.e.* high temperature and low density plasma. The variational equation for two electron system in the $^{1,3}S^e$ state of even parity having same azimuthal quantum number is taken from [6]. Explicitly correlated Hylleraas basis set has been used to get precise non-relativistic estimations of different spectral properties. Soft wall strategy of the stabilization method [7-8] has been employed for the determination of the resonance parameters *i.e.* resonance energy and width. The number of terms in the basis set is fixed by comparing the estimated structural data of the system with that available in the literature [1-4]. Both bound and Feshbach resonance states of $^{1,3}S^e$ symmetry are considered. For a particular screening parameter, if Z decreases then the energy of $2s^2(^1S^e)$ state of the system and the 2s and 2p hydrogenic threshold energies become more and more positive, and it is consistent for all considered screening parameter values. The resonance widths value of the $2s^2(^1S^e)$ auto-ionizing states with different Z values under different screening parameters, have been reported for the first time in the literature.

The expectation values of kinetic energy $\langle T \rangle$, attractive part of potential energy $\langle V_A \rangle$, repulsive part of potential energy $\langle V_R \rangle$, total potential energy $\langle V \rangle$ and the ratio between $\langle V_R \rangle$ to $\langle V_A \rangle$, Γ of the two electron system under screened coulomb interaction have been calculated with the optimized 225 parameter multi-exponent Hylleraas basis set. It is observed that $\langle T \rangle$ gradually decreases as Z decreases for a given μ , whereas $\langle V_A \rangle$ becomes more positive. The repulsion between the electrons decreases with Z, causing $\langle V \rangle$ more positive because Γ increases as Z decreases. The variation of the average distance between the electrons $\langle r_{12} \rangle$ with Z for different screening parameters (λ) reveals that, for the Feshbach resonance state, the first order QPT is absent in the vicinity of critical nuclear charge (Z_{cr}) in contrary to the bound state. The nuclear charge Z and the screening parameter (λ) of the interaction tunes the phase transition. Moreover, it has been found that the nature of variation of $\langle r_{12} \rangle$ with Z is completely opposite in the presence of screening ($\lambda \neq 0$) with respect to the free system. The two particle density and the expectation values of the interelectronic angle gives a hint of symmetry-breaking in the regime of QPT.

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Keywords: *Critical nuclear charge, Variation method, Hylleraas basis, Stabilization technique*

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Doubly Excited States of Helium like ions in Strongly Coupled Plasma

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Abstract

With the advent of X-ray free electron lasers (XFEL) [1,2], it is now possible to create highly dense plasmas for a considerable duration. These experimental advancements need precise theoretical atomic data for verification of experimental results as well as for plasma diagnostics and over the past few years, theoretical research in this direction has gained some attention [3,4]. However, theoretical estimates on doubly excited states (DES) in plasma environment are extremely limited. The metastable DES (e.g. $2p^2(^3P^e)$ state) which do not decay through autoionization and also through radiative decay to ground $1s^2(^1S^e)$ state can have larger population that leads to considerable line intensity. In this work, we present the behaviour of DES inside high density strongly coupled plasma (SCP) environment. The Ion-Sphere (IS) potential [5] is used in the Hamiltonian to consider the effect of SCP on atomic structure. In IS model, a positive charge is considered at the centre of the sphere which is neutralized by the plasma electrons and hence the plasma electron density governs the size of the sphere. Variational calculations are performed to estimate the energy levels where explicitly correlated wavefunction in Hylleraas basis is used. An appropriate methodology has been developed to evaluate correlated integrals inside the finite domain.

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Keywords: Doubly excited states, Metastable, Strongly coupled plasma, Hylleraas, Ion-Sphere potential

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Spectral Properties of Bound and Resonance $^3F^e$ States Of Helium

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Abstract

Doubly excited states (DESs) of He atom have drawn the attention of a large number of theoreticians for many years. On the basis of stability, DES can be classified into two general groups, as bound and resonance states, depending on the angular momentum coupling scheme and parity conservation rule. Some DES has parity $(-1)^L$, while others has parity $(-1)^{L+1}$ (L being the total angular momentum of corresponding state). The former DES are called ‘natural’ parity states and the later is called ‘unnatural’ parity states. The autoionising DES of such *unnatural* parity lies above $N=2$ ionization threshold of He^+ . $^3F^e$ is among those *unnatural* DES. For last few decades there are a number of theoretical calculations on bound and resonance states of $^3F^e$ state of He atom [1-4]. With the advancement of experimental technique [5,6] it is important to make precise theoretical studies on DES.

Highly precise non-relativistic energy eigenvalues for $2pnf (^3F^e)$ [n=4-9] meta-stable bound states of helium are being calculated by using Ritz variational method. The generalized variation equation has been used [7]. Here we have used multi-exponent Hylleraas basis sets [7] to ensure the inclusion of electron correlation effects. The basis set contains total 1530-terms and the energy eigenvalues are obtained by diagonalization technique [8]. Resonance energies and widths for a wide range of resonance states ($^3F^e$) of helium below $N = 3$ ionization threshold of He^+ have also been evaluated by using stabilization method [9]. The present resonance parameters *i.e.* the resonance energies and widths are in excellent agreement with the few available accurate theoretical results [1-3]. For the first time we have found the resonance states ($^3F^e$) of He atom above $N = 3$ ionization threshold of He^+ .

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Keywords: *Doubly excited states, Variation method, Hylleraas basis, Stabilization technique*

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Antioxidative Role of Flavonoids Present in Different Types of Processed Teas

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Abstract

Tea is an important dietary source of flavanols and flavonoids. These flavonoids are antioxidants by virtue of the number and arrangement of their phenolic hydroxyl groups. Tea polyphenols, scavenge reactive oxygen species and chelate transition metal ions in a structure-dependent manner.

Tea processing is a process in which leaves of tea plant i.e. *Camellia sinensis* are converted to dried leaves for brewing tea. Green, Oolong and black tea are the three types of tea obtained during different stages of processing tea leaves.

Freshly harvested tea leaves are immediately steamed to prevent fermentation, yielding a dry, stable product named green tea. This steaming process allows the tea to retain its green color, as the pigment destroying enzymes are deactivated during the process. These processes also preserve natural polyphenols which are important health-promoting agents. The types of polyphenols present in green tea are flavanols, flavandriols, flavonoids, and phenolic acids which accounts for nearly 30% of the dry weight. Most of the green tea polyphenols (GTPs) are flavonols, commonly known as catechins.

Green tea is fermented to produce Oolong tea which is further fermented to produce black tea. Black tea and Oolong tea contain theaflavins. Theaflavins are produced during fermentation or semi fermentation due to the dimerisation of Catechins. In contrast to green tea that contains naturally occurring catechins, black tea contain distinct polyphenols, such as thearubigins and theaflavins. It has been reported that theaflavins have various biological activities, such as antioxidant and anticancer activities. A lot of research work has been done comparing the antioxidant potential of green tea and black tea.

Ki Won Lee et.al. concluded that green tea has more health benefits than an equal volume of black tea in terms of antioxidant capacity. Their observations was the antioxidant capacity per serving of green tea (436 mg vitamin C equivalents) was much higher than that of black tea (239 mg).

Lai Kwok Leung et.al reported that TF present in black tea possess at least the same antioxidant potency as catechins present in green tea with respect to their free radical-scavenging activity. A typical cup of tea (200 ml) contains 24–40 mg catechins, 8–15 mg flavonols plus flavones, ~85 mg thearubigins and 7–15 mg theaflavins, which together amount to 166–193 mg per cup (D.A. Balentine, personal communication). Black tea is therefore one important source of dietary phenols.

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Keywords: *Catechins, Theaflavins, Black tea, Green tea, Antioxidants*

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Radar Based Weather Forecasting: An Assessment

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Abstract

The capability of measurement of precipitation was the interest of research in early age of weather radar system. The microphysical properties of cloud are studied with the help of weather radar. The hydrological modeling and numerical weather prediction (NWP) with the help of weather radar has started in late 20th century. In earlier days of its invention the radar measurement of precipitation was thought to be accurate but it is proved that sometimes the error is very large. Errors are due to the nature of the measurement and meteorological conditions. The radar is referred as a semi-quantitative measurement device in spite of that the information of the radar is highly valuable. The real-time coverage and availability of the data is the main cause of its day-to-day increased use in prediction of weather. The accurate measurement and prediction of the spatial and temporal distribution of rainfall is a basic need in hydrology as it is the main source of water. The weather radar is used in quantitative rainfall estimation rather than for qualitative rainfall estimation. The ground-based weather radar is used for the assessment of storm hazard and flood forecasting, warning, and control. The spatial and temporal variability of rainfall is the topic of research due to the growing attention in the terrestrial hydrological processes in the climate system. Now a days the atmospheric mesoscale models and general circulation models of rainfall parameterizations are verified using ground-based weather radar system. The quantitative precipitation estimation (QPE) issue is not solved till now.

The exact estimation depends on scan strategy and data processing. The rainfall estimation quality depends on precipitation type. The classification of precipitation type by radar is done using dual polarization or dual wavelength methods. These methods are limited to research experiments. The precipitation type information is collected from some other sources like surface and/or upper air observations or NWP models by some of the modern forecasting system rather than weather radar. The measurement of radar reflectivity at a height above the ground and the rain rates at the ground introduces the observer's problem which influences the prediction of rainfall using weather radar systems. The radar uses Z-R relations which are not same for every geographical location and all types of precipitations. It is possible to associate 25 of the 69, Z-R relations unambiguously with a particular type of rainfall from Battan's Z-R relations. An interpretation of the coefficients a and b in terms of the parameters of the corresponding raindrop size distributions in a particular location may help to explain their variability. Drop size estimation causes also problems for prediction. Different drop size distribution laws are there depending on the different types of precipitations and size of the raindrop.

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Keywords: *Weather radar, Numerical weather prediction, Z-R relations, Drop size distribution*

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An Integrated Cloud Web Hosting and Data Centric Approach Using Amazon Web Services (AWS)

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Abstract

Our old-style Hosting services comes with a predefined set amount of RAM, CPU, Disk Space, Bandwidth etc. and can provide better performance and processing facilities, but it lacks scalability, flexibility, availability and less time-to-set up. On the other side Cloud Computing is providing more flexible likelihoods. Cloud Computing is used to store and access the data over the internet with pay as we go pricing model as a replacement for our own computer's hard drive. In simple words, we don't have to purchase, maintain or operate servers; we just have to pay for running our website or web services on them and leave the maintenance and operations to someone else to deal with them. In our paper we are going to demonstrate how AWS plays a key role in cloud hosting and data centric approach abstemiously than traditional hosting approach. In this competitive market, choosing of a cloud service provider is one the crucial business decision that has to make. There are so many factors to consider before choosing a leading cloud provider like Amazon Azure, Salesforce.com and Googleas their offerings are very closely competing with each other. As there are many players in the market, AWS is leading the market with better pricing model according to security, scalability, availability and accessibility with the largest market share.

Amazon Web Services is a cloud business provided by the famous retail company amazon.com. Amazon is providing a complete and embryonic cloud computing platform named as the Amazon Web Services (AWS). It is a mix of different services like Platform as a Service (PaaS), Infrastructure as a Service (IaaS) and packed Software as a Service (SaaS) offerings. In 2006, Amazon Web Services (AWS) initiated to offer IT infrastructure services to different businesses in the form of web services (cloud computing). This provides services like Compute (named as Instance in AWS terminology), Storage, Databases, Development Tools, Migration Tools, Security and others. The AWS cloud operates over 20 geographical regions all over the world. It provides reliable services at low cost which is one of the most important key reasons for its growing popularity. Few years back AWS has entered into the business market of managed cloud services with the aim to cut the operational workload of its clients. This managed cloud services and allows AWS clients to automate their infrastructure and manage resources with cost effective less efforts. Amazon has kickstarted the cloud transformation by introducing the AWS. Formerly it was constructed as the method of meeting company's enormous need for the capitals as this monetary authority build up. This started forming its online framework accessible to outdoor developers. This particular step hit unexpectedly numerous IT worlds' remarkable company, and Amazon's first-mover influence has made AWS the world's leading cloud provider. AWS directs approximately a third of the market, on the contrary to single-digit shares for each of Microsoft and Google.

Through our paper we can conclude that AWS(Cloud computing) is all about computing as an utility based services. As an end user perspective it is accessible at whichever location or hour it is and also from all computers, without the requirement of inserting, or enhancing and fixing the software implementations bodily on a domestic desktop or server. This paper strives to explore how AWS enables a wide range of organizations to concentrate on their key business tools with minimal cost.

