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ON
SCIENCE, TECHNOLOGY AND COMMUNICATION SKILLS
(NCSTCS 2K18)
21 April 2018



**Proceedings of National Conference
on
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(NCSTCS 2K18)**

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ABOUT JIS GROUP

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

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

The journey commenced with a mission

“Igniting Minds, Empowering Lives”

“Learning is the beginning of wealth.

Learning is the beginning of health.

Learning is the beginning of spirituality,

searching and learning is

where the miracle process all begins”

ABOUT THE INSTITUTE

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

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 one day **National Conference on Science, Technology and Communication Skills (NCSTCS 2K18)**. 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.

May 2018, Kolkata

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

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MESSAGE FROM CHAIRMAN, BOG, JIS GROUP

I am happy to observe that the Department of Basic Science and Humanities Department of NiT organised the **“National Conference on Science, Technology and Communication Skills (NCSTCS 2K18)”** on 21 April, 2018. This Conference in terms of its areas and tracks is a comprehensive one providing a platform from multiple disciplines of engineering and technology to participate and contribute. This Conference will definitely be a significant attempt to assemble the leading experts and learners in the field. Understanding the differences between invention and innovation is the keynote to success in today’s globalised market driven economy. It is not only important to invent ideas but also to be able to convert them into productive outcomes in consumer’s society. Innovation and invention are quite different things. While invention is largely a personal pursuit, innovation is much more akin to social pursuit. Innovation warrants attention because it contributes immensely to social and industrial development.



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

Prof. (Dr.) Sparsha Mani Chatterjee

MESSAGE FROM MANAGING DIRECTOR, JIS GROUP

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

I am extremely delighted to share through this message my enthusiasm about the “**National Conference on Science, Technology and Communication Skills (NCSTCS 2K18)**”, 21 April, 2018 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 2K18 and all the eminent persons involved. I wish them great success.

Mr. Taranjit Singh

MESSAGE FROM THE PRINCIPAL, CONFERENCE CHAIR

On behalf of the Organizing Committee, I welcome all to the “**National Conference on Science, Technology and Communication Skills (NCSTCS 2K18)**”, to be held on 21 April, 2018, 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 2K18** 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 2K18** a grand success.

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



Prof. (Dr.) M. R. Kanjilal

MESSAGE FROM THE CONFERENCE CHAIR



I consider conducting **NCSTCS 2K18** 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 2K18**.

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 2K18** gave their best effort to materialize the smooth functioning of the Conference. We find immense satisfaction after the successful completion of the Programme. We hope to organize such programme in future to benefit our students as well as the Nation by providing future Researchers. I hope, every participant will be benefitted and will enjoy the Conference to the most.

Dr. Sumit Nandi
Programme Coordinator

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 “**National Conference on Science, Technology and Communication Skills (NCSTCS 2K18)**”, held on 21 April, 2018, 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 unflinching 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 2018**. 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 2018** 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 2018**. 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

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Adsorptive Removal of Cu (II) from Aqueous Solution by Chitosan- n SiO₂ Nanocomposite

Samanwita Bhattacharya^a, Baisali Rajbansi^b and Sudip Kumar Das^{c*}

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Abstract

Nowadays water pollution becomes a very important environmental issue. Large amount of toxic pollutants are produced by various industrial processes which are released into the water bodies. The major sources of water pollution are untreated industrial wastes and agricultural runoff. Heavy metals and organic dyes present in water in higher concentration exceeding the permissible limit are hazardous to aquatic life as well as to mankind. Copper toxicity is a common finding. World Health Organization has set the Cu (II) permissible limit of 1.5 mg/L in drinking water. Excessive exposure to copper can cause cellular damage leading to Wilson disease in humans. Copper is used in various industrial processes such as mining and smelting, electroplating, brass manufacturing industries, petroleum refineries. Adsorption is a well known process for the removal of heavy metals and dyes from waste water by solid adsorbents. In third world countries, adsorption is preferred as it is economically most favorable. The adsorption capacities of synthetic adsorbents are greater than that of the agricultural and industrial wastes.

Researchers have extensively studied the structure, properties and applications of biopolymers like chitosan. Chitin is a waste product of the sea food manufacturing and processing industries. Chitosan can be prepared chemically from chitin and is found in some fungal cell walls. Chitosan in its native form and chemically modified chitosan have been used to remove heavy metals as well as organic dyes from waste water. Chitosan nanocomposites have very promising role in the field of adsorption of heavy metals and dyes due to increased chemical stability and adsorption capacity of the adsorbents. Silica based materials can be applied for the adsorption of various pollutants.

The present study deals with the preparation and characterization of chitosan- n SiO₂ nanocomposites. Different adsorbent samples were prepared with different weight ratio of chitosan to n SiO₂. The adsorption capacity of the prepared adsorbents towards the copper (II) ion in aqueous solution was also investigated. The adsorption experiment was conducted in batch mode under varying experimental condition such as different pH values, initial metal ion concentration, adsorbent dosage, temperature and contact time.

Keywords: *Adsorption; Chitosan; n SiO₂; Nanocomposites; Copper (II)*

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Microwave Stabilisation of Rice Bran for Better Performance

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Abstract

Rice is one of the major cereal crops in India. Rice bran is derived from the outer layers of the rice caryopsis during milling. The outer layer includes the pericarp, seed coat, nucleus, aleurone layer, germ and part of the subaleurone layer of the starchy endosperm. Stability of rice bran is important for the improvement of quality of extracted oil and meal. Enzyme Lipase present in bran is responsible for the degradation by hydrolysing the oil which ultimately enhances the free fatty acid content of the oil. Rice bran is rich in lipid, protein, minerals, vitamins, phytin, trypsin inhibitor, lipase and lectin. Rice bran has been proved to be the quality product for direct human consumption as well as raw material for edible oil. But it suffers from drawback of high lipase activity. Present study deals with the deactivation of enzyme lipase through microwave treatment of different samples of bran. A domestic microwave oven (LG Electronics India Limited, Model MS 257 PL, Korea) was used for the study. The raw rice bran (20 g) with moisture up to 40% or without moisture was exposed to frequency of 2450 MHz and operated at high power for 50 seconds. It was then stored in zipper top bag and stored in an incubator at 37°C for different time intervals for further studies. After certain time of storage the oil was extracted from bran in a Soxhlet apparatus. After complete extraction the oil was stored under vacuum for further studies.

Moisture, oil content, protein, crude fibre, ash and silica content of raw and microwave stabilized bran was observed. Significant changes were not observed regarding the above characteristics. The quality of deoiled meal is also compared before and after microwave treatment on the basis of protein dispersibility index (PDI) and nitrogen solubility index (NSI). Enhancement of PDI and NSI were observed in the microwave treated samples. This may be due to the breakdown of disulphide bond present in rice bran samples. The quality of extracted oil was also characterised before and after the microwave treatment. The decrease in peroxide value and anisidine value were observed in the microwave treated oil than the control samples. This may be ascribed to the decomposition reaction of peroxides during microwave heating. Oryzanol, responsible for cholesterol lowering property, remains unchanged in the treated oil. So nutrition quality of microwave treated oil is also an added advantage. All the experiments were compared with the control samples in each case and it was found that microwave heating has an important role for the stabilisation of bran. Microwave heating method can be utilised commercially for stabilisation of rice bran. The experiment shows that this technology is cost effective and contributes good quality oil along with minor constituents and bran with good protein quality.

Keywords: *Rice bran; Microwave stabilization, PDI, NSI*

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Importance of Vermicompost and Worm Biomass as Device of Organic Waste Management

Dr. Debayan Mandal

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Abstract

Vermicompost and worm biomass has played a very significant role for the safe disposal of diversified organic solid waste in recent times. The technology adopted, popularly known as Vermitechnolgy is environment friendly and cost effective. The technology mainly adopted in rural areas for sustainability as it process diverse organic waste in the nature, avoids pollution through recycling of plants nutrients. The improper and unscientific disposal of solid waste causes problems like fly and insect breeding, transmission of pathogenic microorganisms, soil and air pollutions. Earthworms are considered as natural bioreactors, which propagate along with other saprophytic microorganisms, supply necessary conditions for the bioprocessing of organic wastes. Hence it is important to study the significant role played by the earthworms through vermitechnolgy in management of organic solid wastes and sustainability of the environment and their future prospects. The products like vermicompost and vermiwash in the form of organic fertilizer and bio pesticides helps to improve physico- chemical and biological parameters of soil and for conditioning the soil which indirectly increase fod production and the soil becomes healthy.

Keywords: Vermicompost; Vermiwash; Organic waste management; Bio pesticides

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Study On Synthesis, Properties and Application Of Graphene Oxide - Metal Oxide Mixed Nanocomposites

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Abstract

The present research and development scenario of the material world highly focuses on the use and implementation of nanomaterials within the existing materials to extend the range of applications. Graphene oxide-Metal oxide mixed nanocomposites are attracting attention day by day because of its extraordinary properties such as enhanced electrochemical properties, more catalytic activity, antibacterial activity. Graphene has high surface area, high thermal and electrical conductivity, high mobility. 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 which is hydrophilic in nature and can be dispersed water very easily is taken as an alternative to Graphene. Due to large surface area Graphene oxide offer sufficient space to accommodate different metal oxide nanoparticles. It prevents agglomeration of nanocomposites and enhances properties of graphene oxide-metal oxide nanocomposites. So Graphene oxide will be prepared from graphite flakes by modified Hummer's method. Then metal oxide nanoparticles will be prepared by various method. Then the prepared metal oxide will be incorporated into Graphene oxide. Graphene oxide-metal oxide mixed composites will be characterised by different microscopic instruments like Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM) etc. Then mixed nanocomposites can be used for determining different antibacterial activities. In this work we will briefly discuss the synthesis strategies, properties and application of the mixed nanocomposites.

Keywords: *Graphene oxide, Metal oxide, Nanocomposite, Antibacterial properties.*

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Modelling and Framework of Side Effects of ART Therapy for HIV/AIDS Infections Using Fuzzy Cognitive Maps

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Abstract

In the real world decision making scenario Fuzzy Cognitive Maps (FCM) are used as a modeling/representation technique for simulation or prediction. However, not many real software implementations are explored in literature. In recent years FCM has become a useful Soft Computing technique for modeling and simulation. They are connectionist and recurrent structures involving concepts describing the system behavior, and causal connections.

This paper describes a modeling and experimentation framework where realistic problems of the Human Immunodeficiency Virus (HIV) affected people can be modeled and controlled using FCM as a knowledge representation form. The Human Immunodeficiency Virus (HIV) is a complex retrovirus that progressively deteriorates the immune system of infected patients, eventually causing death. Although antiviral drugs are not able to eradicate the HIV, they are designed to inhibit the function of three essential proteins in the virus replication process: protease, reverse transcriptase and integrase. However, due to a high mutation rate, this virus is capable to develop resistance to existing drugs causing the treatment failure. Several machine learning techniques have been proposed for predicting HIV drugs resistance, but most of them are unable to interpret the problem.

HIV is one of the most dreaded pathogens of the 21st century. With millions of people infected with HIV, it was once thought to result in “medical apocalypse”. However, with the advent of antiretroviral therapy (ART), it is now possible to control HIV. Adherence to ART helps to keep the viral load under control and prolong the time of progression to AIDS, resulting in near normal life expectancy. Even with the introduction of ART, a substantial number of patients fail to adhere due to a variety of reasons, including adverse side effects, drug abuse, mental disorders, socioeconomic status, literacy, and social stigma. With the availability of so many options for HIV treatment at each stage of the disease progression, physicians can switch between the treatment regimens to avoid and/or minimize the adverse effects of drugs. Close monitoring, major social reforms, and adequate counseling should also be implemented to circumvent other challenges.