Keywords: *Cloud Computing, AWS, PAAS, IAAS, SAAS.*

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Variations in Climatic Conditions Due to Cosmic Rays

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Abstract

The variation in cosmic-ray flux is the main reason for global temperature change which is stimulated by neutron star burst. Due to the production of very high energy γ rays the upper atmosphere of the earth is almost altered. Cosmic radiation usually comes from the galaxy and it consists of charged particles. These charged particles are emitted due to the exploding of supernova and stars. The charged particles are mainly proton and alpha particles. Iron and nickel like heavier nuclei are also there. The cosmic radiation is less intense when the solar activity is high. The earth's atmosphere got ionized due to the cosmic rays. Lower cosmic ray intensity is attributed as the cause of global warming. Dense clouds are formed in lower atmosphere due to cosmic rays. In the lower atmosphere, the air is hot due to the retaining of more amount of surface energy by the low clouds whereas the upper atmosphere is cooler due to reflection of more amount of sunlight in the space. The earth is shield from cosmic rays due to the stronger solar magnetic field. The total cloud cover and thus the climate is affected by the cosmic rays. Actually, the balance between the cosmic radiation on earth and its redistribution is controlled by the cloudiness which in turn is also responsible for changes in environmental conditions. Cosmic rays include GCR (galactic cosmic rays) and SCR (solar cosmic rays). Extragalactic cosmic rays can also influence the earth's environment. Solar wind is directly responsible for the earth's magnetospheric current. The magnetic field around the earth is stronger when Sun's activity is high. During high activity of the Sun, it emits more amount of ultraviolet radiation due to which more number of sunspots are displayed. As a result less amount of cosmic ray can penetrate the earth's upper atmosphere. In the present study, the effect of cosmic rays have been examined on the annual rainfall and temperature of India. The variation of rainfall with cosmic ray intensity is not same in both the hemisphere. It is found that rainfall follows the same trend as the cosmic rays intensity in the northern hemisphere, whereas it is varying oppositely in southern hemisphere. No definite trend is found between cosmic ray intensity and temperature in any of the hemisphere. All three parameters viz. cosmic ray intensity, annual rainfall and yearly average of monthly temperature are plotted to see the variation. As the cosmic ray intensity is not same throughout the globe, five stations from Southern hemisphere and the two stations from Northern Hemisphere are selected. The present study reveals that the annual rainfall of India increases with galactic cosmic ray intensity whereas the temperature decreases with increase of galactic cosmic ray intensity.

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Keywords: *Galactic cosmic rays, Solar cosmic rays, Cloudiness, Sunspot*

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In silico prediction of Inhibitors of lipase from *M. restricta*, a dandruff causing fungus

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Abstract

Lipases are one of the most important enzymes in biotechnology. They belong to the hydrolase family and act on carboxylic ester bonds. *Malassezia restricta* lipase (Mrlip1) secreted from *M. restricta* is found to be responsible for skin diseases. Lipases are known to degrade the triglycerides of human sebum and specific saturated fatty acids. This causes irritation in human skin with dandruff and seborrheic dermatitis. Pathogenic fungi produce extracellular lipases to breach the host tissue barrier and enable them to penetrate the tissue. At present anti-fungal agents such as zinc pyrithione, ketoconazole, selenium sulphide, and general lipase inhibitors are used to treat dandruff (1,2).

Dealing with vast number of three-dimensional structures of molecules deposited in Protein Data Bank and other data bases has been a challenge to biologists at recent times. So a computer aided tool like virtual screening is required to search for potential targets among millions of structures in the data bank. Virtual screening is an alternative to high throughput screening used in laboratories. The drug and the receptor should have shapes complementary to each other. This complementarity is determined by pharmacophore modelling. A pharmacophore is described by the spatial arrangement of a group of structure elements which are essential for interaction with receptor. To design potential drugs a pharmacophore is developed from the known potential inhibitors. The target protein has some important catalytic residues which binds with the certain chemical elements in the pharmacophore. The strong binding between the target protein and the inhibitor is further verified by molecular docking using high resolution crystal structure of the target protein. The dynamic behavior of the protein-inhibitor complex is revealed by molecular dynamics simulation. Analysis of the energy profile of the protein-inhibitor complex explains the role of different residues in inhibitor binding. These methods are used to predict potential drugs against lipase from *M. restricta*.

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Keyword: Lipases, M. restricta, virtual screening, pharmacophore, molecular docking, molecular dynamics simulation

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Big Data -- The Wonder Tool In Genome – Science

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Abstract

Big data is one of the new field of researches. It is the way of sequencing large amount of unprocessed data (10^{15} bytes) in a usable manner. Biologists are working on Genome sequences to enable gene editing in a more efficient manner. DNA sequencing can efficiently give a new way to destroy cancerous cells and it can even help to produce an offspring without any risk of the inherent diseases. In this field of research, a large amount of research data is created every day. A single sequenced human genome is around 140 gigabytes in size. So, if 50 genomes are sequenced, a huge amount of data is to be maintained where using the traditional way of online file sharing method is irrelevant. Big data plays the key role here, along with cloud storage.

Human DNA consists of 4 basic nucleic acid bases: Adenosine, Guanine, Cytosine, Thymine arranged in a particular order so that when they are read by cell machinery, the sequence could be decoded for particular protein production. However, these gene sequences are slightly different for different living beings. The risk of a disease can be detected from a little change in the sequence of genome.

DNA sequencing is used in a therapy called Gene Editing. It produces a huge amount of data every day. For example, BGI (a genome sequencing centre) is one of the largest genome data producer in the world, 157 genome sequencing with 6 terabytes data every day. To protect and analyse this huge data around the world, Big Data is used. It takes this data into the cloud via firewall and then the cloud is made connected to the internet so that the smaller labs without those efficient technology can also retrieve and analyse the data in the cloud itself without downloading it. The cloud has been provided a strong security network so that the confidential research data do not go in wrong hands.

Cloud storage is a model in which digital data is stored in logical pools. It is based on highly virtualized infrastructure where a master control server controls the data analysis using several other storage servers which are connected to the client servers through internet.

Harvard's Bioengineers have performed an experiment of storing 5.5 petabytes, i.e 700 terabytes of data in a single gram of human DNA. From this experiment, it can also be predicted that in near future, DNA will also be used as a digital data storage unit instead of binary data being encoded on magnetic regions hard drive platters.

A single DNA strand containing 2.9 billion base pairs of haploid human genome storing 725MB are synthesized with each of the bases (TGAC) representing a binary value (T and G=1, A and C=0). Each base can store 1 bit, so the data density is also high.

Several scientists namely Andreas Sundquist, Arend (a computational biologist), Xu (BGI president) are working on this project. In University of California, Sandiago, scientists succeeded in transferring a 24GB file in 30 sec using cloud. But, as said by Professor Xu, transferring big data may cause data traffic and researches are still going onto find new technologies to avoid this. If DNA sequencing can be made possible using BIG DATA ANALYSIS on CLOUD, then it will create wonder in Genome Science as well as Digital Science. The total scenario of Computerized world as well as Genome research will touch a new milestone.

Keywords: Big data; Genome sequencing; cloud analyse; DNA storage unit; Data science.

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Synthesis and analysis of Graphene Oxide-Copper oxide nanocomposites

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Abstract

Graphene has attracted tremendous attention of researchers due to its extraordinary properties such as high surface area, high thermal stability, high conductance, high ionic mobility etc. It is a thin tightly packed monolayer allotrope of carbon atoms that are bonded together in a hexagonal honey comb lattice. It is the hardest material ever known. But graphene is hydrophobic in nature and has strong tendency to agglomerate due to vanderwaals interaction which limits its application. To overcome this problem graphene oxide is prepared as the alternative to graphene. The basal plane of graphene is modified and decorated by oxygen containing groups such as hydroxyl, carboxylic, epoxy groups etc. by oxidizing graphene with strong oxidizing agents. Graphene oxide is a single atomic layered nanoscale material. The oxygen containing groups present in graphene oxide have high affinity to water molecule. That is why graphene oxide is hydrophilic in nature and can be easily dispersed in water. So, Graphene oxide is prepared from graphite flakes by modified Hummer's method. Graphene oxide can be easily dispersed in water and other organic solvents. Metal oxide nanoparticles are also very interesting part of nanomaterial science due to its high surface area, exceptional electrical, optical and molecular properties. Metal oxide nanoparticles has possibilities to insert more functional groups on its large surface. Due to large surface area Graphene oxide offer sufficient space to accommodate different metal oxide nanoparticles. So When Graphene oxide -metal oxide mixed nanocomposites are prepared the properties are enhanced remarkably than the properties of graphene oxide and metal oxide alone and prevent the agglomeration of nanoparticles. Here Copper oxide nanoparticles is selected due to its low cost and easy preparation method. Graphene oxide is prepared from graphite flakes by modified Hummer's method. Copper sulphate is used to prepare copper oxide nanoparticles. Then Graphene oxide -copper oxide nanocomposite is prepared. Encapsulation of copper oxide nanoparticles on the surface of graphene oxide is confirmed by UV-Vis spectroscopy and FTIR. In this work we briefly discuss the preparation method of Graphene oxide-copper oxide nanocomposite and the characterisation of the prepared nanocomposite. The antibacterial activity of the nanocomposite can be studied in our future work.

Keywords: Graphene oxide, Metal oxide, Nanocomposite, characterization.

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Investigation of the Properties of SnO₂ Nanostructures Grown by C.B.D. Technique with Variation in Solute Molar Concentration and Growth Time and Fabrication of Gas Sensors

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Abstract

Over the last few decades, there has been an resurgence in the concern regarding toxic gases leading to environmental pollution and inflammable gases which results in combustion accidents. Thus the use of gas sensors employing semiconducting metal oxides for the detection of these harmful gases came into prominence. Nowadays the most widely used commercial gas sensors are based on tin oxides because of their low power consumption, high sensitivity, simple design, fast response and low manufacturing cost [1,2,3].

Tin oxide (SnO₂) is long being used for its excellent optical transparency and high electrical conductivity, excellent chemical stability, strong adherence to glass and mechanically hard nature which makes the oxide suitable for applications such as chemical catalysis, transparent electrodes for displays and solar cells and gas sensors [4]. There are various techniques available for the synthesis of SnO₂ such as chemical vapor deposition (CVD), Spray pyrolysis [5], femto-second pulsed laser deposition [6] and spraying [7]. However, today's commercial realization of SnO₂ nanostructures, demands a fast and cost effective solution for its synthesis. In this context, chemical or solution processed routes such as chemical bath deposition (CBD), in conjunction with sol-gel technique, is mostly favored. The sol-gel provides a seed layer for nucleation. The probability of obtaining continuous films is greater compared to normal (CBD) techniques. These CBD and sol-gel technique provides not only a cost effective way out for synthesis, but also has an environmental friendly growth mechanism.

In this study, SnO₂ nanostructures are grown over glass substrates by CBD in conjunction with sol-gel technique. For the investigation of the materials properties, different nanostructures are grown with variation of solute molar concentration and growth time. The morphological study of the film has been performed with field emission scanning electron microscopy (FESEM). The compositional analysis has been carried out with energy dispersive X-rays (EDAX). X-ray diffraction studies revealed the crystalline properties of the grown films. The percentage of tin oxide in the sample also varied with respect to molar concentration in accordance with the EDAX spectroscopy. UV- visible spectroscopy is done to get the transmission characteristics of nanostructures from which the energy band gap of the material is found. The band gap of the samples varied with the molar concentration. Photoluminescence spectroscopy of the 0.75M sample was taken. Band to band transition was not found but information about defect levels were found in the PL spectra. The electrical properties of the as-grown samples are also measured. SnO₂ gas sensors are fabricated in order to investigate the gas sensing of such devices. Using the same procedure the tin oxide was also deposited on III-V samples leading to the formation of heterostructures. Electrical and optical characterization were performed on the as grown heterostructures.

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Keywords: *Chemical vapor deposition, EDAX*

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Rain Attenuation of Radio Waves and the Drop Size Distribution: A Review

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Abstract

Radio signals get attenuated due to rain. The energy of propagating radio waves is decreased due to either absorption or scattering. The signal is diffused due to scattering and the absorption involves the resonance of the waves with individual molecules of water. Actually, due to absorption the molecular energy is increased corresponding to a slight increase in temperature and results in an equivalent loss of signal energy. Rain attenuation is related to the rainfall rate and frequency of operation of the communication system due to which the path loss is increased and the coverage area got reduced, results in degradation of system performance. All radio frequencies above 10GHz suffer from attenuation. So, it is important to calculate path loss and the signal coverage area for a location before planning for wireless communication. Radio frequencies in the microwave and millimetre wave bands are used to fulfil the demand of high data rates and greater bandwidth. The radio signals attenuated in infrared and optical bands more due to fog whereas the effect of rain attenuation is more in millimetre wave bands. As the electromagnetic waves are most effected by absorption and scattering due to which attenuation is increased in radio link communication with increase of rain rate. There occurs the challenge to the new communication system which uses the radio wave spectrum above 30GHz. The drop size distribution can cause significant variations in the distribution of rain attenuation. This necessitated the long term and precise measurement of drop size. The prediction of rainfall attenuation require the relation between rainfall rate and the attenuation. Basically the drop shape is taken as spherical but with increase of size it becomes slightly non-spherical. So measurement is done by taking same volumic sphere. The specific rain attenuation from rain rate is calculated as per the guideline given by the International Telecommunication Union Radio communication Sector (ITU-R). The reliability of the result depends on the drop size distribution of the rain taken in ITU model. As per ITU-R, India comes under 25 mm/hr to 50 mm/hr rate of precipitation zone and is categorized in k-region in global map for a precipitation of 0.01% of an average year.

Different models for rain drop size are proposed. All the models are not correct for a given geographical area due to type of precipitations. The total average rainfall for an area is calculated using the model appropriate for that geographical region. Generally, Log-normal distributions or Gamma distributions are suitable for precise prediction of attenuation due to rain in India.

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Keywords: *Radio attenuation, communication system, Drop size distribution*

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Land Allocation Planning Problems of Agricultural Systems of West Bengal in Imprecise Environment

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Abstract

This paper describes how the fuzzy goal programming (FGP) can be efficiently used for modelling and solving land allocation problems having chance constraints for optimal production of seasonal crops of agricultural system in inexact environment. The environment in which we live and work is highly imprecise in nature. Unpredictability of the rainfall conditions and unavailability of fresh irrigation water supply due to socio-economic conditions is a matter of concern in the complex real world agricultural situations. Worldwide there is now a huge diversity of agricultural systems ranging, for example, from rice paddies of Asia, to dry land pastoral systems of Africa, and hill farms in the mountains of South America. However, the Earth's biodiversity is being lost at an alarming rate, putting in jeopardy the sustainability of ecosystem services and agriculture, and their ability to adapt to changing conditions. The conservation and sustainable use of biodiversity is essential for the future of agriculture and humanity.

In the proposed model, utilization of total cultivable land, different farming resources, achievement of the aspiration levels of production of seasonal crops are fuzzily described. Water supply as a productive resource and the socio-economic constraints are described probabilistically in the decision making environment. The land-use planning problem for production of the five principal crops such as Paddy, Wheat, Mustard, Potato, Pulses in three different seasons such as the crop-cycles Pre-kharif, Kharif and Rabi successively throughout the planning year of the District Bardhaman of West Bengal (W.B.) in India is considered to illustrate the proposed FGP model.

In this paper, genetic algorithms (GAs) based on natural selection and population genetics have appeared as robust computational tools for solving real-world optimization problems to overcome the computational load and decision error. But, exploration of the potential use of GAs to multiobjective decision making (MODM) problems is yet to be circulated in the literature.

In the solution process, achievement of the highest membership value (unity) of the membership goals defined for the fuzzy goals of the problem to the extent possible on the basis of the needs and desires of the decision maker (DM) is taken into account in the decision making horizon. The potential use of the approach is demonstrated by a case example of the Bardhaman district, West Bengal (W. B.), INDIA. The model solution is compared with the existing cropping plan. A solution scheme based on GA is introduced to reach a satisfactory decision on the basis of priorities of achieving the objectives of the problem in the decision making environment. Considering both the national and international scenario of agriculture, very scanty information is available regarding the application of chance constrained Fuzzy Goal Programming approach to optimize the agricultural production recourses in order to lower production cost and avoid environmental pollution. Thus the present study has planned to propose a fruitful solution of the problem for both short-and long-term farm profitability.

Keywords: Agricultural Planning; Chance Constrained Programming; Fuzzy Programming; Fuzzy Goal Programming; Goal Programming

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Influence of Poly(ethyl acrylate) on Nano CaCO₃ Induced PVC Blend

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Abstract

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.

Poly(vinyl chloride) (PVC) is a widely used commodity plastic which 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. However, the disadvantage of using a non polymeric modifier is that one property of the polymer is modified at the cost of deterioration in some other property of the polymer. The incorporation of acrylic polymers in PVC behaves as equivalent to rubber toughening of glassy polymers. In this context, poly(ethyl acrylate) (PEA) has been used as an effective polymeric modifier which influences the mechanical properties of PVC by raising its toughness and elongation without compromising much on the modulus and ultimate tensile strength.

The PVC – poly(ethyl acrylate) blended polymers also exert a modifying influence on the thermal and morphological properties which has already been reported in literature. 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 acrylate.

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 and modulus by using poly(ethyl acrylate) with nano calcium carbonate (CaCO₃) as the nanofiller. 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 ethyl acrylate monomer (10 to 40 parts premixed with benzoyl peroxide initiator (2 parts) was added to the PVC mix along with the nano calcium carbonate filler (6 parts) and mixed thoroughly in the blender at a slightly elevated temperature. A number of batches were prepared by varying the dose of the acrylate. The mix was then compression moulded into sheets under heat and pressure which was then subjected for mechanical testing in Instron Universal tester. It was observed that the modulus and the ultimate tensile strength did not reduce significantly by the plasticizing influence of poly(ethyl acrylate) showing the balance of mechanical properties due to the presence of the nanofiller. The modifying influences of both the polyethyl acrylate and nano calcium carbonate filler were thus significant in the mechanical properties observed.

Keywords: Poly(vinyl chloride), Poly(ethyl acrylate), Nano calcium carbonate, Mechanical properties

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Effect of Alternative Food in a Food-Chain System in Presence of Allee Effect: A Mathematical Approach

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Abstract

In this paper, we proposed and analyse a predator-prey model with Allee effect and alternative food. Here we consider Tri-tropic food chain model and introduce Allee effect and alternative food in the top predator population. The dynamics of the system are studied using both analytical and numerical techniques. Considering the Alternative food parameter as the bifurcation parameter, Hopf bifurcation analysis is carried out around the coexisting equilibrium. Here we are applying the normal form of theory and centre manifold theorem for determining the direction of Hopf bifurcation and the stability of the bifurcating periodic solutions. In our numerical analysis we observe that enhancement of Allee effect for the top predator enhance the stability of the system, further we enhance the Alternative food in presence of Allee effect which enhance the stability and persistence of the system more significantly. Extensive numerical experiments are performed to illustrate our analytical findings. The dynamic behaviour of predator-prey model has been continuing as one of the most dominant themes in mathematical ecology due to its universal existence and importance. A variety of ecological systems are well modelled by nonlinear systems. In most cases such systems are capable of displaying chaotic behaviour. The control and the management of chaotic population dynamics is one of the main objectives of mathematical modelling in ecology today. The consequences of providing additional food to predator and the corresponding effects on the predator prey dynamics and its utility in biological control have been the topic of great attention for many scientists.

The population dynamics of a large class of ecological system can be effectively modelled by deterministic chaotic system. It is well known that chaotic system are unpredictable in McCann and Hasting stabilised the food web system by eliminating chaotic dynamics and obtained limit cycle behaviour of the HP model by introducing omnivore on top predator. In a three species or tri-tropic food chain model, chaotic dynamics is an important issue. Occurrence of chaos in the simple ecological models make chaos a subject of interest. It has grabbed the attention of computational biologist, mathematical modelers and experimental ecologist. The determination of ecological factors through which chaos can be enhanced or controlled, required theoretical and experimental investigation. Additional foods in presence of Allee effect are an important component of most predators. The availability of suitable additional food in presence of Allee effect in a predator prey system can have significant impact on the dynamics of the system. Although many aspects of alternative food was investigated, but till now the aspect of alternative food in presence of Allee effect is unexplored such as the chaos controllability aspects by supplying additional food in presence of Allee effect was unexplored. In this paper we apply a non chemical method of supplying additional food in presence of Allee effect to top predator for controlling chaos.

Keywords: *Tri-topic food chain, Allee effect, Alternative food, Prey, Middle predator, Top predator, Chaotic system*

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Urea Doped Solution-grown Single Crystals of Epsomites

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Abstract

There is a huge need to build up new class of nonlinear optical materials because of their useful for frequency conversion in the UV to near IR spectral region. Studies on the nonlinear optical (NLO) materials are continuously going on due to their significant impact in various fields like telecommunication, optical data storage, optical switching, image manipulation and processing. High performance electro-optic switching elements of optical information processing and telecommunication are based on materials with high nonlinear optical properties. Intensive research is going on to find suitable materials for frequency conversion of IR radiation to UV wavelengths. Particularly, searches on suitable materials are going on which can generate second harmonic blue-green light using laser diodes. Organic nonlinear compounds steal the show owing to their potentially high nonlinearities, chemical flexibilities and rapid responses in electro-optic effect compared with the inorganic nonlinear compounds. For Nonlinear optical (NLO) applications, good quality single crystals having large NLO coefficients coupled with improved physical parameters are needed. One attractive system, where there is a potential for realizing very large second order nonlinear coefficient is based on organic crystals.

Urea is an important organic compound serving as an important role in the metabolism of nitrogen-containing compounds by animals. Beside this, urea has three major nonlinear optical properties: nonlinear optical coefficient, absorption edge on ultraviolet side and birefringence. Hence, trials are given to grow urea doped inorganic crystals to introduce the important optical properties in the crystal.

The presence of impurities, even in a minute amount in the parent phase, has considerable effect on the growth morphology, chemical nature and mechanical properties of the crystals. In the present study, highly transparent crystals epsomite ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$) having well-defined morphology have been grown by doping with urea in a very low concentration. Vickers microhardness study has been done on solution grown single crystals of urea-doped epsomite over a load range of 10-80g. The Vickers hardness numbers (H_v) are found to decrease with increase in load and then appear to level off. It is found that hardness of the crystals increases with the amount of doping. Meyer's index 'n' is found to be less than 2 for the whole system and thus, the system belongs to the soft material category. Neither Kick's law nor Hays and Kendall's law can fully explain the nonlinear variation of microhardness with load. Instead, preference has been given to Li and Bradt's proportional specimen resistance (PSR) model. The elastic stiffness coefficient C_{11} has also been estimated using Wooster's empirical relation from the hardness data.

Keywords: *Epsomite, Doped crystal, Solution growth, Vicker's microhardness*

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Cluster formation of HRV in AF patients: a comparison with normal people

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Abstract

Atrial Fibrillation (AF) is a disease where the heart beats irregularly due to mal-instruction caused by chaotic electrical impulses. British Heart Foundation defines AF as "...a common abnormal heart rhythm that happens when electrical impulses fire off from different places in the atria (the top chambers of the heart) in a disorganised way. This causes the atria to twitch, and is felt as an irregular heartbeat or pulse." It is a major cause of stroke. Doctors usually diagnose it from the ECG. Scientists have shown that the signature of AF is also visible in the Poincare Plot of Heart Rate Variability (HRV), which is the inverse of Heart Rate (HR). They have shown that the points in the Poincare Plot form multiple clusters in AF patients whereas it is a single cluster for normal people. In his article, we have tried to go a step ahead. We have investigated how these clusters are formed in a step by step fashion.

Data collection

We have collected our data from the Physionet, the well known and well circulated database of Physiological signals.

Method

From the HRV, we constructed Poincare Plot with lag 1, that is, we plotted the points $\{x(i), x(i+1)\}$ for all 'i' and the plot became clustered as expected. Now we started from the beginning, took a small number of points and plotted them. Gradually, we moved forward and plotted them with different colours so that the result of progression can be clearly visible.

Results

The plot immediately makes a distinction between AF patients and normal population. It is usually a single cluster in case of normal but for AF patients it is multi-clustered. We further hypothesize that these different clusters may correspond to different physical places from where the impulses generate. Evolution of the clusters supplied some additional information which tells us how the oscillator is changing over time. At first, a single cluster is formed but over time another begins to appear. If we go on, it can be observed that the previous oscillator or a nearby oscillator again becomes active and this type of activity continues till the end. But in case of normal persons, there is a single cluster and when it is formed there is no such interesting phenomenon. Points are plotted again and again almost in the same place of the two-dimensional plane.

Conclusion

Formation of cluster brings in some additional insight about the disease. It shows how the oscillators are changing over time and activates or de-activates accordingly. It seems that the dynamics of the disease can be captured with these plots just looking at the HRV. More research is needed to explore this promising direction.