This paper highlights how different acute diseases result as side effects as a consequence of the ART therapy when applied to the human body suffering from HIV Infection. Even though ART therapy has controlled AIDS to a great extent, its side effects cause life risk to people having low immune system. The mathematical modeling of the interpretation of the effects and results of these diseases are explained using Fuzzy Cognitive Maps.

Keywords: *Fuzzy Cognitive Maps; HIV; Antiretroviral therapy; Adverse side effects due to ART therapy for HIV infection treatment*

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Enzymatic Production of Biodiesel from Fatty Acid Distillates

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Abstract

The most demanding job in today's world is supposed to find out an alternative green energy sources due to declining nature of fossil fuels and its environmental tribulations. In this regard, biodiesel creates an important role due to its renewable, non toxic, biodegradable and environmental friendly nature. Biodiesel is produced from different edible and non edible vegetable oils and fats but cheap and effective raw materials are required due to easy conversion, reduction of process hazards and low cost factors. Fatty acid distillates (FADs), a refinery by products from vegetable oil refinery industry, may be the ideal source for this purpose. Presently, FADs are mostly utilised in the soap industry, animal feed industry and raw materials for oleo chemical industry. But it may be an important and cheap source for the production of alternative energy sources.

In the present research investigation, rice bran oil fatty acid distillate (RBOFAD) has been considered for the enzymatic production of biodiesel and the parameters of reaction process have been optimised. Enzymatic method is more effective than base catalytic method with regard to productivity, ecofriendliness, selective nature, purity of the product, minimum purification stage, low temperature requirement and reuse of catalyst. Here, esterification as well as transesterification reaction was carried out with methanol in the presence of immobilized enzyme, Novozyme 40013 (*Candida antarctica*) maintaining different reaction conditions. Experiments showed that the productivity of biodiesel from RBOFAD through esterification as well as transesterification reaction with methanol depend on molar ratio of FAD to methanol, reaction temperature, catalyst concentration and stirrer speed or mixing effect of the reaction system. The optimum reaction conditions contribute a conversion efficiency of nearly 95% and the used enzyme can be recycled. The excellent performance of the catalyst enzyme indicates that biodiesel from RBOFAD can be produced in commercial scale with minimum process hazards. The physical properties of biodiesel such as density, flashpoint, kinematic viscosity, cloud point, pour point etc. have been compared with diesel fuel. The results indicate that biodiesel from RBOFAD can be used in engine without modification and the identified process may be an alternative solution of scarcity of energy resources in the near future from cheap raw materials.

Keywords: *Biodiesel; Fatty acid distillates; Candida antarctica; Esterification; Transesterification*

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Effect of Nano CaCO₃ on the Mechanical Property of PVC Modified with Poly(ethyl acrylate)

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Abstract

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 nanofiller.

Nanotechnology and nanocomposite formation is the new word of the world today. After the concept of nanocomposites was introduced, PVC nanocomposites have attracted great interest. Many properties of the PVC polymer such as strength, hardness, fire retardancy, etc. can be tailored by the blending of a wide range of nanofillers to extend the application range of PVC. Several authors have reported about the incorporation of various nanofillers to enhance the properties of PVC. The electrical behavior of PVC is significantly improved by the addition of multiwalled carbon nanotubes. PVC composites containing well dispersed nanoclays exhibits increased hardness and decreased smoke production. Introduction of copper or silver nanoparticles in PVC influences the antimicrobial property and photostability of PVC.

In the present study, an endeavour has been made to enhance the mechanical properties of PVC in terms of its ultimate tensile strength and modulus by using 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 (20 parts) premixed with benzoyl peroxide initiator (2 parts) was added to the PVC mix along with the nano calcium carbonate filler and mixed thoroughly in the blender at a slightly elevated temperature. A number of batches were prepared varying the dose of the nanofiller. 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 increased over 0 to 15 parts of incorporation of the nanofiller without affecting the properties of elongation at break and toughness. 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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Development of Synbiotic Biscuits Using Sesame Seed Meal

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Abstract

A “Prebiotic” is a non-digestible food ingredient that beneficially affects the host by selectively stimulating growth and activity of a limited number of beneficial bacterial species already resident in human colon whereas “Probiotics” are live microorganisms (*Lactobacillus* & *Bifidobacteria*) which when administered in adequate amounts confers a health benefit on the host. A food which is a combination of both is called “Synbiotics”. To date oligofructose and inulin are established prebiotics but still there exist a lot of unexplored plant material which has prebiotic potentials and *Lactobacillus* & *Bifidobacteria* are the major probiotic bacterial species.

India being an agriculture based country produces a large volume of oil seed crops. The seed remains after extraction of oil (seed meals) are mainly utilized as fodder, soil conditioner or fertilizers. Oil seed meals are rich in dietary fibre and protein content and may have the potential to serve as prebiotic. *Dietary fibers* are nondigestible carbohydrates and some parts of these fibres are prebiotic fibers. Our previous study revealed that oil seed meals has excellent potential as prebiotic material as they support the growth of probiotic bacteria along with provide an antagonistic effect on the pathogenic bacteria like *E. Coli*.

The aim of the present study

- 1 To prepare prebiotic biscuits using sesame meal as a substitute of flour and jam enriched with probiotic bacteria sandwiched between two biscuits
- 2 To evaluate the survival of the prebiotic bacteria during the storage of the sesame biscuits upto 30 days at 5°C and 25°C.
- 3 Sensory evaluation of the biscuits

Sesame meal biscuits were prepared with the incorporation of 25-75% defatted sesame meal in the standard formula of making biscuits. Mixed fruit jam without any preservatives and additives were collected from a local jam manufacturer. The jar of the jam was opened aseptically and inoculated with approximately 10^9 CFU/mg of *Lactobacillus acidophilus* strain. The cell suspension was mixed thoroughly with the jam and 2 gm of jam was spread and sandwiched between two sesame biscuits and stored for 30 days at 5°C and 25°C.

The survival of the probiotic bacteria during storage was monitored by measuring the CFU/mg counts at regular intervals i.e. 5, 10, 15, 20, 25 and 30 days. The viability study of the probiotic bacteria shows a drop in colony count after 20 days while storing at 25°C but the CFU/mg count still remains above 10^6 CFU/mg i.e. above the critical value. Storage at 5°C shows uniform vitality of the bacteria throughout the storage period. The sensory evaluation indicates the wide acceptability of the biscuits.

From the industrial point of view the present research work provides the ground work for commercialisation of synbiotic (probiotic & prebiotic) food products utilizing sesame oil seed meal and *Lactobacillus acidophilus*.

Keywords: *Prebiotics, Probiotics; Sesame; Oilseed meals; Lactobacillus acidophilus*

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Design of Irreversible Inhibitors of Human Cathepsin B by Bioinformatics Technique

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Abstract

Cathepsin B belongs to a family of lysosomal papain like cysteine proteases (1). It plays an important role in intracellular proteolysis. Its role has been found in initiation and growth of tumor cells, neuromuscular dysfunction, memory loss, epilepsy and neuronal cell death causing Alzheimer's symptoms. Due to its important involvement in many human diseases, cathepsin B has been chosen as a drug development target. The first inhibitor was isolated from *Aspergillus japonicus*, identified as N-(L-3. trans-carboxyoxirane-2-carbonyl)-L-leucine-4-guanidinobutylamide, and popularly known as E-64. It inhibits cathepsins B and L, papain and calpains. But E-64 and its derivatives are not, however, selective inhibitors of cathepsins B. (2) As specific inhibitors are required for drug actions an attempt is made to find the features required for the inhibitor of cathepsin B. Statistical methods in QSAR (The Quantitative-Structure-Activity-Method) presented here deals with small inhibitor molecules. Computational chemistry generates molecular data or descriptors including geometries, energies and associated properties from a molecular structure. The biological activity of the molecules is measured by $\log IC_{50}$ (50% inhibitory concentration). Over 250 descriptors are generated with MOE QSAR module. After calculation of the descriptors a reduced set of descriptors are selected which are rich in information. The feature selection process is done by the Genetic Algorithm variable selection technique. A subset of descriptors is selected to relate with IC_{50} values by MLR (Multiple Linear Regression). The nine descriptors that demonstrated an apparent correlation with the observed biological activity are chosen to build QSAR models.

$$IC_{50} = 3.07A_{pol} + 3.4 MR + 0.45 E_{sol} + 0.34 \log P - 0.21D_{ipol} + 0.5 I2SA_{pol} + 12.03$$

The above equation is validated for the experimental value of $\log IC_{50}$.

A computer- simulated study of epoxy succinyl peptides shows the essential features of inhibitors. In this paper an attempt is made to design cathepsin B-specific inhibitors.

Keywords: *irreversible inhibitors; Human Cathepsin B; bioinformatics; descriptors; Genetic Algorithm; variable selection technique*

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Time Machine---Gadget to Win the Time

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Abstract

This paper examines the logical, metaphysical and theoretical possibilities of time travel depending upon the concept of the existence of closely spaced time lines that can be traced out by physical objects. The wormhole theory proposed in 1940 is used to explain the possibility of time travel. There were some archaeological proofs which first made scientists curious about this wonder gadget.

The wormhole theory states that any two points in space can be joined by a tube in which the speed of any particle is billion times the speed of light. The two points can be of different time gradients or even it can be of same time gradient, even trillions of kilometers apart. As the points of two different time gradients can be joined according to this theory, so, time travel may also be possible.

'The closely spaced time lines theory' is another concept which can give rise to the possibility of time travel. It can be explained more precisely using Einstein's theory of relativity. Using this research information, many scientists including H.G Wells, Stephen Hawking tried to make a time machine which can take human-beings to future, but they faced many problems while executing their plan. There were certain paradoxes as the obstacles in inventing time machine like grandfather paradox, twin paradox etc. According to Grandfather paradox, if a person travels in past and kills his grandfather before the birth of his father then how can he exist. This paradox was given a probable solution that one can't do anything by time travel which didn't happen in past.

The twin paradox was solved using black hole theory. It states that the emitted rays of Black hole can slow down time. As the existence of Worm hole is not found physically till date, Time Machine is not yet made. Many scientists are working on it and if the worm hole is found in space then in near future, every difficulty of human-life will be solved. For that, we need materials like huge meteors like structures which can bend time-space curves into loops so that time travel in both directions can be possible.

So, practically this kind of study can be implemented in space or it can be done on earth if a substitute of meteors i.e., this huge amount of gravitational force of attraction can be applied using a strong artificial magnetic field. If Time machine is built someday, the total scenario of life will be changed. The greatest obstacle of human-beings, i.e., Time, will no longer be able to stop anything. In other words, the word 'NO' will become invalid in case of progress and peace

Keywords: *Time machine; wormhole; Black hole emission; time-space loops; paradox*

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Size Effect of Zirconia Nano Additives On Ionic Conductivity Of Solid Polymer Electrolyte

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Abstract

Solid composite polymer electrolytes consisting of high molecular weight polyethylene oxide (PEO) with sodium perchlorate (NaClO_4) as electrolyte salts and zirconium oxide (ZrO_2) nanoparticles as fillers have been prepared by standard solution cast technique. The zirconia nano particle has been prepared using zirconium oxychloride octahydrate [$\text{ZrOCl}_2 \cdot 8\text{H}_2\text{O}$] and NaOH by solvothermal process. To calibrate the size of the nanostructures, the experiment has been performed at different synthesis temperatures such as 100°C, 120°C, 140°C and 160°C. The crystallite size of the samples has been determined accurately by Rietveld analysis of the XRD pattern. The calculated values of the crystallite sizes are 4.5 ± 0.02 nm, 5.6 ± 0.05 nm, 6.4 ± 0.04 nm, and 7.6 ± 0.04 nm synthesized at temperature 100°C, 120°C, 140°C, and 160°C respectively. Methanol has been used as the solvent for the preparation of $\text{PEO}_{25}\text{-NaClO}_4\text{-ZrO}_2$ nano composites. The molar ratio in PEO-NaClO_4 polymer salt complex has been taken to be 25:1 and the concentration of the various sizes of the nano-sizes of ZrO_2 has been kept constant to investigate the influence on the ionic conductivity.