Keywords: *Heart rate variability(HRV), Heart rate(HR), Electrocardiogram(ECG), Cluster, Atrial Fibrillation (AF), Poincare Plot*

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When Cultures Collide

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Abstract.

“Language and culture are the frameworks through which humans experience, communicate and understand reality.” – Lev Vygotsky.

Before we come to know what it means, we should know what culture is. Well it's just the way of life. Different cultures have different customs, ethics, thoughts, standards & even patterns. Now as we are the elements of certain culture, hence whenever we go and start any conversation with a person who is from totally different culture, the intercultural communication takes place in between and that's the reason why good intercultural communication requires a strong willingness to accept those differences of cultures. There are plenty of countries and so do their cultures but as time is passing by and we are growing, we need to communicate with various people daily. Communication can be verbal, non-verbal, but what matters is the ability to adapt the changes of that person we communicate with. We see people who are from different societies, their styles, rituals, and way of thinking everything is different but we always try to communicate; this is the beauty of the World. We may understand or may not but we end up having a friendly cultural bonding. Moreover gradually the non-verbal communication is rising. Relationship doesn't demand language always, rather the only thing it needs is the wish to have the courage to adapt them, to grab other's cultural norms, physical, economical, structural ethics.

Russia, Japan, and France many countries are working on it. There are institutions which teach youngsters how to get the healthy cross cultural communication. This type of relationship builds a positive impact on corporate world, business, and international communication too. When different cultures collide it makes the people aware of the history, literature, costumes, languages and lifestyles of those different societies.

“Intercultural”, the word itself brings a belief of having willingness to gather knowledge and communicate with others. Intercultural communication increases the potential to get in touch worldwide. It enhances business, political issues, and many more relationship. We can only know about our cultures properly when we will know the others. Communication between different cultures often leads to have a more beneficial outcome. We must realize the missing link between North and South, East and West, mountains and seas and etc. That's how we can set up the structured manifestation of human behavior all over the world. When two people from totally different cultures come and communicate in a healthy manner the beauty of communication comes out.

We have diversity, but communication accepts no bar, no wall, nothing. Ability of understanding and to adapt others and to get a positive conversation even knowing nothing about the background of the person he or she is talking to one can learn, acquire the cultural norms easily. As we know when cultures collide it makes a more beautiful output. Not all collisions are harmful; some give us worthy relationships only demanding the wish to have an intercultural communication power.

That is why; there is the phrase, “Togetherness in diversity.”

Keywords: *Cultures, Communication, Willingness, Adaptation, Understanding.*

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An Estimated Future of Gender Neutral English

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Abstract

If there is one marker of development that reflects rapid globalisation, it is development of and in communication processes. The more our civilisation developed, the more we knocked down cultural and language barriers across the globe and made way for global population to partake and contribute in rapid tides of progress. A massive change in centuries old ideologies followed and as a result the marginalised classes, shunned by patriarchal society were soon found in the forefront of the action. Some members of these marginalised sections were women, transgender individuals, queer individuals and gender-fluid or genderless individuals. Gender, we learnt, was a social construct and has very little to do with biological sex of the individual.

Once freed however, the journey for the marginalised to merge into mainstream culture was difficult. Under patriarchal social conditioning, the default state, condition and being is always male. And this is best understood while navigating nuances of language systems, particularly English. Words, terminologies, formal nomenclatures lean towards masculine gender of the noun form instead of feminine gender or neutral gender. An attempt was made by feminist critics and theorists to point this out and demand for a gender fluid or neutral version of terminologies, nomenclatures and pronouns be developed to help the several different genders related with language and communication. Casey Miller and Kate Swift's *The Handbook of Non-Sexist Writing* pioneers in non-masculine, alternative forms of address and nomenclatures.

Business Communication deals with most precise and economical version of the spoken and written form of English. With inclusion of individuals from all walks of life, there is a need to update the existing repertoire of male-centric nomenclature and pronouns to address every individual with the recognition and respect they deserve. So far in the Indian Context, very little change has been incorporated, although there is certainly scope for dynamic change. In this paper, I shall endeavour to briefly discuss a teaching model to introduce the students with gender neutral English in a rational and considerate fashion. While I hope impressionable and eager young minds to immediately register the idea, change might take some time to materialise, owing to overcoming the barriers of social conditioning. The first part of the paper shall map how much change has been incorporated in Indian college education syllabi, the second part of the paper shall discuss the teaching model and the third and last part shall produce an assumptive map of future of gender neutral English education in India. The reference follows Chicago Manual of Style.

Keywords: *Intercultural studies, gender neutral, English education, communicative English.*

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'Language' & 'Peace': Civilization in Tranquility

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Abstract

'Language' & 'Peace': Although the words pose different meanings in the dictionary, they almost become synonymous in the realm of today. As tensions escalate between various fronts of the human endeavours, fighting to find a solution might even end up in a nuclear winter. Hence to find a solution, an enlightening of the thought process is needed for the sides involved so as to resolute a win-win attitude & work towards prosperity of human as a community of the world. In order to achieve such an encouraging future, improvement of human communication is urgently needed that can only be accomplished through proper education of how to use language as an efficient means.

Since the beginning of civilization humans have devised ways to communicate with each other: non-verbal and verbal. Verbal communication might be a more advanced way to convey a message, but the animal world still communicates through calls and actions. As human brains have developed, civilization has flourished and terms like 'politics', 'economics' and 'money' have been coined and introduced. Thus, to grow politically, economically and of course reproductively human societies must be in good terms with each other, flock together and communicate effectively. Peace prevails when there's economic and political stability. Hence communication, rather languages play a very important role in tranquillity.

The scope of non-verbal techniques being absolutely limited, man must rely on the complicated means of language to negotiate. Man in this case is gifted with the ability to learn the basics of one language almost with little or no effort from his environment. But in order to be adept in sensitively handling such a sophisticated procedure, proper training & education is needed because scientific education has invoked breakthroughs that put humans on the verge where they question the superiority of the almighty. But the lost souls of Hiroshima & Nagasaki will always question the lack of education on language & ethics that could've proposed negotiable terms through human communication. So will the families who lost their loved ones in the attacks of 9/11 or the riots of Gujarat. Wars & riots existed since the advent of human civilization & as days continue it's taking an uglier turn. So, let us use this power to outlay our dreams of alternative timeline for generations to come where the species works together towards it's spiritual growth and also one that doesn't end up in a manmade catastrophe.

Just like a wolf shows its belly to surrender and declare peace, humans also spread harmony by promises, hugs and hand-shakes. Understanding languages develops tolerance as one learns to bear with another's religion and traditions. Every country has one drawback or the other. Languages break the invisible barrier between students, travelers and refugees in a foreign land. And through these languages accompanied by intense logic, a society will discuss its drawbacks and take a step further towards a better world.

Keywords: *Dictionary meaning, Human civilization, Harmony, Understanding*

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Multiculturally Us

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Abstract

We all know that human beings are social animals, they cannot live in isolation. The fact itself implies that they need some form of interaction in their day to day lives which we commonly call as “communication”. It is the procedure of transmission or imparting of information by speaking, writing, or using body language. Famous norms and social behaviour shown by every other human being called as “culture” which symbolises their existence in a society. It is a mutually social participation among people of different caste, gender, race, background showing common interests in rituals, religion, habits, clothes, cooking, art and dance. It focuses on the range of communication channel where people from different countries and cultures interact and perceive the world as a whole. It also serves as the building point for international businesses.

“Every human is like all other humans, some other humans, and no other human”---Clyde Kluckhohn. The lines above give us a pretty simple yet impactful message which good communicators should understand. Every human is like all other humans when it comes to the needs, desires and aspirations necessary for human existence. Every human is like some other human when personal features get involve like shyness or frankness or cultural commonness persists, while every human is like no other human genetically or in case of having unique experiences and beliefs.

While a crucial part of intercultural communication is usage of different languages as this involves a mix of people from different cultures but is certainly not the most absolute requirement. It needs a good interpretation that these cultures have different customs, traditions and beliefs. And in order to inculcate good intercultural communication skills one needs to accept the differences, respect their identities equally and adapt to them as well. Not only a well thought speech of how cultures affect people and their communication methodology matters but also one should have awareness of how to handle sensitive areas while dealing with people belonging from diverse backgrounds and realise the thin line between establishing a point and igniting a clash regarding people’s values and beliefs. Intercultural communication can be carried out either verbally or nonverbally. Verbal communication generally depends on language, use of expressions and the tone in which the sender and receiver decodes the message. Nonverbal communication is mainly communication without use of words and is often denoted by facial expression, body language, postures, gestures and eye contact.

The areas of interest include cross cultural business communication where the capability to communicate, negotiate and handle people from other cultures is vital. Even, globalisation plays a key role in portraying ideas of mass communication, role of media and removal of imaginary cultural barriers which all through provides us an open globalised society where opinions of everyone is understood and reciprocated.

Keywords: *Intercultural, Globalisation, Methodology, Stereotypical, Reciprocated*

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English For Academics Purposes

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Abstract

Rightly quoted by D. Blocher that “Learning is not a spectator sport”. If you need to learn English and speak it fluently then you need to immerse in the beauty of the language, that is, you need to practice it regularly. English is just a language to which most of us are familiar and by which humans often referred to as ‘social animals’ communicate with their kind. Well, but did you ever think what makes it so important to other languages?

English gained its popularity because of mostly the British Empire which reigned over many territories over the world, making it a language for the elites and who worked with literature, philosophy and wanted to make a mark in it. Although the empire has been destroyed but the legacy of the language has prevailed over the years making English one of the most widely spoken languages of the world.

For Indians, English is introduced in pretty early years of education, and one of the two Central Boards follow English as their medium of language mostly ICSE and CBSE Board schools. The habit is inculcated in them to speak and write because English is the only language they are allowed to use to communicate in with their teachers. For studying abroad after one completes his/her high school a mandatory exam is taken which checks the capability of a candidate to write and speak English fluently. So, English proves to be important at various times in one’s academic life, be it simply in an English paper or for developing soft skills which give an upper hand to them in many cases. It is seen that in Engineering or Medical universities and colleges that majority of students who are weak in English face a lot of problems interacting with their peers who may not be of the same city or even state and also they need to have a swift grip on the language as many of the academic syllabus is in English itself. For better understanding and to target all audiences, this language is too used in project displays and presentations.

English is such a language of which to gain expertise in one needs to update one’s vocabulary regularly. Even in order to inculcate the habit of English speaking starting the education of a child must begin with English, from Kindergarten level English is such a language that is common among every person, where two people coming from different backgrounds having a separate mother tongue communicate via one language, which is English. It is such a language which binds every native and non native English speaking student with a single invisible thread. When the matter comes to academic purposes then special training classes and as well as lab classes are arranged so that students can learn English in a better way. Learning English helps any person to grow, develop oneself in any country and communicate freely with others fluently without hesitation.

Keywords: *Communicate, Soft skills, Interacting, Vocabulary*

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illuminating the Era of Language & Knowledge Harmony

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Abstract

Education is the passport of future to those who gains knowledge of languages and peace to open the door of wisdom. It is a life itself, breeds of confidence. Confidence breeds hope and hope breeds peace. Increasing globalization has created a great need for people in the workplace who can communicate in multiple languages. The highest form of objective for any education is the inculcating peace and is an essential value to be cherished by every individual.

The origin of the word, 'language' is from the Latin word – 'Lingua' which means 'The Tongue'. Communication is the process through which we share or exchange our views, feelings, ideas and thoughts with others and language is the only medium which enables us to communicate. Language is a system of arbitrary vocal symbols by means of which human beings interact. As per the survey, worldwide nearly 7000 languages are spoken today. Many languages are spoken by ethnic minorities who are educationally as well as economically disadvantaged because of limited language fluency. More than 200 million children globally live in homes where language spoken are different than the ones used in schools. These children are vulnerable to non-enrollment repetition and non-completion. It is obvious that languages play an integral role in various aspects of lives in modern education it is often considered that *bilingualism* and language learning are important skills to achieve excellence in education we must recognize the centrality of the language acts as a connective tissue which binds us all together it is not only useful but the most strongest part of our being.

Peace Education is the process of acquiring the values, the knowledge and developing the attitude, skills and behavior so as to live in harmony to oneself with others and with the natural environment. Our mind is filled with hatred and rage for our fellow competitors. In such situation all we need is peace of mind. Hence, peace education is of utmost importance. According to *UNESCO*, they develop peace education materials and provide skills and network for young people and erstwhile combatants, promoting peace building through education in situations of both conflict and peace. The concept of peace can be described as the values incorporating respecting features – race, gender, religion is physical appearance, unity, cooperation and being fair. *Peace Education* is a golden key for establishing a consensual peace and maintaining it over time when there is no peace among the person in a society then it leads to serious threatening and catastrophe. So, it is high time we inculcate peace within ourselves. Educating for peace will aid every individual to find a way of keeping peace by conflict resolution. The language and peace education simultaneously and imbibe this two essential roots of education which would promote the youngsters of forthcoming generation to find and live on such a beautiful planet. It is only the language that makes humanity a unique species.

Keywords: *Door of wisdom, Arbitrary, Consensual piece, Unique species*

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New Anthropological Vistas For Intercultural Communication Research In Cross-Cultural Management

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ABSTRACT

One of the earliest articulations of the *social anthropological* meaning of the term “culture” came from Sir Edward Tylor who writes on the first page of his 1871 book: “Culture, or civilization, taken in its broad, ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society”. With Geertz’s classic works on culture as meaning-making, much anthropological culture research had taken an “interpretive turn”. However, in the 1980s, anthropological conceptions of culture and the classic ethnographic field methodology were subjected to a critical questioning. A critical and postmodern movement in American anthropology; comprising Marcus, Fischer, Rosaldo and Rabinow, took center stage.

The paper not only proposes to substitute the view of culture as comprising of abstract values and codes as determinants of communication with concepts of culture as dynamically enfolded in practice and socially situated in specific contexts, in order to give new directions to theories on intercultural communication but also examines how newer developments in anthropology may contribute to this research. Over the years the views of anthropologists can be briefed mainly into three opinions.

First, the view that cultural differences are always immersed and sustained in a local context of organizational, professional and social structures and processes is represented in a broad range of anthropological theories. The anthropological literature suggests that the role of cultural differences in shaping communication cannot be adequately understood without an analysis of how cultural variation either intersects with or cross-cut other social, professional or status differences.

Second, anthropological research has paid attention to the socially shaped motives, interests and experiential knowledge informing how culture is brought to bear on communication. This argument arises from Weber’s ambition of obtaining an interpretive understanding of action through actors’ motives and interests. Hence, the status of cultural values and norms in actual practices of communication is dependent on how they resonate with communicating parties’ motives and interests.

Third, agency, for example, in the form of strategies is employed by actors aiming at realizing interests, motives and goals in the context of specific social fields. The social or professional strategies through which actors manage their work situation shape how they utilize or instrumentalize culture when communicating about their identity. Culture is thus not merely a synthetic a priori, but may serve as a resource, which actors strategically draw on.

In summary, the appropriate object of inquiry in intercultural communication research in *cross-cultural managements* may be found in the nexus of cultural differences, actors and the context of communication. These dimensions of a context-based approach to culture and communication are to various degrees present in much newer anthropological research. Thus, even cognitive anthropologists have demonstrated how it is impossible to obtain an adequate understanding of the role of cultural knowing without an account of the social situations in which cognition and communication takes place.

Keywords: *Social anthropology, Cross-cultural management, Dynamically enfolded, Intercultural communication*

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Eptitudes of Multimedia and ICT in English Edification

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Abstract

The ponderosity and embodiment of Multimedia and Information and Communication Technology (ICT) in English education is awfully effectual and didactic. During the last few decades, there is a propensity of fore fronting Multimedia and ICT in English education to emendate and enhance English edification, teaching learning scenario regionally, nationally and internationally. This paper illustrates multifarious usages of Multimedia and ICT in English education; it also describes the versatile on goings of Multimedia and ICT in English education along with variants of amenities and sundry of challenges. Multimedia and ICT elaborates personalized learning, four basic skills (LSRW) of English language learning, it has fantabulous efficacy to endorse the English education in the rural places also, it also helps the learners for group discussion in communicative English with different institutions, reciprocation of knowledge in English language also, learners are able to collect their study materials in a visual way, audio visual methods according to their choice with the accurate usage of Multimedia and ICT, which should be usurped as a possibility that could be portrayed to reify online educational deeds for English education. Accurate usage of Multimedia and ICT boosts English Language Teaching (ELT), etymology of English language, teaching literature, communicative English, English phonetics, phonology, linguistics. Nowadays Multimedia and ICT are the hefty apparatus for English edification, here technology plays a vociferous role of novelty and infusion for the learners, this paper also enucleates different perspectives of English education through technologies, it also facilitates English vocabularies, lexicons to the learners and pedagogues along with modern and traditional etymology of English language. With the accurate infliction of Multimedia and ICT the ordination of wisdom, edification and learning of English become more malleable, it is also learner centric, where the learners are able to do additional tasks outside of the classroom, learners can learn English grammar by playing miscellaneous grammar games, language games and increase the spare disclosure towards the English language and enhance their headway in English edification. In case of distance learning or distance education there is a great importance of Multimedia or ICT, online learning or e-learning in English edification, there we can see the learners can spontaneously attend online classes of different pedagogues, and at the end of the course they can give online examinations which is extremely significant for distance edification, at the completion of the entire course the learners can get their degrees. In case of the blushing students, usage of Multimedia and ICT is very important because with the help of this, those students can easily acquire their study materials according to their need. With the precise appliance of ICT and Multimedia, the writing skill is also elevated which is extremely important for the learners to be proficient in English writing. The pedagogues are also able to give umpteen tasks to the learners through Multimedia and ICT, which indeed has a great impact in English edification.

Keywords: *Edification, Multimedia, ICT, English*

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Ligature of Language Acquisition and Language Learning: an Empirical Study

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Abstract

The abstraction of language Acquisition and Learning is a salient area of Applied Linguistics which is also a paramount segment of Macro linguistics. This Macro linguistics actually is an umbrella term of Psycholinguistics, Sociolinguistics, Neurolinguistics, Computational Linguistics, Discourse Analysis and lastly Applied Linguistics. Though these two complicated terms- “Acquisition” and “Learning” are synonymous to each other but there is a simplistic distinction between them. And this contrast is an important phenomenon. Stephen Krashen, an eminent linguist and educational researcher was the first person who made the distinction between these two terms. He tried to equal the term “Acquisition” with the First Language or L1 and the term “Learning” with the Second Language or L2. First Language, by this particular term, we do want to mean that it is very often a primary language. So these terms- First Language, Second Language, Primary Language and Secondary Language have two kinds of compressions. One is chronological and another one is functional. Chronologically, we do acquire some language that is a primary language. Suppose for us (Bengali speakers) Bengali, Hindi for Hindi speakers, Gujarati for Gujarati speakers or someone might be French or English – whatever it is. The aim of my paper is to exhibit that the way we acquire our Mother tongue (Bengali, Gujarati, Marathi, Hindi etc.), we cannot acquire the Second Language or L2 in the same way. So the process of acquiring Second Language or L2 and to acquiring Mother tongue, there are some distinctive features of acquisition. And obviously, the factors of acquisition are also changed. The speed of learning will be also differed. So then what kinds of factors are responsible for accounting these variations in success stage? Do this remake only within the classroom, or is the teacher or is there something also very specific to the learner which is responsible for these variations? Nextly my paper illustrates some indispensable issues regarding the theme of Language Acquisition and Language Learning like, the concept of Mother tongue, First Language or L1 and Second Language or L2 in a very cursory way and the basic requisites of L1 acquisition. This paper also illustrates a fundamental distinction between Acquisition and Learning. Not only that, the major factors behind failure to learn an L2 or Second language, the components of teaching in SLA (Second Language Acquisition), learners related factors to SLA and the possible sub-factors related to Learner, Teacher and System regarding SLA- all these portions are briefly accentuated. The implications of First language Acquisition for Second Language Learning that means L2 acquisition could be facilitated through the adoption of some specific procedures adopted in L1 context that is also fleetingly highlighted in this paper. Finally to terminate my paper Krashen’s Five Hypotheses and the concept of interlanguage are exemplified which are very germane and pertinent regarding this paper on Language Acquisition and Language Learning.

Keywords: *Language, Learning, Acquisition, L1, L2*

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Necessity of English Language for Engineers

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Abstract

Dexterity in English is very important from the students of Engineering. For an engineer and an engineering student, English language fluency is important both in studies and career. Engineering is the only field that has integrated the entire world through technologies to make the human being's life simpler and easier. The engineers need to communicate among its peers and seniors and exchange each other's ideas and that can be possible using the English language.

The English language is the most effective tool which is applied by the engineers during presentation to give a talk and pitch their ideas regarding that particular product for which they are delivering the presentation. The tech giants like Google and Microsoft which has its employees working from all around the globe use the English language for communicating with each other with ease. The English language has also played an important role in the world of Computer Science, Computer Application and Information Technology as for the programmers to communicate with the machines they need to know their language to communicate which is almost next to impossible for them to remember as their language consists of only 0's and 1's. So, to bridge the gap between the programmers and the machines there is some kind of high-level programming language has been introduced that is based on English language thereby making the programmers easily overcome the hurdles that they were facing earlier and easily communicate with the machines. In India, approximately 75% of the engineering students are belonging from rural areas and have done their schooling from the regional medium schools. At the time when they enter the college for pursuing engineering, they face a lot of problems at every walk of life as they possess the required eligibility criteria and also have immense talent but they lack communication skills and their fluency in English language. These problems need to be addressed by our Indian Education System and also some necessary steps should be imposed by them in order to improve their present so as to make their future bright. Audio/Video clips must be introduced in the classroom so that the engineering students get to understand the English language by visualizing it and also get a good grasp of the English language by listening to those audio clips. Now-a-days, communication skills are fundamental requirements for engineers. The employers are looking for someone who has an academic result along with good communication skills. When we are writing something about the importance of communication skills then we should know that according to Thakur "Lack of sufficient communication skills serves only to undermine the image of Engineer."

Thus, the English language is an important aspect of engineers. It has a great impact on their academic as well as professional life. The engineering students must make the best use of the resources like the faculties, and the facilities provided by the Indian Education System by putting self-effort to emerge as the proficient user of English language and also to get established in their life.

Keywords: *Audio/Video Clips, Education System, Language, Communication Skills.*

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Multimedia as an ICT tool in English Language Education

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Abstract

English is one of the most important and common language which has played a great deal of improvement in global communication. In Indian context it is treated as a second language. It is necessary to teach English and develop English language skills among the students from school level because English language has become vital for better learning and earning. In India, in recent years English language is being given the most importance as a language to communicate. To teach this language and develop English language skills various approaches and techniques are in use in our country. But most of them are traditional, less motivating, less interesting as well as ineffective. Language learning is an act of creativity, imagination, construction, exploration, expression and cultural collaboration. If we use computerised mechanism to fully humanize and enhance this, rather than to try to automate it, we can help bring out the best. So, we use multimedia as a tool of ICT (Information and Communication Technology) to develop better understanding and acquisition of basic skills of English language among the school students. More importantly English teachers should be aware of the strategies to use it in an effective manner. Now a day's ICT tools and multimedia approaches are being used widely due to their convenience, omnipresence, effectiveness and being economic. In the multimedia environment, teaching has been greatly enriched by adding the related online materials and combining the related texts, pictures and videos. As a multimedia, ICT provides us with many tools such as CALA (Computer Assisted Language Assessment), CALI (Computer Assisted Language Instruction), CALL (Computer Assisted Language Learning), MALL (Mobile Assisted Language Learning), TELL (Technology Enhanced Language Learning), Digital libraries, free and open source software and social media, MOOCs, Virtual classrooms, documentaries, Digital storytelling,. Most of the common means are Mobile Applications, i-Pads, Digital Notebooks, Tablets, Smart Phones, Recorded audio- video materials, online spoken tutorials, Digital pronunciation dictionaries etc. Modern studies and researches show positive feedback of integration of ICT in the field of English Language Teaching and development of English language skills. The Ministry of Human Resource Development has calculated according to the Mission Document that ICT has enhanced the current enrolment rate in Higher Education, at present 15% to 30% by the end of the 11th Plan period. These facilities have constructed the way of smart learning and given freedom of learning anytime, anywhere according to needs and convenience of the learners. In order to apply these new teaching modes to serve the English language teaching more effectively, we should make good use of the advantages and avoid the disadvantages. On one hand, the Mission would create high quality e-teaching content for the students and on the other, it would improve computer infrastructure and connectivity to over 18000 colleges in the country including each of the departments of nearly 400 universities/deemed universities and institutions of national importance. Of course, it can't fully replace the conventional teaching method but we can utilize modern education technology reasonably to achieve better results.

Keywords: Modern technology, Multimedia approaches, Learning, Earning, Positive feedback.