XRD studies have been carried out for pure PEO, $\text{PEO}_{25}\text{-NaClO}_4$ and $\text{PEO}_{25}\text{-NaClO}_4\text{-ZrO}_2$ which confirms the incorporation of nano particles in polymer matrix. The variation of glass transition temperature (T_g), melting temperature (T_m), change of enthalpy of melting (ΔH) and percentage of crystalline (χ_c) of different composite polymer electrolytes have been examined by DSC studies. The complexation and ion-ion interactions between the various constitutions of $\text{PEO}_{25}\text{-NaClO}_4\text{-ZrO}_2$ complex have been studied by FTIR spectrum within the range of 2000-500 cm^{-1} .

Ionic conductivity has been measured using the ac impedance techniques with Agilent 4192A frequency response impedance analyzer. The variation in room temperature ionic conductivity of composites have been studied as a function of the size of ZrO_2 nanofiller and also the temperature dependence of ionic conductivity those samples have been carried out. All the samples show a discontinuity around the T_m of PEO, temperature range from 55 to 65 °C which has been explained by Lewis acid-base interaction of ZrO_2 with ether oxygen. The migration of ion depends mainly on the segmental movement of polymer chain in the amorphous region which often follows -Tammann-Fulcher relation.

Overall, it can be concluded that different sizes of ZrO_2 nanoparticles can influence the ionic conductivity. The room temperature ionic conductivity increases with decrease in particle size and the observed highest value of the ionic conductivity is $6.96 \times 10^{-5} \text{ S-cm}^{-1}$ for 4.5 nm of ZrO_2 .

Keywords: *Polymer electrolyte; Nanocomposite; Thermal properties; Ionic conductivity*

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Dependence of Radio Communication on Rain Rate and Drop Size Distribution

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Abstract

The subject of fading of radio communication with time becomes more important due to rain which results in modeling of rainfall and rain rate at a particular location. The duration of exceedances of rain rates and concerned intensity affect the statistics of durations and time intervals. Each geographical location has a specified distribution and a well defined rainfall climate. In this paper statistics of rain rate and rain intensity is discussed on the basis of the published data. Also a new model for rain rate is proposed for different climatic conditions. It appears that the proposed model can be used largely in different climates but under certain conditions. As the radio waves are scattered depending on the shape and size of the rain drops, so it becomes equally essential to study rain drop size distribution and rain rate for the prediction of rain attenuation. For the estimation of radio wave attenuation the rain characteristics specially rain rate and drop size distribution is more important. The precise drop size distribution is difficult to estimate, but using the rain gauge the rain rate can be measured. The rain drops are not spherical at every location results in different rainfall characteristics. The stations selected are Kolkata (22.39° N, 88.27° E), Delhi (28.32° N, 77.12° E) and Mumbai (19.04° N, 72.06° E) from the same tropical country India with different rainfall distributions. In India, the rain drops of 8 mm are generally observed whereas the frozen hydrometeors may be even larger than 10 mm. These larger particles reflects much less than predicted by Rayleigh approximation which results in smaller estimation of rain drops than they actually are. The normal drop size distribution is unable to describe these large particles. The graph between the rain rate and the time lapse reveals the characteristic variations of the rain rates as measured by rain gauges including the non-rainy months. The figure suggests the rain rate over Delhi is lowest and it is highest at Mumbai. The rain rate so obtained is compared to monthly rainfall data reported by India Meteorological Department (IMD). It is tedious to get instantaneous rain rate from the data published by IMD because the non rainy period is also present in the monthly rainfall report. A closure agreement is seen.

Keywords: *Radio communication; rainfall; rain rate; drop size distribution*

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Structural Properties of Doubly Excited States of ions embedded in Dense Plasma

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Abstract

With the advent of free electron lasers(FEL), which operate in X-ray regime it is possible to create highly ionized and dense plasmas. These facilities are available in Linac Coherent Light Source (LCLS) in USA and SACLA in Japan. Plasma densities of the order of 10^{24} cc i.e. solid state densities are obtained [1{3]. With such advancement in the experimental facilities, a large number of theoretical work has been done in the past few years involving strongly coupled plasma (SCP) [4{10]. All these works are limited to singly excited states of He-like system. To the best of our knowledge this is the only work involving doubly excited states of He-like ions in strongly coupled plasma. In this present work, we have evaluated the structural properties of He-like ions embedded in SCP environment in the framework of Ritz variational technique. The wavefunctions employed in the present work are explicitly correlated and expanded in terms of Hylleraas basis set. The energy values of $2pnp$ ($^3P^e$) and $1s2p$ ($^3P^0$) states of He-like C, Al, Ar within the SCP environment has been estimated non-relativistically. The energy values estimated are very precise and the convergence is tested by increasing the number of terms (N) in the Hylleraas basis set. The states $2pnp$ ($^3P^e$) are also studied in the box confinement so as to evaluate the effect of plasma environment on the change in structural properties of such systems. The dominance of the effect of plasma environment over the confinement effect has been discussed. The system is enclosed within the ion-sphere, bounded by the impenetrable walls of the confinement. When the density of the plasma (n_e) is increased the Wigner-Seitz radius(R) decreases. The ions within the sphere experiences a pressure is also evaluated as a function of n_e .

Keywords: *Free electron lasers; Ritz variational technique; Wigner-Seitz radius.*

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Application of Quantum Tunneling

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Abstract

One of the most remarkable consequences of the rules in quantum mechanics is the capability of a quantum particle to penetrate through a potential barrier even though its energy would not allow for the corresponding classical motion. This is known as quantum tunnelling, and manifests itself in a multitude of well-known phenomena. For example, it explains nuclear radioactive decay, fusion reactions in the interior of stars, and electron transport through quantum dots. Tunnelling also is at the heart of many technical applications, for instance it allows for imaging of surfaces on the atomic length scale in scanning tunnelling microscopes.

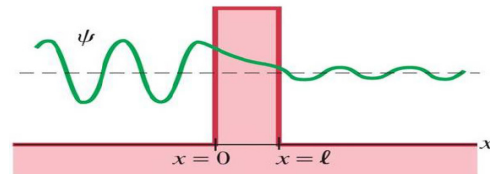
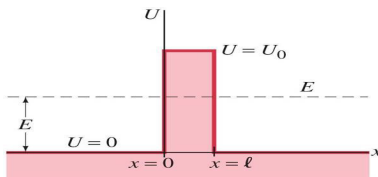
Brief idea about tunneling:

Solving the TISE for the square barrier problem yields a peculiar result: If the quantum particle has energy E less than the potential energy barrier U , there is still a non-zero probability of finding the particle classically forbidden region ! This phenomenon is called

tunnelling. To see how this works let us solve the TISE... In the barrier: $\frac{d^2\psi}{dx^2} - \left[\frac{2m(U_0 - E)}{\hbar^2}\right]\psi = 0$ $\psi_b = Ce^{Gx} + De^{-Gx}$;
 Approximation: assume that the decaying function is dominant: $\psi_b = De^{-Gx}$

$$\text{Transmission: } T = \frac{|\psi(x=\ell)|^2}{|\psi(x=0)|^2} = \frac{(De^{-G\ell})^2}{D^2} = e^{-2G\ell}$$

The probability that a particle tunnels through a barrier can be expressed as a transmission coefficient, T , and a reflection coefficient, R (where $T + R = 1$). If T is small, $T \approx e^{-2G\ell}$, where $G = \sqrt{2m(U_0 - E)}/\hbar$. The smaller E is with respect to U_0 the smaller the probability that the particle will tunnel through the barrier.



Applications:

- **Alpha Decay:** In case of alpha decay of polonium-212, which emits an 8.78 MeV alpha particle with a half-life of 0.3 microseconds, The Coulomb barrier faced by an alpha particle with this energy is about 26 MeV, so by classical physics it cannot escape at all. Quantum mechanical tunnelling gives a small probability that the alpha can penetrate the barrier.
- **The scanning tunnelling microscope:** Scanning-tunnelling microscopes allow us to see objects at the atomic level. In this case, A small air gap between the probe and the sample acts as a potential barrier. Energy of an electron is less than the energy of a free electron by an amount equal to the work function. Electrons can tunnel through the barrier to create a current in the probe.
- **Flash Memory Drive:** Data on flash drives is stored in a network of memory cells made up of "floating-gate" transistors. These consist of two metal gates, a control gate and a floating gate. When data is erased from flash memory, a strong positive charge applied to the control gate causes the trapped electron to tunnel through the insulating layer, returning the memory cell to a "1" state.

Future of Quantum Tunneling: In the present day, the world is moving to a world of nanotechnology. In this technology, we will definitely need a thorough understanding at what occurs at the atomic scale including quantum tunnelling e.g. transistors, scanning tunnelling microscope. Soon enough it will be in every part of our everyday.

Keywords: Tunneling; Transmission Coefficient; Alpha Decay; Scanning-tunnelling microscope; Flash Memory Drive

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Solar Activity and Earth's Climate: A Reassessment

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Abstract

The Sun affects the environment of earth in a variety of ways. In recent past the scientists in different part of the globe reported the interaction between the Sun and the Earth. It is established by various means that there is a great influence of the Sun on the Earth's atmosphere although both are separated by a huge distance of 93 million miles. The solar winds and the hail storms of energetic particles affect the Earth's climate because it is situated in the outer atmosphere of the Sun as disclosed by spacecraft studies and ground-based observations. In real these two heavenly bodies are connected by magnetism. The invisible lines of force can be traced from the Earth's poles to the Sun during reconnection events several times a day. The energy released by a large solar flare is equal to the energy released by more than ten million hydrogen bombs in a few minutes. At that time the temperatures exceeds to 20×10^6 K (twenty million Kelvin), hotter than the core of the Sun, even if the smaller part of these flares are capable to produce striking effects in the upper atmosphere of the earth. These effects are due to the emissions of ultraviolet, X-rays, and energetic particles from the solar flare and by the other eruptions. Single energetic eruptions and the periods of enhanced flare activity seem to be related with weather on the earth. The cloud electrification, rainfall and circulation are regulated by Flare induced variations in electric fields and ionizing radiation due to the redistribution of energy already present in the atmosphere. The atmospheric circulation varies at middle and high latitudes after 6 to 12 hours of the strong flare occurred and last for nearly one day. The space between the Sun and the planets is filled by tenuous magnetized plasma. This plasma is flowing away from the Sun. Solar activity, especially Coronal Mass Ejections (CMEs), solar flares and energetic particles are the major factors controlling space weather and the terrestrial weather. The radiation contains the frequency throughout the spectrum, but most of the flares are not in visible region. The solar flare produced in the active regions where the photosphere is penetrated by highly intense magnetic field to link the corona to the interior of the sun are less intense at white light but their brightness may be very high at a particular atomic line. Solar activity varies with a 11-year cycle which results in an 11-year activity cycle in the geomagnetic phenomena. The activity level is at minimum during the solstices when the projection of the IMF onto the Earth's field is on average a minimum. In this paper the development in the recent decades on the subject is briefly discussed.