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English for Engineers

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Abstract

English Language is West Germanic and it was first spoken in early medieval England. It was named after Angles. It is an international language and it is understood by most of the countries in the world. English Language is an important language for everyone. It helps in connecting people from all over the world.

Now, we talk about Engineers. They are quite the people with skills. Put them in any field and they will surely find a way to deal with any problem. But dealing with a problem is not always the solution especially all by oneself. What if they need help and if they cannot ask for it or rather communicate with others. We all speak in our mother tongue as it makes us feel comfortable. English is an important language. It should be made mandatory for all institutions to have an extra subject of English Language. Be it project work or an assignment or maybe even a presentation, English is the language that everybody can understand. And yes, interview. It is not just knowing English Language but knowing how to convey. It requires some practice. In an interview people often become nervous and may say something which they did not intend to speak. In order to overcome it that person needs to prepare himself/herself for that opportunity by taking lessons of English. It is not just saying English but also to write it correctly. When it comes to write a CV or a resume, writing it correctly is what matters. It really makes a difference. And going abroad for studies or maybe for a job, it is very important that the person knows English. Many foreign countries have their national language as English like USA and Australia. In these countries people do not face any problem communicating with each other but unlike our country we speak many languages, precisely 22. So communication in our country can be a bit difficult when one is travelling from one state to another. Well the solution is to have a common language. The same thing goes for Engineers and of course other streams like the Medical that in order to be at par with the world you should be knowing English. Research shows that English speaking can make you smarter which is a good thing. In fact bilingualism makes your brain stronger and healthier in older ages especially when it comes to remembering things. And this goes without saying that English is the most used language online. If we search for something or buy a product online or even order food via any app, we do it using English Language.

Hence the application of English Language can be very useful as it got many opportunities and very important when it comes to expressing our thoughts.

Keywords: *English, Employment, Bilingualism, Engineers*

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Computer Touch in Language Teaching

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Abstract

Imagining our lives without computers is next to impossible. Ubiquity of these machines shows our indurated dependence on them. Computers have changed the way we perceive teaching, particularly the delivery and interaction in and with course materials and study resources.

In this modern era, almost every aspect of people's lives is influenced by computers in a way. The advancement of technology has made computers play an important role in language teaching, known as Computer Assisted Language Teaching. Computers are tools or devices that help in the process of language teaching but can't be entirely independent, it is intermediary and part of the teaching process.

Computer Assisted Language Teaching (CALT) can be defined as the use of computers to aid in the delivery of instruction, reinforcement and assessment of material to be learned, usually including a substantial interactive element. The system allows for remediation based on answers but not for a change in the underlying program structure.

Teachers and students alike accept that computer technology in teaching has several applications like:

- Learning style: Each student has a different study cycle or pattern. Some can grasp quickly while some can't. Computers study and recognize the pattern. They accordingly make a study plan, designed to suit each student. CALT can provide an exciting "fast" drill for one student and slow for the other.
- Error analysis: Computers can analyse the weak areas of a student. It can also help teachers to identify the problems of a student. Computers can make necessary additions to the study material for reinforced learning.
- Motivation: Language learning can become a boring, monotonous task. But computers can provide animated, graphical techniques to make language teaching and learning more funny and interesting.
- Computer as a tool: Tools such as word processors, spelling checkers, grammar checkers etc. are highly beneficial for students and teachers.

CALT has been developed from last 30 years and can be divided into three phases:

- Behaviouristic: This was implemented in 1960s and 1970s using the 'drill and practice' technique meaning the computer carries out repeated drills of the same material as repeated exposure is beneficial for learning. Based on this, several tutoring systems were developed, one of them is PLATO. But this system was later discarded due to rejection at both the theoretical and pedagogical level and the introduction of microcomputers made new possibilities.
- Communicative: Became prominent in 1970s and 80s. It teaches grammar implicitly rather than explicitly. Allows and encourages students to generate original utterances. It uses the target language exclusively and creates an environment in which using the target language feels natural, both on and off the screen. But this was later discarded as teachers demanded a more integrative way.
- Integrative: This entails hypermedia. Listening combined with seeing, use of variety of media and allowing the students to learn at their own pace are major advantages of this system.

Computers have huge potential to revolutionise language teaching. The help to teachers and students is immeasurable.

Keywords: *Reinforcement, Interactive, Pattern, Microcomputers, Hypermedia*

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Role Play and Gestalt Learning Theory

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Abstract

In English Language Teaching and Learning (ELTL) various methods and approaches have shown their various techniques to develop various skills in the target language, English in this case, mainly listening, speaking, reading and writing skills (LSRW). To develop these skills various types of language games and dramatic activities are often incorporated in the implementation of various methods and approaches of language teaching. According to Prodromou's study, "what is game? One working definition is that of an enjoyable activity involving an objective that is achieved by following certain rules, usually in competition with one or more people" (quoted in Palamova, 2010, P. 8). In an English Language Teaching classroom language games provide the students a friendly and liberal atmosphere without the fear of punishment that eventually give them enough scope for free practice in the target language to develop their communicative competencies. Games like Mimes, Role Play, Coffeepot game, and many other Communication and Cooperative games focus on different areas of language learning. Some games focus on developing the vocabulary, some on developing the grammar sense among the learners and some focus on enhancing the communicative competencies and functional use of the language in the real life situation. These diverse areas of interest of various language games are governed by various Schools of Learning Theories, like, Trial and Error Theory of Learning, Thorndike's Law of Learning, Theory of Classical Conditioning, and Operant Conditioning etc. Among various Communication and Cooperative language games Role Play is one such game that with Functional Communicative Approach (FCA) looks at language not as a mere combination of signs but as a functional medium to built communication among human beings. Role Play is governed by the Theory of Insightful Learning or Gestalt Learning Theory that looks at language learning process or the learning experience as an "organized whole" (Mangal, 2017, P. 201) developed through critical thinking, problem solving and functional outlook of the learners to language learning. The success of language games depends on the presentation of the game in the classroom situation. Without an in-depth knowledge of the governing learning theory of the game it may be quiet difficult for the teacher to conduct the game successfully, to attain the desired goal, in an ELT classroom. This paper aims to project and explain the link between Role Play and Gestalt Theory of Learning or Theory of Insightful Learning. This paper also focuses on the necessity of knowing the learning theory of Gestalt to conduct such communication game, Role Play in this case, appropriately in an English Language Teaching (ELT) classroom. This paper also aims to describe the game of Role Play and the applications of the learning theory for this game with some examples.

Keywords: Role Play, Learning theory, Gestalt and Theory of Insightful Learning.

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Computer Assisted Language Learning (CALL): An Innovative Practice for today's Engineers

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Abstract

The present status of English as a global language, demands everybody that they should be communicatively competent in order to achieve their goal. Now-a-days it has got very significance especially for those of Engineers. The study of English is considered as one of the pre-requisites of studying Engineering as they come across numerous lectures, tutorials, labs, projects and papers in English.. Proficiency in English is very important for students of engineering because it is the medium of instruction in all higher academics and is widely used as the medium of communication in all organizations within the country and abroad. English language is the current lingua franca of international business, technology and all global transactions. India's national development perspective envisages our scientists and technocrats to be proficient in English which is the dominant language of science and technology. Employers in the corporate sector too want engineers proficient in English for effectively communicating in the workplace in view of growing prevalence of global interaction. For this reason study of English has been included in the modern curriculum of Engineering starting from undergraduate to post doctorate. In recent years, the development of technology has created the need for investigating the effects of Computer Assisted Language Learning to enhance the communication skills of students. CALL is an approach in which Computer Technology is used as an aid for Presentation, Reinforcement and assessment of material to be learned, usually including a substantial interactive element. Now-a-days some special softwares are activated to check articulation, ascent, fluency, etc. to grab jobs in modern industry. CALL embraces a wide range of information and communication technology; facilitates presentation of information in a ordered manner; uses wide range of Multi-media ; offers consistency and uniformity; active participation of the learners, greater interaction with the contents of topic; assures enhanced authenticity; guaranties intermediate test results and feedback; thus provides self-pacing, self-assessment, time management, etc. The method of teaching through this mode is commonly referred as CALT (Computer Assisted Language Teaching). Now-a-days CALT have many implications for all those who are associated with language assessment and testing practice. The current philosophy of CALL puts a strong emphasis on student-centred materials that allow learners to work on their own. Such materials may be structured or unstructured, but they normally embody two important features: interactive learning and individualized learning. CALL is essentially a tool that helps teachers to facilitate the language learning process. It can be used to reinforce what has already been learned in the classroom or as a remedial tool to help learners who require additional support. These implications of CALT can be categorized under three major domains- 1] Implications for academic institutions 2] Implications for language teachers and 3] Implications for language learners. Though it is used widely in modern days it has got many disadvantages such as issues related to security, technical expertise, Constraint of medium, adaptive item selection, inaccurate automatic response scoring, etc.

This study aims to make Engineers more efficient; since its advent, CALL has changed the existing testing practices to make them in line with the needs of the 21st Century e-generation by making them more flexible, innovative, individualized, dynamic and efficient.

Keywords: *CALL, Self-assessment, Communication, Self-pacing*

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Use of Multimedia And ICT In English Education.

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Abstract

In 21st century, English has become the most representable and influential language around the globe in many aspects. As the use of the English language has increased over the years, the demands of its learners have also increased. Though being the second language to a lot, English language enjoys the prestige and authority of the first language. Although the British people left India a long time back, English fought its way into our society. So English is not an indigenous language, it remains as an 'Associate Language' in India, alongside Hindi, the 'Official Language of the Union of India'. But English has its greater importance today due to its international growth. At present the role and status of English in India is higher than ever as evidenced by its position as a key subject of medium of instruction and curriculum.

There is continuous rise in English Learners, so innovative methods have been introduced to enhance their learning experience and intensify the effectiveness of teaching. The present era poses challenges and difficulties to the traditional methods of teaching. Use of technology has been proven successful and effective in replacing the traditional methods. Technology increases creativity and effectiveness in teaching methods so as to amplify the interest of the students. Entry of Technology has drastically changed the trend of English teaching methods. Technology has been the most significant drivers of both social and linguistic change since the invention of computers.

It's an accepted fact that technology plays a positive role in enhancing teaching effect in English communication class. Emergence of multimedia technology and its application in teaching methods which includes audio, visual and animation effects comes into full play in English class which has allowed for better and more appealing teaching models to reach the classrooms. The satisfaction that Multimedia provides both through visual and auditory senses has been instrumental in its gaining popularity in Language teaching. The teacher uses these as tools for teaching concepts and in turn ensures long term retention in the learners. As it is said by George Couros, "Technology can't replace Great Teachers, but technology in the hands of great teacher is transformational". Classes become more fun-filled and build a unique relationship between teacher and students. Advances in multimedia and technology have made it easier for teachers and learners of English to access a wide range of resources in terms of authentic input and communication with native and non-native speakers of English around the globe. Multimedia Technology removes the language barrier for non-native learners which could hinder their way to knowledge.

The use of ICTs in language teaching has countless benefits. The development in the use of ICT, like language lab, videos, satellite broadcast and videoconferencing have support the richness and quality of education both on and off campus. Thus, information and communication technologies and multimedia encompasses several devices that the teacher can manipulate appropriately on for a lesson being taught to facilitate delivery, learning activities as well as evaluation.

Keywords: Multi-media, Technology, Information, English Teaching, Strategy.

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English for Academic Purpose

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Abstract

English for Academic Purpose (EAP) deals with training students setting to use language appropriately for study. EAP program focuses instruction on skills required to perform in English speaking in an university. This EAP program includes language teaching, vocabulary, grammar and the main focus skills:- reading, writing, speaking and listening.

There are several advantages of knowing English language. The main advantage of knowing English language is that it will allow you to stand in front of the crowd. In other words English language will help us to communicate with nearly all the people around the world as nowadays English has become the medium of communication. Moreover, knowing English increases our chances of getting good job.

Our academic session begins from school and ends up in college. In school life, a student is being taught various subjects, among them English is also an important subject. From the school life it has been entered into student's mind that English language plays an important role in their life. In schools, the students are taught to know the correct English i.e., use of correct vocabulary, grammar, sentence making, fluency in speaking with correct pronunciation and frequent writing skills, whereas in an university they are taught to execute the English language. The main thing that the universities teaches that how to face the crowd and how to speak confidently and fluently in front of the audience while standing in the dias. Nowadays, the universities have adopted to get familiar with the LSRW skills which helps the student in improving their listening, speaking, reading and writing and also assessing presentations. In other words the students were required to choose the topics, gathered information on that topic, access those information and express their structure in the form of presentations.

A various outcomes are possible from this program. The important result obtained from this program is cracking job interviews. It also helps us in developing our accent of speaking with proper intonations, eradicate the fear of speaking in front of the audience and also improve our presentation skills. Another important result of knowing English language is that if we want to build a startup, then we express our ideas in front of public and can motivate them through our speaking. If a person knows the proper knowledge of English language then person can also build their career in the field of English.

In conclusion it is being noticed that English had become a global language. If you do not know English no one would recognize. It is also concluded that communicate through English also gives pleasure as one can express their feelings in a way beautiful manner with fascinating words. So, it is rightly to be said that knowing proper English develops one's career. For taking this EAP program to the next level, schools and colleges may organize a seminar where English laureates will be called and they will educate students regarding different types of English accent used in different countries and it's application in our daily lives.

Keywords: *LSRW skills, Attaining Seminars, Confidence Building, Career Development.*

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The Elements of English for Academic Purposes

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Abstract

English for academic purposes is designed to help students develop the necessary skills required for academic success. Students not only develop their overall language skills but also focus on developing specific academic skills such as note taking, academic writing and reading along with individual presentations and group discussions. English for academic purposes is quite important as it equips students with required speaking, listening, reading and writing skills. As a result students overcome the language barrier and build their knowledge and confidence to pursue their international degree course.

In common with most language teaching, English for academic purpose teaches vocabulary, grammar and the four skills such as reading, writing, speaking and listening. For example a writing lesson would focus on writing essays rather than say, business letters. Similarly, the vocabulary chosen for students tends to be based on academic texts for study.

English for academic purposes is an approach to teaching English that aims at the training students usually in a higher education setting to use the language appropriately for study. It is a common form of English for Specific purposes. English for academic purposes has been shown to effectively prepare students in terms of language for undergraduate programs in college and university level.

English for academic purposes helps students to prepare themselves through two main types of such as pre-session courses and in session courses. During these courses students are given resources to prepare their skills in formal and informal communication, and vocabulary reading and writing skills. It also includes critical thinking, oral presentation skills and other areas. In addition it helps international students, second language influenced local students, certain students with a gap in their track records and get acquainted with new learning environment and educational system.

Practice of critical thinking is one of the strongest driver in EAP. It is a predominant assignment criteria across all education outcomes. Critically thinking includes embracing ambiguities, challenging assumptions, recognizing paradigmatic perspective and looking for subtext.

Studying English is beneficial as we will receive a placement test on arrival to determine level. It enhances our skills and confidence in academic English communications. As a result we receive an official transcript with marks and attendance which improves our self confidence.

The academic writing class gives students as much time as they can to practice their writing skills. Which practicing their writing students can have the chance to develop the language use based on their current ability. As a result learner outcomes include general academic vocabulary development, listening skill improvement in an academic setting and improved academic discussion and presentation skills.

Keywords: *English, EAP, Education, Placement*

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Language and Peace Education

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Abstract

According to John Galtung, a renowned peace studies specialist, language learning can never be done in isolation. It is well recognized fact that language is the core requirement for teaching peace education, as it is impossible to communicate and comprehend learning... and it is a well recognized fact that peace education is one of the most planned processes to raise learners. The nature of language requires relationship. To learn about culture, not just in order to tolerate other cultures, but to start to look deeply at cultural values and expressions from a peace perspective. Language education is a unique setting to learn about culture. Language learners have a role in building peace within and between their multiple cultures. Peace educators have the opportunity to help learners along this path.

Mostly peace educators believe that it provides students with a deep understanding of their social and political contexts while at the same time considering the possibilities for action and change. Many speak that the process of education can impart in all students social "goods", values and skills. While analysing the present situation of absence of peace in the contemporary world we can hardly find any nation living an ideal peaceful life which is free from various kinds of peace issues as a reserve violation of human rights social injustice, crime against women, child abuse, religious conflicts and many more are included.

In our own society, in India we need to address search issues in our education system where we are facing the same difficulties to step forward towards peace and tranquility. Peace Education is a process of acquiring knowledge developing the attitudes, skills and behaviour to live in harmony with oneself, with others and with the natural environment. If the schools and society have problems and they can't solve them in themselves, they can apply to the experts of peace education and the experts can go to these places and organise a programme in a limited time. Language is the core requirement for teaching peace education, as it is impossible to communicate and comprehend learning about the issues without having the ability to understand the language spoken.

Objectives of peace education

- ★ To faster changes in order to make the world a better and more human place.
- ★ To develop the values and skills to assist the students in striving for the fullness of live.
- ★ To help students develop a rich vision of peace to work for a viable global society.

Importance of peace education

Peace education activities promote the knowledge, skills and attitudes that will help people either to prevent the occurrence of conflict, resolve conflicts peacefully, or create social conditions conducive to peace. Core values of nonviolence and social justice are central to peace education.

Keywords: *Language, Peace, Education*

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Multimedia and ICT in English Education

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Abstract

Multimedia is a combination of audio, video, text and other interfaces which are some of the most important medium of communication. The above reason makes multimedia a key factor in Information and Communication Technology (ICT) which is the process of empowering technical advancements in educational policies. ICT provides broader knowledge and can help in gaining and accessing information throughout the world.

Today, when globalisation is at its peak, we can consider English as the most important language to communicate around the world. This makes the promotion of English and its development very essential in every possible sector. So it's necessary to use modern approaches like multimedia and tools of ICT to develop better basic learning skills i.e. LSRW (Listening, Speaking, Reading, Writing). ICT offers a lot of things to not only students but also teachers for the betterment of their vocabulary and English skills. Some of the approaches under it include CAI (Computer Assisted Learning), CALL (Computer Assisted Language Learning), MALL (Mobile Assisted Language Learning), TELL (Technology Assisted Language Learning). It also includes the use of Wiki, e-mail, blogs, virtual classrooms, online spoken tutorials and many other sources which are not only reliable but also very economic and can be accessed by the students anytime and anywhere according to their convenience. The introduction of these methods also changes the approach of teachers. Since the role of teachers has changed overtime, they are not only considered as a provider of knowledge but also as a friend and guide who helps the students in learning. So, it is helpful in the professional development of the teachers resulting in lifelong language learning. But the use of ICT tools technically trained teachers. Therefore, the teachers would also have to upgrade themselves according to these methods, which mean ICT also helps a teacher to learn innovative methods of teaching.

Our education system is more oriented towards bookish knowledge but these techniques would lead to out of the box thinking and overall development of a student. So we need to adapt this technique for a better learning environment. ICT is encourage in English education system is due to its convenience, omnipresent, effectiveness and being economic. This piece aims to highlight some trendy teaching-learning techniques through the use multimedia and ICT in English Language Teaching (ELT) which might be beneficial for both the teacher and student as well. This paper has been designed keeping in mind the need of multimedia and ICT in English Education to make exchange of thoughts, ideas, experience and feelings easier resulting in more efficient learning and teaching techniques.

Keywords: *ICT, LSRW, CALL, Teaching-learning techniques, ELT.*

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Computer Assisted language Teaching

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Abstract

Computer-assisted language learning (CALL) is an approach to language teaching and learning in which computer technology is used as an aid to the presentation, reinforcement and assessment of material to be learned, usually including a substantial interactive element. It also includes the search for and the investigation of applications in language teaching and learning. Except for self-study software, CALL is meant to supplement face-to-face language instruction, not replace it. It has also been known by several other terms such as technology-enhanced language learning, computer-assisted language instruction and computer-aided language learning. CALL's origins and development trace back to the 1960's and since has consisted of a symbiotic relationship between development of technology and pedagogy. Its development can be divided into three phases: behavioristic CALL, communicative CALL and integrative /explorative CALL.

A number of studies have been done concerning how the use of CALL affects the development of language learners' four skills (listening, speaking, reading and writing). Most report significant gains in reading and listening and most CALL programs are geared toward these receptive skills because of the current state of computer technology. There has been success in using it, in particular computer-mediated communication, to help speaking skills closely linked to "communicative competence" (ability to engage in meaningful conversation in the target language) and provide controlled interactive speaking practice outside the classroom. Using chat has been shown to help students reutilize certain often-used expressions to promote the development of automatic structure that help develop speaking skills. The use of video conferencing gives not only immediacy when communicating with a real person but also visual cues, such as facial expressions, making such communication more authentic. Use of computer technology in classrooms is generally reported to improve self-concept and mastery of basic skills, more student-centered learning and engagement in the learning process, more active processing resulting in higher-order thinking skills and better recall, gain confidence in directing their own learning.

The impact of CALL in foreign language education has been modest. The first attribution is the limitations of the technology, both in its ability and availability. First of all, there is the problem with cost and the simple availability of technological resources such as the internet. However, most of the problems that appear in the literature on CALL have more to do with teacher's expectations and apprehensions about what computers can do for the language learner and teacher. While computer technology has improved greatly in the last three decades, demands placed on CALL have grown even more so. One major goal is to have computers with which students can have true human-like interaction; the technology is far from that point.

Keywords: Computer mediated communication, Development of speaking abilities, Communicative competence, Mastery of basic skills, Teacher's expectations and apprehensions.

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English for Engineers

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Abstract

Communication is the primary need of human beings, it is not possible for any person to survive in this world without communicating. Communication helps us to share our thoughts with each other. Language is the basic need of human communication. People belonging to different communities use different languages. Engineering, which has global market, needs a common language that has universal access. In the present day, English is accepted as the official language for global communication in engineering field.

Communication plays a key role in any profession. It is very difficult to handle any profession in the world without good communication skills. Nowadays, success depends highly on the communicating skills and on the soft skills of the professionals.

And here the question arises as to why we should choose English as an official language? The reason lies in history. In the twentieth century Britain emerged as one of the most powerful colonial empires, and it had imposed English as the administrative language in the colonies over which they ruled. Almost thirty percent of world was under British rule. Due to the simplicity of the language many people starting learning this language and later English emerged as the third most spoken language all over the world.

Great minds in the past have chosen English as the medium to present their prolific ideas about inventions.

English language is the only medium of communication in the examinations in the engineering colleges. Almost all the books that a budding engineer follows during the course, irrespective of their field of specialization are written in English. Also, the most common language used in the internet is English. So, students need to possess a sound knowledge of English to read these intellectual works and understand them.

Most of the schools and colleges have chosen English as their first language of communication due to its worldwide access and reach. Which helps in the development of communication skills and soft skills and these skills are the key skills for an individual to succeed in his career. English plays a more important role when engineers come to their workplace as they have to work in groups since their task can rarely be solved by an individual and to solve a problem they need to communicate. Nearly, 1.8 million people all over world speak English which strongly proves its acceptability.

Through this paper we want to highlight the importance of English in an engineer's life. English is an inevitable part of an engineer's life right from the start, from his college days to his retirement English is his constant companion, without English neither can he excel in his work nor in his social life.

Keywords: *English, Engineers, Job, Global Language of communication*

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Language the Key to Peace in Education

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Abstract

It is a well recognized fact that peace education is one of the most planned processes to raise learner's critical consciousness. Mostly peace educators believe it provides students with a deep understanding of their social and political contexts while at the same time considering the possibilities of action and change. Many speak that the process of the education can impart in all student social 'goods' values and skill; once we give the relevant information and experience, individual students can be agents in promoting local, nation international peace, thus transforming the societies into a peaceful one.

If we see our present situation of the absence of peace in our society as well as contemporary world. We are not leaving in an ideal peaceful life. Not only us, it is difficult to find any nation leaving a peaceful life which is free from various kinds of peace issues. This includes violation of human rights, social injustice and gender discrimination, intolerance towards other cultures, injustice with woman, child abuses. So we need to address such issues in our education system to step forward towards peace and tranquility.

There are many different paths to peace that are explained to students while teaching about peace education programs. Each different form of peace issue requires a unique way of teaching. So it should be in unique method where discussion is considered as a valuable form of interaction between the student. However, language is the core requirement for teaching peace education, as it is impossible to communicate with students if the language is uncommon to them. So English is the universal language, and everyone can understand the language easily. That's why English plays a vital role in peace education throughout the world. If we take some example of peace education in our West Bengal then we are looking about our government scheme they target the injustice over women and for helping them they provide a new scheme name as "Kanya Sree" parkalpa. So in this case Bengali language plays an important role, because in peace education one of the most important thing is to realize that all languages are worthy to be given equal position. This is crucial for the country. Because India is a linguistic diverse country, where every states has their own language. Peace education in, mother tongue plays a vital role because it is acceptable throughout the every people.

Plato was first to recognize that language is an instrument associated with a specific art the art of communicating and distinguishing and Aristotle was the first to formulate that a language is governed by different structures that implicitly use different sets of rules.