Keywords: *Solar flares, Coronal mass ejections, Earth's climate, Geomagnetic phenomena*

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Influences of Cosmic Rays on the Earth's Climate

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Abstract

The absorption, redistribution and re-radiation of cosmic rays affect the climate change on the earth. Cosmic rays consist of galactic cosmic rays and solar cosmic rays. Extragalactic rays can also influence the earth's environment. The atmospheric changes are attributed to cloud distribution which is influenced by the cosmic rays intensity. Low amount of cosmic rays reaching earth results less cloud formation. If sun is in a phase of high activity with a strong magnetic field then the magnetic field of sun deflects the galactic cosmic rays due to which less amount of galactic cosmic ray will reach to earth results in high impact of sun on climate. High activity of the sun results in global increase in temperature and low activity of sun gives decrease in world's temperature. This becomes a common belief that global warming can be explained on this basis. But there is no long term upward trend is found for high solar activity and also not long term downward trend is found in cosmic rays reaching the earth surface, so global warming can't be precisely attributed due to cosmic radiation. Galactic cosmic rays and solar cosmic ray varies in similar fashion which leads complication for recognition of effects due to them. The annual rainfall depends on cosmic ray intensity. In solar cosmic rays a beam of electrons is spew out towards earth which is highly conductive. The electric field produced affects the plasmosphere and ionosphere of the earth. The beam of electron produces the magnetic disturbance. It has been reported that the change in E-flux is responsible for creation of ionospheric currents. These ionospheric currents influence the atmospheric temperature. For formation of cloud, low temperature is required which is enhanced during low solar activity. This suggests that due to increase in E-flux if global warming is possible then decrease in E-flux value results in snowfall, thunderstorms and high rainfall. The cosmic ray variation with planetary indices, electron flux and proton flux and coronal mass ejections established the effect of cosmic rays on earth's environment. The Kp values and E-flux increase drastically before thirty six hours, the advent of earthquake as reported by different observations. The disturbance in atmosphere is seen when a coronal mass ejection is directed towards earth. The sudden change in these parameters is found to be responsible for change in geosphere. The earth's magnetic field is protecting it from continuous stream of solar wind as continuous E-flux and proton flux changes the Kp values suddenly results in change of earth's climate. In this paper the influences of cosmic ray intensity is considered for Indian rainfall. It is evident that the variation of Indian rainfall doesn't follow the same trend in both the hemispheres with cosmic ray intensity.

Keywords: *Climate change, Coronal mass ejections, Ionospheric current, Geosphere, Cosmic ray*

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Polymer Nano Composites – A Review
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Abstract

Nano-technology and polymer is one the most used and versatile technology in today's world. This topic is one the most trending topic in the world of science. Polymer has become a part of our day to day life right from clothing to stationary, everything has a part of polymer in it. Polymers, both natural and synthetic, are created via polymerization of many small molecules, known as monomers. Their consequently large molecular mass relative to small molecule compounds produces unique physical properties, including toughness, viscoelasticity, and a tendency to form glasses and semicrystalline structures rather than crystals. Normally polymers show poor mechanical, optical, electrical and dielectric properties. Polymer has many disadvantages like it has low compressive strength and are brittle. And also the glass transition temperature (T_g) and melting point may not as per our desire in most of the time. They also have poor barrier and mechanical property. But even if we add a low percentage of nanofiller we may observe a great change in the behaviour of the material. So for the effective use of polymer we have to manipulate the properties by doping it with nano-material. Polymer nanocomposites are polymer matrices reinforced with nano-scale fillers. This new class of composite materials will show improvement in these properties along with the increment in the mechanical strength of the polymer. Nano-material shows different properties for compare to the property shown by the same material in macro scale. Their physical property depends upon the surface area of the material -- larger the surface area greater the reactivity. By doping the polymer we can enhance the surface to volume ratio of the polymer and thereby also change many important thermodynamic parameters like glass transitions and melting point of a polymer which defines as they are the most important thermodynamic parameter for common polymer it defines the nature of polymer as well as its flexibility. This change in transition is accompanied by the change in the heat capacity of the material. Above this glass transition temperature (T_g), the polymer is in rubbery state and below this it is in glassy state. And the polymer below T_g is preferable as it has high tension compression etc.

By doping the polymer with nanomaterial we can increase or decrease the electrical conductivity of polymers by going through several processes. Like in Polyethylenes, the valance electrons are bound in sp³ hybridized covalent bond. The conjugated p-orbitals from a one dimensional electronic band and the electrons within this band become mobile when it is partially emptied. Non-doping increases in conductivity can also be accomplished in a field effect transistor (FET or OFET) and by irradiation. Some materials also exhibit negative differential resistance & voltage controlled "switching" analog to that seen in inorganic amorphous semiconductor.

Regarding applications one obvious way to increase strength is the addition of rein for cements, such as glass fibres but the user should have basic knowledge of working the temperature range and also the related environment.

Carbon nano-tubes are not only very strong but are also flexible. They can be twisted and bent without breaking. Thus they are used in polymers and composites to strengthen a structure -- to increase the electrical conductivity of the material and to increase heat transfer.

On the other hand, composites containing silica nano-particles can withstand the heat of a car engine and are therefore have been used as engine parts. Nano-composite materials made out of clay-reinforced, originated by Toyota, are now being used to make panels for cars, which are as much as 30% lighter than existing structures and are twice as resistant to denting and scratching as conventional polymers. This gives rise to lighter car that means more fuel-efficient cars with corresponding environmental benefits.

Therefore, there are lots of applications of polymer nano composites despite of several disadvantages of polymers,

Keywords: *Polymer; Nano materials; Polymer nanocomposites; Applications*

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Real Time Traffic Congestion Prediction Approach on a Road System Using Dynamic Clustering of Inter-vehicle Communication

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Abstract

In the past two decades, the proliferation of new technology has made a huge impact in the life style of the people. Here transport is one of the fascinating technology branches developed during last 200 years and time is the very precious demand in today's fast moving life. As more or more vehicles are being introduced into the populated countries like India, traffic congestion has become a serious problem in the context of transportation system. Due to this serious problem the overall transportation service become disturb and inconvenience in the crucial perspective of time. Accurate real time prediction of traffic congestion can therefore facilitate adaptive decision making process of both operations and passengers. Providing high quality information with time for generating better mobility and increased overall satisfaction with public transmit. Actually in our daily life situation, time assessment is needed for handling different travelling hazards. People can do any type of real time planning and scheduling by their thinking in their own desire. Even sometimes, feeling comfort and always getting updated time to time news is recommended as an enjoyable mind free journey. That's why a successful implementation of travelling system will provide the passengers with an easy, reliable and time saving way of travelling and that will also greatly encourage the use of public transmit.

Infrastructure based existing solutions of traffic congestion prediction has several drawbacks with respect of time, cost, bandwidth and coverage area. So, here we adopt vehicular communication that can be used to predict and transmit traffic information. Clustering is one of the efficient transmission strategies in vehicular Ad-hoc network (VANET). It is an important approach in the process of geographic region formation for vehicular Ad-hoc network (VANET). In this paper, for real time traffic congestion prediction purpose we propose a dynamic inter-vehicle cluster formation strategy that is necessary for knowing how many vehicles are communicated with each other in any time instant and identify the regions in which vehicles are densely concentrated. Inter-vehicle communication systems rely on direct communication between running vehicles to satisfy the communication needs of large class of applications. Each vehicle works as a source, destination and/or a router to disseminate traffic related information. Each vehicle broadcast beacon message containing information about their location, speed, moving direction periodically to the other vehicles through light weight communication protocol. Inter-vehicle communication envisioned to provide broad range of applications in the area of traffic congestion information. So, for real time interaction between passengers is necessary for the implementation of real time analysis. The inter-vehicle cluster is a group of vehicles with similar mobility pattern as per inter-distance, speed and moving direction and also elects a leader, called cluster head, for each group. Cluster head have the responsibility to collect all the vehicles information within its own cluster area through inter-vehicle communication system and forward the merged result to the next cluster head. All the calculations inside the clusters are unbiased; all vehicles get the same priority for exchange their information to each other. In this way global traffic information about the whole road can be in priority propagated to each vehicle and all its passengers. So, here our intention is to develop a real time traffic congestion prediction approach on a road system in a very smart way for which time related any obstacles will be easily managed in any capacity to meet the desired demand.

Keywords: *Traffic Congestion, Inter-vehicle Communication, Clustering, Vehicular Ad-hoc Network (VANET)*

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Propagation of Two Collinear Griffith Cracks in a Transversely Isotropic Elastic Strip

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Abstract

Fracture mechanics is the field of mechanics concerned with the study of propagation of cracks in materials. It uses methods of analytical solid mechanics to determine the driving force on a crack and those of experimental solid mechanics to represent the material's resistance to fracture. In present-day material science, fracture mechanics is an imperative apparatus in developing the mechanical performance of materials and components. It applies the physics of stress and strain, in particular the theories of elasticity and plasticity, to the microscopic crystallographic shortage found in real materials in order to predict the macroscopic mechanical failure of bodies. Initially, the fluctuating load nucleates a crack and grows it slowly but the crack growth rate per cycle picks up speed eventually. A major short coming of classical theory is that it cannot predict the direction of crack propagation. Therefore, a dangerous crack may be nucleated and grown during the service of the component. Now our main objective of this article is dealing with the distribution of stress due to the steady-state propagation of two equal collinear Griffith cracks in an infinite transversely isotropic strip of finite thickness. As in the Yoffe model it is counterfeited that cracks are propagating along constant speed c and beyond variation in length along with the positive X -axis. Applying integral transform method the problem has been diminished to the solution of a set of triple integral equations with cosine kernel and a weight function. Using the finite Hilbert transform technique these triple integral equations are transformed to a single Fredholm integral equation of the second kind, that is also determined by an iterative process. Approximate analytic interpretation for dynamic stress intensity factors is obtained. Finally Numerical calculation are carried out for two different pairs of isotropic materials with first one as Uranium and Epoxy Boron and the second one as Beryllium and Epoxy Boron, which are exhibited through figures. The effect of material constants and temperature coefficients on the nature of physical quantities viz., stress intensity factors and crack energy of the interfacial cracks is the crucial characteristic of this article.

Keywords: *Transversely isotropic Elastic Medium; Integral Transform Technique; Riemann-Hilbert Technique; Local Stress Field and Stress Intensity Factor*

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Generalized Thermo elastic Interaction in an Isotropic Medium with Moving Heat Source Using L-S Model

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Abstract

At present, there are two different generalizations of the generalized thermoelasticity. The beginning conjecture act by Lord and Shulman and is known as L–S Theory that associate one loosening time for a thermoelastic procedure. This method reaches a wave form heat equation by hypothesize a modern law of heat conduction equation to recover the classical Fourier’s law. Heat conduction equation of that method is of the wave from, it naturally assuring finite speed of propagation for heat wave. Secondary generalization is due to Green and Lindsay and is known as G–L method which catches into account two parameters in loosening times. This theory adapts equation of motion not only the heat conduction equation. However, the classical thermoelasticity conclude a finite speed for widely elastic disturbances, but an infinite speed for widely thermal disturbances that are coupled together. In aspect of Lord and Shulman a part of every solution of the equations extends to infinity. In spite of this theory the main objective present study is carried out a problem of one dimensional generalized thermoelastic interactions due to moving heat source in an isotropic infinite media under Lord shulman model (L-S). The Governing equation of this mathematical model from of vector-matrix differential equation in the Laplace transform domain, the basic equations have been written, which is solved by an eigenvalue approach technique. The analytical solution in the Laplace transforms domain with eigenvalue approach gives exact solution beyond any affected restrictions on the certain physical quantities. Finally the inversion of the Laplace-transform in the physical space time domain has been obtained with the help of Zakian method and MATLAB software. Numerical results are represented graphically for the, temperature, displacement and the stress distributions. Some comparisons have been expressed in the form of graphical representation. The moving heat source velocity has expressive effect on all distributions.

Keywords: *Generalized Thermoelasticity; Lord-Shulman Theory; Vector Matrix Differential equation; Laplace transform; Eigenvalue approach*

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Analysis of the Dynamics of Interaction on Prey Predator: Cluster Prey, Susceptible and Infected Predator

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Abstract

In the theory of ecology the interaction of prey and predator are most important discussing topic. There exist different literature where researcher take prey predator interaction in a new way. The models are based on some realistic situation. The solution and stability analysis are most important topic for studying the nature of the model in different time scale. For different situation and for different environment the interaction can be found in various ways. The model then modified and re considered from the previous one. For prey predator modeling time is a key factor. So depending on time we can model a discrete and continuous model. In this study we consider a prey-predator system model but the concept is that, the predator population size suffers from diseases and in the other hand the prey held out a Herd behavior in such a way that the predator interacts with the prey along the outer surface of the herd of prey. As for the mathematical consequence of the herd behavior we consider the two species competition models. The governing systems in which interaction terms is use the square root of the prey population rather than ordinary prey population. The main interaction term is relative to the square root of the prey population, which properly model systems in which the prey held out strong herd structure implying that the predator generally interacts with the prey along the outer region of the herd. We analyze the fact on the basis of the concept dynamical behavior of prey predator system with one prey and two predators. In this section we consider one of predator is susceptible, the other is infected due to diseases and the prey held out with herd behavior. Lastly we analyze the dynamical system near the origin. For the other equilibrium points we also consider jacobian matrix and studied the stability analysis. Finally numerical calculations are carried out for this system and the results are compared with the nature of prey and how the predator's death rate depends on some parameters. The numerical are done by MATLAB software.

Keywords: Prey-Predator interaction; Square root functional response; Outer surface

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Investigation of the Population Dynamics of Prey Predator Synergy by taking Grouped Prey, Infected Prey and Predator

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Abstract

In the concept of ecological modeling the fight between prey and predator are one of the most crucial debating topic in mathematical modeling. For various realistic conditions and for different surroundings or atmosphere the competition between them can be found in many distinct ways and we write it by the concept of mathematical modeling. For this reason we need to modify the earlier models and have to study dynamical nature of the new model for different cases in different environment. The model is also dependent on some environmental factors. The model can be formulating in discrete and continuous both the cases. In case of prey predator modeling time dependency and grouping is one of the important points which can be affecting in the solution of the certain model. In this paper we tacit a prey-predator model structure where the population of the predator deteriorates due to the presence of the infection but they attack the prey population's simultaneously. In the other hand if one of the prey performed a Herd behavior such that the predator can attack the prey along the exterior region of the collection of prey. To construct the mathematical model by taking the before said assumption for this system we deals with herd behavior and choose two species clash model. The governing scheme or strategy in which interaction term is utilized and used the square root in the prey section rather than general prey populations. In this paper we also considered the second prey population doesn't acts herd behavior but it fights with the first one and the corresponding functional response term is Holling–Type-II functional response. We construct the ecological model on the ground of the concept of dynamical behavior of prey predator system with two distinct prey and one infected predator. In this category we wish to deals with one diseased predator and two different prey one of it held out with herd behavior and the other consumes the first one. Finally we investigate the dynamical system in the neighborhood of origin and for the other critical points consider jacobian matrix and examine the stability analysis. Lastly numerical computations are carried out for this ecological structure and the results are compared with the nature of prey and how the predator's extinction rate depends on some specifications. The numerical results are done using MATLAB software. The main concept of the paper can help the researcher who is deals on mathematical ecology.

Keywords: *Prey-Predator interaction, Herd nature, Outer surface, Holling Type-II*

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A Fuzzy Goal Programming Model for Land Allocation Problem of Optimal Cropping Plan in Agricultural Systems

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Abstract

The history of human civilization has shown that mankind prefers to settle on the places where water and plants both are plenty, and originally human settled near river basin sides to meet the two basic needs such as food and water. Actually, water is the unique substance for evolution of life on the planet Earth. Among all the species, plants are the primitive species, and the major constituent of any kind of plant is water.

It is thought that domestication of plants went on as far as 7000 B.C. and plant-based food production system through forest gardening, the world's oldest known form of agriculture, was started as far back as 5200 BC. Actually, the development of agriculture made human civilization possible. Biodiversity has enabled farming systems to evolve ever since agriculture was first developed some 10,000 years ago in regions across the world. 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.

This paper presents how fuzzy goal programming (FGP) method can be efficiently used for modeling and solving agricultural planning problems for achieving the aspiration levels of production of five seasonal crops cultivated in a planning period by allocating the arable land properly and utilizing the available productive resources efficiently in three different seasons such as the crop-cycles Pre-kharif, Kharif and Rabi successively throughout the planning year. The land-use planning problem for production of the five principal crops such as Paddy, Wheat, Mustard, Potato, Pulses of the District Nadia of West Bengal (W.B.) in India is considered to illustrate the proposed FGP model. Considering both the national and international scenario of agriculture, very scanty information is available regarding the application of Fuzzy Goal Programming approach to optimize the agricultural production inputs such as fertilizer 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; Fuzzy Goal Programming; Goal Programming; Cropping Plan*

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Mathematical Modeling of Single Species Population

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Abstract

Ecology is a diverse discipline. After all it has all of life to account for. In the old days, it was common to divide ecology into two sub disciplines, ecology, the ecology of individual organisms and of population, and gynecology, the study of plant and animal communities. But ecology is divided into many sub disciplines. Several sub disciplines are used in mathematics. For example behavioural ecology makes extensive use of game theory and of other brands of optimization. It is quite impossible to discuss all sub disciplines in one paper.

In this paper I want to focus about mathematical ecology because in any prey-predictor or single species, model ecology must be considered. In the elements of mathematical ecology provides an introduction to classical and modern mathematical models and issues in population ecology. Topics covered include density dependence, bifurcation, demographics, population, interaction and the application of optimal control theory.

In the paper, I am going to discuss about single species population model. The population model depends upon various parameters like space, food etc. So on the basis of these parameters different approach like exponential growth, Lotka Volterra model etc is going to be applied. At first I will discuss about the exponential model, when we assume that there is a single species which do not have any competitor, the resources are unlimited for that species as well as there is no predictor exist in that model. That's why that model is quite unrealistic, because if such happens in real life then the species will not extinct. For that reason I make some changes on that model, by using some changes on that model, by using some parameters I make that model quite realistic. Here, I have shown that the population of that species will decay after some time due to insufficient resources. Because as the population increases the competitors will be increased. That's why the growth of population of that species will not increase, instead of that the population will be become stable and stagnant after certain period.

Honestly if we consider if there are some predictor appear in that system then that species will become endangered because their amount of resource also become less. By the hypothesis of natural selection that species will lead to extinction. In this way, that paper can explain the process about the genesis of a species and its extinction.

Keywords: Ecology; Bifurcation; Lotka-Volterra; Exponential; Logistic; Natural selection

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Effect of Refuge in a Food-Chain System: A Mathematical Approach

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Abstract

Here we proposed an eco-epidemiological model with refuge parameter in the susceptible prey. Holling type II functional response for the predation is considered. In this paper our main aim is to consider different competition coefficients within the prey population, which leads to the emergent carrying capacity. Dynamical behaviors of the system such as boundedness, permanence, local and global stability of the system are studied using both analytical and numerical techniques. Refuge parameter is treated as the bifurcation parameter and study the Hopf bifurcation of the system around the coexistence equilibrium. In our numerical analysis we observe that enhancement of the refuge of the susceptible prey enhance the stability of the system. Extensive numerical simulation is performed to illustrate our analytical findings.

In our analytical results we found four equilibrium point where the trivial equilibrium point always exist, the axial equilibrium point exist conditionally and the interior point equilibrium exist conditionally. We found that the trivial equilibrium point always unstable and on the other two boundary equilibrium point are asymptotically stable conditionally and one axial equilibrium point always unstable. We performe the numerical simulation to vaildate our analytical findings.

Keywords: *Eco-epidemiological Model; Permanence; Global Stability; Hopf bifurcation*

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Estimation of Viral Dynamics in a Dynamical Model of Hepatitis B Virus Infection

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Abstract

In the last several years, few numbers of mathematical models have been developed to describe the HBV virus infection. Hepatitis B virus is a virus which primarily causes inflammation of the liver. The virus can be transmitted in several ways including blood transfusion, needle sticks, body piercing and tattooing using unsterile instruments, dialysis, sexual and even less intimate close contact, and childbirth. CDC says that the number of people who get this disease is down, the. Rates have dropped from an average of 200,000 per year in the 1980s to around 18,000 in 2012. People between the ages of 20 and 49 are most likely to get it. Only 5% to 10% of adults and children older than 5 who have hepatitis B end up with a chronic infection. The numbers aren't so good for those younger than 5 (25% to 50%) and even higher for infants infected at birth (90%). It is observed that 1.4 million people in the U.S. are carriers of the virus. In India it is observed that average 2.4-4.7% people have HBV infection. If a patient has it, he'll be given a complete physical exam. He'll have to check to see if liver is healthy. The diagnosis is made with blood tests that look for the hepatitis virus and cells that fight infection, called antibodies. If the disease becomes chronic, doctor might take a tissue sample from liver, called a biopsy. The Hepatitis B virus is 100 times more infectious than the AIDS virus. HBV virus leads to over 1 million deaths each year. WHO (World Health Organisation) estimates that 400 million people worldwide are already chronically infected with Hepatitis-B. If not diagnosed and treated chronic Hepatitis B can lead to Cirrhosis (scarring of the liver), liver cancer and liver failure.

In this paper we proposed a mathematical model containing uninfected cell, infected cell and a free virus. Analytically we found three equilibrium point where the trivial equilibrium point always exist and the axial equilibrium point and interior point exist conditionally. We found that the trivial equilibrium point always stable and the other two equilibrium point stable conditionally. We perform the numerical simulation also to validate our analytical findings.

Keywords: *HBV; Inflammation; Liver; Stability, HIV*

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Optimization of Input Cutting Constrains And Effect of Materials Removal Rate And Surface Roughness on Chip Thickness And Tool Wear For Straight Turning Done In CNC Lathe

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Abstract

Surface roughness has been taken as one of the most significant factors for any machining operation. Roughness plays an important role in predicting the performance of a mechanical component. In this experimental based thesis work, three cylindrical pieces of EN8 were taken as work pieces and were machined on CNC lathe. Three levels of Spindle speed, Feed and Depth of cut were taken as input constrains and L₉ Taguchi orthogonal array was generated with the help of “Minitab”. The initial diameter of EN8 work pieces were 48mm and lengths 100 mm. As in this present work, the number of observations was nine, so, first three operations were done with one work piece, next three with another work piece and the last three with the remaining one. For all the nine observations, surface roughness values were measured with the help of “Talysurf”. Tool tip distances before and after all the nine operations from a particular surface on tool were seen under “Toolmaker’s Microscope” and tool wear was calculated by computing the difference between distance of the tool tip from a particular surface on the tool before machining and the distance of the tool tip from that particular surface on the tool after machining in μm . Optimization based on Taguchi method was done for both Surface roughness and Materials removal rate. Signal to noise ratio (S/N ratio) for surface roughness was calculated as “Smaller the better” because a smaller value of surface roughness is desired. Signal to noise ratio (S/N ratio) for Materials removal rate was calculated as “Larger the better” because a larger value of Materials removal rate is desired. Graphs were drawn with the help of “OriginPro 8” to show the effect of Materials removal rate and surface roughness on chip thickness and also the effect of Materials removal rate and surface roughness on tool wear.

Keywords: Surface roughness; Taguchi orthogonal array; CNC lathe; Signal to noise ratio; Tool wear.