Lastly I want to end with a sloke from Bhagavad Gita where the path of achieving peace is written "NAASTI BUDDHIR AYUKTASYA NA CHAYUKTASYA BHAVANA NA CHABHAVAYATAHA SHANTIR ASHANTASYA KUTAHA SUKHAM"

Keywords: *Peace, Peace education, Peace education in India.*

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English for Civil Engineers

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Abstract

*A bridge usually connects two ends of a river,
English makes the communication cycle complete between a sender and receiver.
Globalization today in this world is on its peak,
So obviously companies, for English speaking engineers they seek.*

“Social Animals” we, who always needs to travel, work, associate with new people around the world, needs a strong dialect for communication. There is no doubt that in the prevailing era of scientific and technological development, the entire has been reduced to the level of a global village. Man has made many rapid strides in each and every sphere of life and average life span of an individual has also increased to an appreciable extent. India being a land of rich array of diversity, has a special significance in this context. Apart from ethnic, cultural and religious diversity, linguistic diversity is also quite prevalent in this country. Hence the usage and adoption of English as a common and universal language for comprehension and communication is absolutely warranted in order to ensure optimal and judicious use of indigenous as well as exotic resources of infrastructure.

Usually it is being asked that Engineers and English, do they really have a connection? The answer is “yes” and even their initials starts with an ‘E’. Whether it comes to communicating with customers, workers or even reading basic instructions on machineries on which engineers work, English is a must. No one works in an empty room, from getting a job till working efficiently at our work place, English goes hand in hand with engineers. When it comes to learning, basic group discussion rounds or is about even preparations of varying engineering exams say- GATE and almost all books are written and read in English. Engineers working at International level, in different foreign countries need to speak and communicate in English.

Added to this, the desired goal can also be complemented through international exposure which enables these engineers to seek an adequate skill and training in handling, these modern infrastructural tools and techniques. All these fruits of development could be harnessed if English language is made compulsory for the engineers. Further if can also go a long way in shunning the inhibition of transcending the limits of political boundaries, thereby paving way for initiating and facilitating cross cultural socio-economic and technological mutual exchange programs. Such an endeavors would ultimately open up new corridors of opportunities for exploiting both biological and non-biological resources at intra and international level which would not only argument the overall economic welfare of all the nations but also ensure permanent peace, prosperity and happiness of the mankind in general.

Keywords: Connection by communication; Technological development; International exposure; Open's opportunities

School and English

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Abstract

**Human being need good nourishment, when they are saplings
If educated well at childhood, their life becomes happening.**

A country with 3.287 million km² area, with 29 different states, with more than 400 million speakers. Yes I am talking about India where language changes from district- to – district, having 22 major languages written in 13 different scripts and 720 dialects. A large country like India human to human connection is very important. And the common language for connecting people can be English. India is a developing country where as Europe is a developed country and to stand equally with them we need a strong bridge for connection which can be communication and that too in English as it is the common language among all. For development of our country we need technology, researches and analysis, all these we get in English and when our initial stage students study English there future light becomes brighter.

So, when we talk about school, the first thought strikes in our mind is about teachers and students. Only a teacher has the capability to teach and spread knowledge among everyone. But when a teacher of any different state knowing a different language tries to teach students of a different language, an understanding barrier shows up. And when a native teacher, teaches only native language then the students will suffer in future. It is said that growing brain have more capability to receive. When English is introduced in primary stage then having different boards will be less effective. The speaking problem is not only an issue for students but also for teachers. When English is cultured from the beginning then studying becomes easier. Many coaching institutes and educational assets gives the first priority to English to cope up with developed cities. And the curriculum of these institutes have the responsibly to bring students fluent in the official language of our country. In India most of the administrative work is done in English, employs are selected on the basis of their speaking and understanding capability. Money making becomes simple with the knowledge of English. Many entrepreneurs can speed up there trade on a bigger and better platform without any problems as English opens many gates of success for them. When trading spreads on an International state then the need of communication increase and without fluent English the trade can deteriorate causing a big loss. Many tourists visit us and India is the country of culture and heritages. Fluent in English will attract them to visit us more and can affect our economy in a positive manner.

That's the reason when English is initiated from the base the foundation of our future will be bright. English is free for all and frees all the closed gateways.

Keywords: *Bridge of connection; Initial state study of English; Priority of English; Foundation of Future.*

English: An Indispensable Skill for Engineers

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Abstract

In the present era of Liberalisation, Privatisation and Globalisation (LPG), communication skill is the key to success. Here English serves as the bridge language for international business, technology and research. Now due to globalisation, when the whole world has seemingly been shrunk to a single society, the importance of communication through the English language is increasing at a rapid pace. English has become the ascendant language internationally, being the widespread. It is the prime means of communication, and can often serve as the global language among people from different cultures, wherein English is not the native tongue. About 1.8 billion people in the world speak English and the number is still rising.

In the field of engineering also, English language is being used as a common means of communication all over the world, whether it is for acquiring knowledge from books, publishing the research reports, giving oral presentations, or for presenting papers in the seminars and conferences.

English has also become the predominant language for communication among the scientists, technologists and business experts from culturally and linguistically different communities.

Engineers are the people who have international job markets. Hence, they have to communicate more with their counterparts across the globe. The engineer who has obtained their degree from the university of one country, may have an equal access to job opportunity in another country. Thus a large number of engineers have to travel to many continents and work away from their home country. When they go abroad, they may come across many different scientists, technologists and business experts. At this moment, they need a common language and that is none other than English.

Communication skills in English are the fundamental requirements for every person who has adopted engineering as their career. No matter however qualified and proficient engineer they might be in their academic career, they need to possess high level of proficiency in English.

Proficiency in English is very important for students of engineering because it is the medium of instruction in all higher academics and is widely used as the medium of communication in all organizations within the country and abroad. English language is the current lingua franca of international business, technology and all global transactions. India's national development perspective envisages our scientists and technocrats to be proficient in English which is the dominant language of science and technology. Employers in the corporate sector too want engineers proficient in English for effectively communicating in the workplace in view of growing prevalence of global interaction. They seek engineering graduates with sound communication skills, along with competent technical knowledge. A person having good command on communication skills is a valuable asset for any organisation. Professionals with strong hold on English language have better chances of growth in the organisation.

Hence, as an engineering student and an engineer – to be, there is no doubt that English language competence is indispensable for the students to prosper in the area of academics as well as to advance in their career.

Keywords: *Indispensable, Global, Linguistically, Proficiency*

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Language Acquisition and Learning

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Abstract

The objective of this paper is to bring a clear distinction between language acquisition and language learning. Primarily learning and acquisition are identical in meaning. Both the terms convey the meaning to attain some knowledge. But as far as being competent in language is concerned, these terms differ in meaning. Acquisition is deeply associated with first language (L1), where as learning is associated with second language (L2). Linguistics is very much associated with psychoanalytic school of criticism. It deals with the psyche – the mind. Language acquisition is one of the pivotal functions of mind. Noam Chomsky, the great American linguist, opines that when a child is born, he or she is born with a basic set of language skill – Language Acquisition Device (LAD) – “a hypothetical hardwired into the brain that helps children rapidly learn and understood language”. LAD is an instinctive mental capacity which enables an infant to acquire and produce language. It is a component of nativist theory of language. Children have already a set of grammatical rules in their mind and they implement it and produce correct sentences with proper grammatical sequence. Language acquisition and language learning are entirely different thing, these terms distinctively carry different meanings irrespective of languages. There is a general notion that we acquire our mother-tongue that is first language. And if we learn anything after the first language is second language - “A language is ‘first’ and so its acquisition – if no other language was acquired before; otherwise it is second. Thus, the mother tongue, which is acquired primarily by a child when his language cells are empty, is first language (L1), and the language, which is acquired or learnt in addition to the L1, is second language”. But the difference is not all about of L1 and L2. Different circumstances provide different necessary tools to acquire and learn the languages. These circumstances are apparently associated with setting, consciousness, effort, motivation, exposure, context etc. In language acquisition, there is immediate reinforcement but in language learning, the reinforcement is limited. Acquisition is a gradual development of ability in a language by using it naturally in communication situation. On the other hand, learning is a conscious process of accumulating knowledge of vocabulary and grammar of a language. To a broader extent, acquisition is knowledge about language (KAL), whereas learning is formal knowledge of language (KOL). Children, who are in the process of acquiring language, readily acquire the language for communicative purpose. But learning helps the learner to write, read as well. To conclude, in tech-savvy world learning has become an easier process where ICT plays an important role. And last but not the least; the teachers will have to play a crucial role to make the students competent, proficient in the target language

Keywords: *Language Acquisition Device (LAD), Tech-savvy, Knowledge About Language (KAL), Knowledge Of Language (KOL)*

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Green Route of Preparation of Polymer nanocomposites

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Abstract

Growing environmental awareness in the society for past few decades has paved a way to open frontiers in new environmentally benign polymers. Hence, the recent trend is to replace the mainstream petroleum polymers by the bio-based ones in various products. It is also observed that natural cellulose such as starch, cellulose and protein-based materials are biodegradable. The best examples of biopolymers are cellulosic plastics, polylactic acid (PLA) and soy-based plastics. Amongst them, cellulose is the most plentiful biodegradable and renewable raw material available. Cellulose is a straight chain polymer. Unlike starch, no coiling or branching occurs and the molecule adopts an extended and rather stiff rod-like conformation, aided by the equatorial conformation of the glucose residues. Recently attempts have been made to substitute inorganic fillers with the cellulosic ones to reinforce the polymer composites. Several methods such as acid hydrolysis, enzymatic hydrolysis, application of high-pressure homogenizer on microcrystalline cellulose, using ionic liquid etc. can be employed to convert natural cellulose into its nano-form. In this respect it is worthy to mention that cellulose is insoluble in water and most organic solvents and is chiral and biodegradable. The method of using ionic liquid is the greenest, environmentally sustainable route for nanocellulose generation. An ionic liquid is a salt in which the ions are poorly coordinated as a result it is a liquid solvent below 100°C, or even at room temperature (room temperature ionic liquids, RTIL's). Here, at least one ion has a delocalized charge and one component is organic, which prevents the formation of a stable crystal lattice. However, the high cost of ionic liquid is the main barrier in its widespread application. The cellulose nanoparticles can be incorporated into the polymer matrices to produce cellulose nanocomposites and these green materials can have vast applications in medical and biomedical field, in electronic devices, food and pharmaceutical packaging, aerospace and transportation industries and modernizing the performance of fibres and textiles. The main objective of the study is to discuss the generation of cellulose nanoparticles by green routes, their structures and properties, their application as nanofiller in polymer matrices and most importantly, the advantages and disadvantages associated with this route.

In the present study cellulose was dissolved in an ionic liquid BMIMCl (1-butyl-3-methyl imidazonium chloride) by heating in a water bath for nearly five hours and the solution of cellulose was reinforced into poly vinyl alcohol (PVA) matrix by in-situ precipitation method to formation of cellulose nanocomposites. PVA-cellulose nanocomposites, were characterized by X-ray diffraction (XRD), Fourier transform infrared (FTIR), Field emission scanning electron microscopy (FESEM) and Atomic Force Microscopy (AFM) analysis. XRD analysis showed significant changes in crystalline nature of PVA when solution of cellulose was incorporated into PVA matrix at different loading percent. Cellulose nanocrystals, having dimension around about 7-9 nm were observed in the PVA-cellulose films under the FESEM. The presence nano form of cellulose particle was also confirmed by AFM analysis. The interaction of cellulose and PVA was confirmed by FTIR study. We have also recovered the ionic liquid from PVA-cellulose composites by green route and it was also confirmed by ¹H-NMR study. Moreover, the recovered ionic liquid has been reused as the starting material to dissolve cellulose and it has minimised the cost of preparation of polymer nanocomposites by green route.

Keywords: *Green route, Cellulose nanocomposite, Ionic liquid.*

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ABOUT EDITORS



After completion of B.Sc. (Hons.) in Chemistry, Dr. Sumit Nandi completed B.Tech. (Chemical Technology), M.Tech. (1st class 1st & Gold Medalist) in Chemical Technology and Ph.D. (Tech.) from Calcutta University. He completed MBA with dual specialization in finance and marketing after that. He also completed one year Post Graduate Diploma In Environmental Management from Kalyani University. Dr. Nandi has been teaching for the last fifteen 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, polymer nano composites, mathematical modeling in environmental issues 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 75 research publications in reputed international journals and conferences. He visited different countries like Germany, China, Poland, Czee Republic, Hungary, Bulgaria and Lithuania for invited talk and attending international conferences.

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