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Response of Crack in a Cantilever Beam by Static Analysis

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Abstract

It is very well known to a researcher that any kind of damage in a mechanical element can cause failure before determined limit. In case of building components like beam and column it may cause catastrophic effect. So it is a very important part of research to identify the position as well as the depth of the crack in a mechanical component. Studies of structural health monitoring (SHM) have attracted great amount of attention. Damage identification is a critical step for SHM, which involves damage detection, localization, evaluation, etc. There are several ways by which one can approximately find the crack in an element, like⁽¹⁾ NDT. The non-destructive testing is a very useful technique that obtains information of interior region of structure without any damage to it. It contains many branches like liquid penetrant, magnetic particles, eddy current, ultrasonic testing, modal analysis, etc. but those are costly, and time consuming.⁽²⁾ As we know crack changes different mechanical properties e.g. - stiffness, natural frequency e.t.c. So by following the changes of these properties one can identify the crack position. There is a 2nd order differential relation between deflection of a beam with bending moment, where for same loading condition deflection depends on young modulus and 2nd moment of area. As it is known to us 2nd moment of inertia is a geometric property and young modulus is material property so both should be affected due to presence of crack. Here our study aims to follow the change in deflection at the free end of a cantilever beam to identify the crack through theoretical study. Here an Aluminium beam is analyzed at different crack size and location. The crack assumed is a transverse and open. All the numerical analysis of the beam has been done with FEA with the help of ABAQUS 6.12.

Keywords: *FEA; NDT; Open Crack; SHM; ABAQUS*

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Classification of Meditative and Non-Meditative State Based on HRV Time Series

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Abstract

In Present era HRV is a decisive impression of the many physiological factors regulating the normal rhythm of the heart. It is expected that in meditation HRV provide a powerful means of observing the interplay between the sympathetic and parasympathetic nervous systems. It is a non-trivial & important task to search for that signature in HRV time series. In this study we have used a well known mathematical tool i.e. information based similarity index to uncover that apparently hidden pattern of meditation. Our method consisted of three major stages: Binary Conversion, Rank Calculation and Distance Calculation. HRV time series of twelve subjects have been obtained in meditative and premeditative states from the Physionet [1] and they are converted to binary sequences. Finally, we computed their information based similarity index developed by Yang *et. al* [2][3] with a fixed word size and plotted the points in the two dimensional plane which represent a clear idea of similarity and dissimilarity between two different HRV time series. This Similarity Index successfully discriminates the meditative state from the non- meditative one for some specific word size.

Keywords: *HRV, Meditation, Similarity index*

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Design of Low Cost Neuromuscular Stimulator

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Abstract

Stimulators are the system which can generate pulses with adjustable amplitude, frequency and duration (duty cycle) for the treatment of many organ failures of the human body used in a proper clinical environment. A 555 timer based low-cost portable general purpose neuro-muscular stimulator device has been designed and implemented in printed circuit board (PCB) to obtain desired frequency, and amplitude. One of the effective non-invasive approach of neutralizing impairments and deformities of superficial pain is to apply low frequency electrical triggering stimulation on muscle. Researchers have shown that electrical stimulation helps to control pain both over peripheral and also central mechanisms. In this work it has been proposed a portable low cost neuro-muscular stimulator which can be used specially for hand injuries. Proposed stimulator can produce a frequency ranging from 2 Hz to 100Hz by varying a preset knob with output voltage changeable from 30 volt to 110 volt and an adhesive electrodes are used to stimulate muscle. The neuro-muscular stimulator is portable and can be operated by using a 9 volt battery. The schematic is made using Proteus 8.0 and that schematic is converted to PCB using Diptrace.

Keywords: Muscular Stimulator; Timer; Low frequency pulses;

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Low Cost Adjustable Water Level Indicator with Alarm And Automatic Shut Down

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Abstract

There are a huge no of experimental setup and real life application, where we have to fillup the reservoir upto a certain level . And in most of the case the accuracy of water level is needed. So we must install a water level indicator system. But as the available water level indicator systems are installed at a fixed level of reservoir, so if we change the condition means if we change the required water level height ,it will not work . The Low Cost Adjustable Water Level Indicator with Alarm and Automatic Shut down is a perfect solution for this problem. In this system we can set the water level indicator probe at the required level very easily. And in this system we use Metal Rod instead of any sensor, due to which the costing of the system decreases. We can set an ALARM , a LED light , or an AUTOMATIC SHUT DOWN SYSTEM or both the alarm & LED or, alarm, LED,& automatic shut down system .

In the EXPERIMENTAL SETUP, where the perfect time for filling up a certain level of reservoir is to be measured ,we will install the ALARM or/and LED , so that when the water level reaches the required level ,the alarm will blow and the LED will lighten up indicating to stop the stopwatch.

In the REAL LIFE APPLICATION, where we have to fill up the reservoir to a certain level, the AUTOMATIC SHUT DOWN SYSTEM is to be installed, so that when the water level reaches the required level ,the pump will automatically shut down.

Keywords: low cost water level indicator; Adjustable water level indicator; Automatic shut down system

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Study on Slope Stability of Embankment using Plaxis 2d Software

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Abstract

Slope stability analysis is one of the most challenging problems for geotechnical Engineers. This analysis is performed to evaluate the safe design of slopes either occurring naturally or made by human activity. Traditional limit-equilibrium method is the most common technique for analysis. In recent times, finite Element Method (FEM), a powerful, viable alternative technique is available to the geotechnical engineers. It is important to recognize the complexity of mechanical behavior of soil that cause slipping. In this respect only high quality research work can be a good platform for the analysis of slopes. In the present investigation, an attempt has been made to study the analysis of slope with the help of Plaxis-2D software using field data. Present research work investigated the analysis of slope consists to determine the failure surface and the corresponding safety factor. In this study, an effort is also made to correlate factor of safety of embankment based on analytical approach with finite element model.

Keywords: *Plaxis-2D; finite element analysis; factor of safety; analytical approach*

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Conservation of Water and Electricity Using Automatic Pump Controller

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Abstract

Over the last few decades, due to the increase in population all over the world, the rate of usage of water resources and natural fuels has also increased. It has been predicted by scientists that at this rate of usage, there will be acute shortage of natural fuels (like coal, petroleum etc.) and usable water for human civilization in the future.

In urban areas, water is supplied by the local municipal authority to our households from their centralized storage. Water is directly delivered to the underground reservoir for temporary storage. Then this water is drawn up by electric pumps to the overhead tank for supply of household works. Many times, there is wastage of water from the reservoir or tank, consuming extra electricity. Keeping this in mind the purpose of this work is to conserve the two important resources. In this work, we develop a laboratory prototype hardware that automatically starts and stops a pump based on water quantity in the reservoir and tank. For this, two water sensing elements are used, which send the water level continuously to an Arduino processor. The control signal operates a relay to automatically start or stop the pump.

Two beakers are used with the larger one acting as the reservoir, while the smaller one is kept at a slightly elevated position to act as overhead tank. A pump is used to draw water from the lower to the upper beaker. Two wires are dipped into each beaker for water level sensing, one as reference (energized at +5 volts) and the other as sensor. The sensing is based on the principle that the two wires get shorted when water level reaches proper level. This sends a digital signal to the Arduino processor as input to indicate status ('full' or 'empty') of the tanks. Accordingly, the Arduino processor starts or stops the pump through a relay. Water is drawn till the water is available in lower tank, or, rises to the sensing point in upper tank. This protects the pump from 'dry-run' and prevents overflow from the upper tank. In this way, the automatic pump controller conserves both water and electrical energy by minimizing their wastage.

The hardware components used in this project are: Arduino Uno board, a computer containing Arduino programming language, an USB cable to upload the program and provide power supply to the circuit, vero board, 5 volt relay, a submersible pump, connecting wires, resistors, and pipes, two beakers.

Keywords: *Arduino; pump-controller; water and electricity conservation; water level sensing.*

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Optimization Technique Using Taguchi Method By Turning Operation On Titanium Alloy Grade 5

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Abstract

In this research work, an investigation is made to study the effect of process parameters on machining characteristics of Titanium alloy Grade 5 and thereby optimization of process parameters using Taguchi method. Taguchi Method is a statistical approach to optimize the process parameters and improve the quality of components that are manufactured. The objective of this study is to illustrate the procedure adopted in using Taguchi Method to a lathe turning operation. The cutting speed, depth of cut and feed rate are taken as process parameters and the cutting forces and surface roughness are taken as performance characteristics. An attempt has been made to demonstrate the application of Taguchi's Method to improve the surface finish characteristics of turned components that were processed on a CNC lathe. Surface roughness is a measure of the smoothness of a product's surface and it is a factor that has a high influence on the manufacturing cost. Surface finish also affects the life of any product and hence it is desirable to obtain higher grades of surface finish at minimum cost. The L27 orthogonal array used in design of experiments is used as the tool to conduct the experiment. The effect of each process parameter on each performance characteristics is carefully analyzed. Titanium alloy grade 5 which has a hardness of 36 Rc, Rockwell density of 4.50 g/cc, composition Ti 6Al 4V (6% Aluminium, 4 % Vanadium and rest Titanium). CNC lathe tool was used for performing the turning operation and CNMG 120408 NF3 WPP01 insert was chosen for the operation. While performing the experiment low cutting speed and high feed rate were maintained as tool tip temperature are affected more by cutting speed than by any other variable. A range of cutting speed from 6 to 46 meter per min is preferable with carbide tools. High feed rate is maintained as temperature is not affected by feed rate. A range of feed rate from (0.002 to 0.020) inch per revolution is preferable. Suitable cutting fluid is used for dissipating the heat. Surface roughness is the measurement of smoothness of the surface which plays vital role in robust design and the cutting forces are the forces offered by the tool and the job which is a very important parameter while machining any job as it ensures better surface finish and long tool life. After conducting the experiments the surface roughness was measured with the help of Optical Profilometer. Detection of the force components were by lathe tool force Dynamometer. The orthogonal array, signal-to-noise ratio, and the analysis of variance are employed to study the performance characteristics on facing operation. Signal to Noise ratio (S/N Ratio) was calculated. The optimum parameter level was measured with the help of ANOVA (Analysis of Variance). With the help of graphs, optimum parameter values were obtained and the confirmation experiments were carried out. These results were compared with the results of full factorial method.

Keywords: *Titanium alloy; turning operation; Taguchi method; S/N Ratio; ANOVA*

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Iris Recognition Technology

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Abstract

In today's world, security system is becoming an important parameter in IT Sector. A Biometric system is a technology based system which composes of methods for uniquely recognizing humans based upon physical and behavioural characteristics. Here the system uses information about a man or any of his biological organs to recognise that person. Activity of the system depends on specific data about unique biological traits in order to work effectively. Iris recognition is an automatic process which recognizes a person by analysing video images of one or both of the irises of an individual's eyes using mathematical pattern-recognition technique. The complex patterns of iris are unique, stable, and can be seen from some distance. This type of recognition is the most reliable as it has few remarkable advantages. Iris is an internal organ of eye, which is externally visible, held by a transparent and sensitive membrane cornea and is well protected against damage. Iris recognition is independent of person's age. Iris recognition is the fastest error free biometric method when a search of large database is needed. Many surgical methods are mostly dependent on the colour and total shape of the iris. Human iris has a circular midriff between cornea and lens. It also has identical iris pattern formed in early life, remains unchanged during adult life. Iris-based identification requires specific hardware, unlike software based modalities such as face and voice recognition. The system is very user friendly, scanning can be done from a normal distance, and the main advantages of the system are accuracy, scalability, stability etc. But the system is an expensive one. Moreover, it operates only on steady persons standing closer (within few meters) to the scanning device. In few cases, presence of reflections makes it hard to perform an iris scanning. Moreover, exposure to IR light for a long time may cause harm to the iris. Recently iris biometrics is becoming more prominent across the vertical markets and also in the consumer electronics sphere due to the innovations in new biometrics technology in terms of cost and installation, It is also frequently used in border control deployments and able to identify travellers as they enter and exit countries by land, sea and air. We should be aware of both the advantages and the disadvantages of iris recognition technology, as it is one of the top arsenals of the society and it is likely to become a part of our lives sooner than we may expect.

Keywords: *Biometric system; Iris recognition; Cornea; mathematical pattern-recognition*

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BIOHACKING: The Art and Science of Evolution by Self Quantification

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Abstract

"BIOHACKING" or "DO-IT-YOURSELF" biology is a new ethic for tapping Life's code by optimizing the body to hack biological system. It is an emerging practice that can lead to a major change in life which involves environmental monitoring, personal diagnostic and use of biomaterials. In this profound technological ground, this practice can be used for exploring the Ecosystem where Engineering can meet Biology.

In this paper, our interest is mainly focused on biohacking of stuffs by Bioprinting. It is a technology for constructing and fabricating artificial tissue and organ constructs using bio-printers. This overview the idea of bioprinting in broader aspects which can lead to more explorations of human genome. In most parts of the world countless masses are suffering and dying from diseases as life-saving drugs have failed to function inside human body. In spite of testing the drugs in animals which are giving positive result most of these drug failure gets tragic when tested on human, leading to damage of many human organs. For example; a drug curing a disease on one person may cause fatal side effects to another, due to different immune system of the two individuals. So, in order to avoid these detrimental side effects 3D-bioprinting is performed, which involves combining of cells, growth factors, optimum temperature to culture 3d tissues and biomaterials. In other words customization made possible according to patient's needs.

So the ultimate motto of this technology is to develop an entire replacement organ that could replace a diseased organ instead of injecting the tested drugs inside the body. 3D-bioprinting has progressed significantly in medical field widely, although it is not flexible in India to that much extent. The advancement in this technology will help our society in wide ways and will wipe-out the serious health hazards, thus improving the lives of masses.

Keywords: *DIY Biology; Bioprinters; Biomaterials; Biohacking.*

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Wireless Charging

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Abstract

In today's world, we are so much dependent on the latest electronics gadgets like smartphones, smartwatches and many other devices. Battery of those devices is always considered as a major problem for the manufacturers. People always complain about their phones battery, that they don't have a long battery life. Although the world is very much forward in developing of technology but these technology is still lagging because of this problem. This problem can get solved by Wireless Charging, the true Wireless Charging using microwave without any charging pad. Now a days some flagship smartphones has the feature of wireless charging but we need to put the phones on a charging pad but it is not true wireless. If we just place a device in our room and when we just enter into the room, our devices will get charging automatically, no need to find any dedicated wires. We can also use the devices at the time of charging. In this paper, we would like to introduce a new idea with the charging of smart devices wirelessly with the help of microwaves over a large scale. Microwaves are the radio waves that are used to communicate through two mobile phones. Here we use microwaves as a power transmitter to our mobile phones. For this we require a sensor, a "RECTENNA" Circuit and a filer in our mobile phone. The microwave is sent with the message by the transmitter using antenna at frequency 2.24 GHz.

The Electrical energy firstly converted into microwaves by microwave generator then the power is sent over free space. A superior device named Rectenna is used to convert the microwave energy into electrical energy at the receiver side. The device Rectana is very much effective for converting microwaves into electricity. In laboratory environments, above 90% efficiencies have been observed with regularity. Some researches have also been done to convert electrical energy to microwaves, the inverse rectana but efficiencies are far lesser, only in 1%. With the arrival of nanotechnology and MEMS the size of these devices can be compressed to molecular level. Applications of transferring power using microwaves are plentiful for not only changing the path of current technologies, it as hypotheses for future constructs. Transferring power without wires can completely dislocate and modernize the current and future technologies. We can have a lot of choices if the facility of wireless charging of smart devices is somehow implemented. If we are running out of battery, then what we need to do is just call a number from our phone will be recharged by packet energy within some time without the need to search for plugging in our phone. What we need to do is to turn on our laptop or search for any other laptop or phone users nearby and charge our phone by Bluetooth.

Keywords: *Smartphone; Smart watches; Microwave; Rectenna; Nanotechnology.*

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Optimization of Control Parameters in Sand Casting Process for Aluminium

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Abstract

This experimental study is intended to optimize the control parameters that lead to better surface finish for Aluminium in sand casting process. Metal casting is the process of pouring liquid metal into a mould to achieve the desired shape. The object that results from this process is also called a casting. In sand casting, sand is used to define the cavity inside a mould. In addition, sand is used to make any cores that are contained in the mould. The molten metal solidifies in the cavity. Among various casting process sand casting is one of the useful casting process utilized for ferrous and nonferrous metal both. Casting product should be defect free and with good surface finish, otherwise the manufactured product is not accepted in the industry. So that we should be conscious about the overall casting quality. An attempt was made to obtain optimal settings of process parameters for aluminium sand casting processes to reduce the casting defects as well as reduce surface roughness. The casting process involves a number of parameters affecting various casting quality features of the product. The experiments are carried out by Design of Experiments method using Taguchi L_9 orthogonal array to find out the optimal setting of control parameters. Signal-to-Noise Ratio is carried out to identify the effect of each parameter on the surface finish of the aluminium cast product. As a process sand casting involves many parameters which are even interdependent, if not controlled properly they may lead to defects which eventually affect the quality of the components. In order to optimize the process three control factors such as runner size, riser size, and pouring time were selected. Each factor was considered at three levels. Various designs were modelled and mould filling simulation was carried out. L_9 orthogonal array was constructed for the three factors undertaken and performing nine sets of experiments with their replicates generated the data. A statistical analysis of variance (ANOVA) was performed to see which process parameters are statistically significant. An orthogonal array (as mentioned earlier) the signal-to-noise (S/N) ratio, and analysis of variance are used to analyse the effect of selected process parameters. The levels were chosen sufficiently far to cover a wide experimental region because sensitivity to noise factors does not usually change with small changes in control factor settings. Therefore, each parameter is analysed at different levels based on the behaviour of the process parameters. Based on the results and their interpretation, the optimal values of the parameters are determined to eliminate the defects.

Keywords: *Sand casting, Runner, Riser, Pouring time, Aluminium, S/N Ratio, ANOVA,*

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Pump Control by Gravity Controlled Water Level Indicator

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Abstract:

The Water level indicator employs a simple mechanism to detect and indicate the water in different levels in an overhead tank or any other container. The drinking water crisis in Asia is reaching in almost alarming proportions. It might very soon attain the global crisis. Hence it is the utmost importance to preserve the water for human being. The main problem is the control of water level of overhead tank or any other container and as a result the wastage of water is increasing day by day. Automatic Water Level Indicator and Controller can provide a solution to this problem. There are so many kinds of water level indicators shown, e.g. – with contact indicator, contactless (ultrasonic) indicator, radar microwave based indicator, PLC indicator etc. So, if we control the flow of water, we can save it for the future. In this project we controlled the flow of water by using a simple logic gate circuit contains 4 input NAND Gate(1), 2 input NAND Gate(1), 2 input OR Gate(1), some 100 ohm resistors, IGBT (1) and some LED's for determining different levels and using some floating ball for sensing the level of the water in different levels at a low cost. In this water level indicator, when the tank starts filling with the water, the sensing is done by gravity operated switches such as floating balls which are placed at different levels inside the reservoir. By using logic gate operation, we can detect different water levels. When the water level is below the detectable level, it will send signal through the logic gates and the motor started. When the tank is near to fill, logics gates send the signal to the IGBT and stop the motor in that time immediately. The floating balls without water due to gravity, it is suspended at a particular level. As the level of water increases, the water push up the floating ball and the switch is on from the back side so it is called gravity operated switch. Besides saving water, this automatic water level indicator also saves the electricity bill. We design this project at a low cost. This project also describes the development the hardware and also the design of it. The report includes the content upon design, enhancement, control of water, manufacturing methods. Advantages of the proposed water level controller are less maintenance, very simple construction, ensures no overflows and the circuit involved is also relatively simpler. It can be easily made at home. Basically, this type of water level indicator can be used in the home purposes, commercial complexes, drainage, hotels, factories etc. It can also be used in the boiler part in the thermal power plant for detecting the water level.

Keywords: *Crisis ; Water level indicator ; Low cost ; Logic gate circuit ; Floating ball ; Automatic.*

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Design and Development of Smart Pump

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Abstract :

Smart pump can be used to control the flow of water & saves water for the future also. Ground hand pumps are ubiquitous in many developing nations and essential to life in rural communities. The drinking water crisis in Asia is reaching in almost alarming proportions. Water in its various forms is always on the move, in a complex process known as the water cycle. Global warming is already having a measurable effect on this cycle, altering the amount, distribution, timing, and quality of available water. Water users from communities, to industries, to ecosystems are in turn affected their activities and functions depend, either directly or indirectly, on water. With climate change, the water cycle is expected to undergo significant change. For example, a warmer climate causes more water to evaporate from both land and oceans; in turn, a warmer atmosphere can hold more water roughly four percent more water for every 1°F rise in temperature. For the increasing temperature draught arises. Using this smart pump we can reduce the water crisis. This problem can be solved by designing a smart pump. To design the smart pump, the requirement of components are an adapter, one transistor (BC548/BC547), one relay circuit and a water pump. In this project for sensing the water level, we use two probes. A transistor is used for sensing the water level. When the water is at the low level the probes are open then relay is closed (NC), as a result the pump starts, and fill the overhead tank or any other container. After increasing the water level, when it reaches the upper most part, the probes are shorted the collector and base of the transistor. As a result, the relay is normally open (NO), so the pump is stopped. By varying the base resistance of the transistor, the speed of the motor can be controlled. By this method we can control the motor and the wastage of water. It has many applications for controlling the level of the water in a overhead tank or any other other container. The design of this project enables to operate the pump whenever the necessity of water is at its utmost requirement. Thus the usage of water can be controlled and reduced to a minimum level. Not only in water supply and water distribution the pump has its application in various fields of industrial usage such as controlling the water level of boilers and fluid tanks automation of auto-refilling techniques can be achieved by using this smart pump. Advantages of the proposed smart pump is less maintenance, very simple construction, low cost, ensures no overflows and the circuit involved is also relatively simpler. Moreover, it can also be used for domestic purposes to save energy consumption of households.

Keywords: *Water crisis; smart pump; probes; relay.*

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IoT (Internet of Things): Smart Farming

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Abstract

The Internet of Things is the thought of basically linking any appliance to the Internet, A global network underbuilding, linking physical and implicit objects through the mistreatment of data capture and communication capability. This includes the whole thing from lamps, coffee makers, washing machines, headphones. So, that anyone can operate that device from anywhere.

These will be characterised by a soaring degree of autonomous statistics capture, event transfer, system connectivity & interoperability.

Soon the global population is set to touch 10 billion by 2050. So, to feed this much of residents, the farming industry needs an upgrade to their system so that they can produce more and healthy products. As there is another huge problem of global warming, soon we have to install a conservatory or artificial shelters to protect plants from non-favourable calamities this is also known as greenhouse. Aenclosed glass arrangement that protects the plants from broad external climate situation and diseases, create a micro environment and offer aresourceful year round farming. So, to feed this manyresidents, the farming production must embrace IoT. Against the challenges such as extreme weather conditions and rising climate change, and environmental impact resulting from intensive farming practices, the demand for more food has to be met. Smart farming of IoT based on technologies will reduce wastes and enhance productivity. By this the most important water and fertilizer will be saved. And this will help to increase soil capabilities like water holding capacity, nutrition, soil temperature etc.

So, what is smart farming? And how it works and helps farmers? In IoT-based smart farming, a system is built for monitoring the crop field with the help of sensors light, humidity, temperature, soil moisture, etc. and automates the irrigation scheme. The farmers can supervise the field situation from everywhere. IoT-based smart farming is highly resourceful when compared with the unadventurous approach. It will provide great benefits including more efficient water usage and treatments. So the objective of this project is building smart greenhouses. It is designed with the help of IoT, this will monitor as well as controls the internal climate or the microenvironment as per the requirement of the crop. Now the question arises that how it works, for controlling the environment in a smart greenhouse, different sensors that measure the environmental parameters according to the plant requirement are used. This will exclude the participation of farmer to read the data. Or else it will be controlled by the researchers, scientist to monitor the environment and find the better way to grow crops. With these sensors we can monitor the humidity, temperature, water usage, light levels, pressure and these sensors can also control the actuators to open a window, turning on lights, controlling misters, heaters, fan, motors etc. and this can be done automatically or manually from any part of the world. These meaningful data can also be used by the scientists, farmers, students for their research. We can expect that IoT will change the way we grow food.

Keywords: *Smart farming; autonomous data capture; microclimate; green house.*

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Lie Detection based on Facial Expression, Body Language Using Artificial Intelligence

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Abstract

Communication is an important aspect of daily life. It helps us to connect with others as individuals or as groups. Without communication life would be non-existent. We communicate to others verbally and non-verbally. It is the very basis that drives our development in relationships, education and work. But as important as communication is less than 10% of how we communicate is done verbally, percentages ranging from 55% to as much as 80% state that most of how we communicate is done through non-verbal behaviour. While the percentage conclusions do vary the results are clear, non-verbal communication is incredibly important in human interaction. Most of the time body language is used to determine the message that the speaker is trying to say to the hearer because body language has credibility to enhance the understanding of the message through conversation.

The current study will examine deception in communication focusing on nonverbal behaviour. Deception through body language is harder to disguise than verbal communication. When individuals are occupied in deception their bodies more than their faces are the main source of leakage where non-verbal behaviour discloses information otherwise hidden (Ekman & Friesen, 1969). Our non-verbal behaviour has symbolic meaning, often these are used to deceive or for deception, to be elaborated on the full paper.

The following deception detection techniques are used by police, forensic psychologists, security experts and other investigators. This knowledge is also useful for managers, employers, and for anyone to use in everyday situations where telling the truth from a lie can help prevent you from being a victim of fraud/scams and other deceptions. This is just a basic run down of physical (body language) gestures and verbal cues that may indicate someone is being untruthful. These signs don't indicate someone is lying, just that they are more likely to be lying.

. Most lie detecting experts agree that a combination of body language and other cues must be used to make an educated guess on whether someone is telling the truth or a lie. Some of the lies detecting technologies are:

1. Polygraph examination which is one of the standard methods for detecting lies.
2. Eye detect technologies is one of the preferred method because of its accuracy rate about 90%. It is launched in the year 2014 and successfully used in accessing the job interviews in nearly 34 countries all over the world. Researchers of polygraph technology are in a great stake of the future methods going to develop.

After doing the intense review of the recent available technologies of lie detection, a new method has been suggested in this paper. The objective of the work is to analyze the drawbacks of Eye detect technologies and incorporate a suitable solution for the purpose. New Technologies for lie detection is already a huge area of interest for the researchers. Artificial Intelligence (AI) is a worldwide accepted concept and can drive the eye detecting hardware. AI also has the capability to understand the physiological changes in a person who are not telling Truth. This technological amalgam can be a optimal solution for the lie detection in future days.

Keywords: non-verbal communication; body language; deception, lie detection

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Rubcrete an Alternative for Conventional Concrete

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Abstract

In this paper, the authors have discussed about the replacement of aggregates by discarded tyre rubber. This type of concrete is known as “Rubcrete”. Research over the last decade led to a conceivable answer for safe disposal of remnant tyre. The uses of Rubcrete are limited because of its reduced strength. By improving the mechanical properties of Rubcrete it can be used for advanced construction works. A trial study was directed to evaluate the possible practice of ground and scrap rubber as aggregate in Portland cement concrete. The main objective of this research is to gather the knowledge about the credibility of rubber addition and to assess the impacts of elastic particle size on the intrinsic features of the resulting concrete with new and hardened state and also to increase the workability of the concrete. With the water cement ratio being kept constant fine and coarse aggregate has been replaced with tyre rubber powder and chipped rubber and also cement has been replaced with silica fume. Change in the properties of Rubcrete over the conventional concrete, in hardened and fresh state such as slump, unit weight, air content, plastic shrinkage, mechanical strength have been discussed. Furthermore, durability studies have been conducted and mixes have been designed for M30 grade concrete.

Keywords: Rubcrete, Rubber; Chipped rubber; Silica fume; Rubcrete properties.

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Footsteps Power Generation by Piezoelectric Effect

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Abstract

2018!! We are still now largely dependent on the conventional sources of energy to drive us. They aren't going to be replenished soon; moreover a substantial amount of the energy required is wasted in the whole process of procuring them so as to reinforce them to use the lost energy to increase the efficiency of the whole process. The need for energy is growing day in, day out .So there is an immediate need to switch our main fuel source as the newer and cleaner Non-conventional sources of energy rather than the old Conventional sources which are responsible for various issues like global warming. Recently various advancements had been done in the field of production of energy through nonconventional sources. The perspective is to utilize the energy from the humans this time .We always lose a lot of energy from our body unused into the atmosphere vaguely. Here, the weight of the body and the force required to move here work as the elixir of energy. The use of piezoelectric sensor here converts the mechanical pressure into the electrical energy. The Present work aims to gather electrical energy by human footsteps. The piezoelectric sensors are mounted inside the sole of the shoes in multiple numbers. The pressure is exerted by the weight of the body and this pressure accumulates the charge particles inside cell which on being released is responsible for the flow of electricity. The electrical energy obtained from this is stored into battery for later use. The battery is portable and is attached to the ankle with the help of a belt and an indicator is attached to show when the battery is fully charged. The sensors used here are extremely compact and have no adverse effect on the environment .This technology finds its application in various fields other than this like placing the piezo-plates or crystals under the tiles in the footpath or railway stations or shopping malls and can be later used for street lighting, Household appliances, etc. By the use of multiple sensors larger requirements of energy can be harnessed like in public gatherings. This process is also suitable for powering a device remotely like in this case.

Keywords: *Piezoelectricity; Footstep; Mechanical pressure; Portable battery; Piezo-plates.*

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Wired-Up Roads

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Abstract

This dissertation examines the recent advancement of Electric Cars among the top automobile companies over the world. Due to their low local emissions, battery powered cars are more in demand than ever, but they still have a reputation for being too expensive and having too short a driving range.

So we came with an idea of recharging them without having to plug in cables, while parking or even driving on the road. By using the same technology we use in wireless charging of iPhone 8 plus in which the phone can be charged just by being placed on the top of a pad.

Working: An alternating current (AC) flows through a wire coil (the transmitter), which causes a magnetic field to switch between two directions at a high frequency. A second coil (the receiver) exposed to the magnetic fields picks up those oscillations, inducing an AC current in its own circuit, which is then used to power the car.

Electronic systems are able to handle higher frequencies, which allow more power to be transmitted, are becoming more affordable. Energy can now be transferred between coils that are increasingly further apart or aren't aligned accurately.

Some electric cars can already be charged by parking them on top of charging pads, which can be approximately 20 cm away from the receiving coil at the bottom of the vehicle. The next step is to wire-up the roads themselves with coils so that cars, buses, and even trucks could be charged while moving.

For peace of mind, wireless charging systems are properly shielded so that no animals or humans will be harmed. A coil in the road will only emit power when it is in wireless communication with the receiver coil above it, and the latter will absorb nearly all of it. The bit that is lost is mostly absorbed by the metal body of the car itself.

The path to wired-up roads

The construction work does not cost much. The biggest part of the cost comes from the construction work itself-or a new or renovated road, the extra costs are not that high.

Charging on the move isn't just a convenient time saver -it will also bring down the cost of electric vehicles themselves. Batteries that get recharged more frequently during usage will last longer and can be made smaller while retaining the same driving range.

For passenger cars, wireless charging will first come as a convenience feature. People will be able to park in their driveway or garage without having to plug in a cable, and will still have a recharged battery next time they need the car.

Experience with the technology and agreement on international compatibility standards will be prerequisites of such investment. Safety must not be ignored. The transmitter coil emits substantial power, which is only considered safe if it is in proper communication with receiver coil. Communication between transmitter and receiver must also be secured against accidental or even intentional interference- an aspect that even touches on cyber security.

Keywords: *low local emission; wireless; charging pads; convenience features; international compatibility standards.*

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Implementation of Foundation Field Bus in DCS for Thermal Power Plant

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Abstract

Foundation Fieldbus is a communication protocol which connects FF compliant instruments of a plant to DCS (Distributed Control System) so that we can monitor and control them remotely and it reduces a lot of cabling works. It's a fully digital, multi-drop communication system. In conventional analog control system, instrument generates 4-20 mA output signal which travels through marshaling racks, remote IO cards, RTUs to control system and similar for control signals to valve actuators and pumps. Lot of cabling is laid through Cable trays, conduits, cabinets, enclosures. Fieldbus allows multiple instruments to use a single cable instead of using individual one for the instrument saving significant amount of manpower and material resources. This is because many devices share the same set of cables in a multi-dropped fashion rather than requiring a dedicated set of cables per device as in the case of 4-20 mA devices. Moreover, several parameters can be communicated per device in a Fieldbus network whereas only one parameter can be transmitted on a 4-20 mA connection. Fieldbus also provides a good foundation for the creation of a predictive and proactive maintenance strategy. The 4-20 mA signals, however, has reached its transmission capacity limits. Process information is converted by the sensors into digital signals for the instrument microprocessor. After the signal is processed in the microprocessor, the signal is reconverted into analog for the transmission. This inefficient conversion process costs money and reduces signal accuracy. By contrast, a pure digital signal transmission offers broader bandwidth for plausibility checks and status signals. Fieldbuses are the most appropriate type of field networks for control and diagnostics in process operations. That's because fieldbuses provide highly reliable two-way communications between "smart" devices and systems in time-critical applications.

Power plant operators have been hesitant to replace proven hardwired technology with the field bus. The application of field bus technology only makes sense if the efficiency of the entire system is increased and total cost of ownership can be reduced. In order for customers to switch to the fieldbus, I&C vendors argue as follows: Advantages for the fieldbus technology in relation to conventional systems already occur due to the implementation of the system. The omission of I/O modules as well as racks and cabinets in the control systems reduce the hardware expenditure substantially. The associated savings balance additional expenditure for necessary components to operate a decentralized system. The application of fieldbus devices avoids the use of a large number of cables, cable routes, terminal blocks, and marshaling racks as well as costs of laying of cables, cable connection, and checking. Reduced hardware needs result in easier project engineering, fewer engineering hours, and less documentation. Also, upgrades require no additional cables or cable routes and thereby become more economical.

Keywords: *Foundation field bus; DCS; thermal power plant*

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Implementation of Wireless Communication in SCADA for Ash Disposal System

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Abstract

Due to the very fast development in automation system, the Wireless Communication is more suitable for transmission of information over a distance without help of wires, cables or any other forms of electrical conductors. The SCADA (Supervisory Control and Data Acquisition) facilitates remote operation, control and monitoring for industrial automation. This paper is for implementation of Wireless Communication in SCADA for Ash Disposal System in Bhushan Power & Steel Ltd. In this project the Ash slurry underground pipe line is 25 km long from slurry pump house to disposal mine. To detect the abnormality in normal run of ash slurry through the underground pipe line wireless pressure transmitter is used. For monitoring the leakage as well as blockage of the pipeline during flow of ash slurry, the pressure is monitored from SCADA system along the length of the pipe line. For this, suitable Diaphragm type pressure transmitters are installed at every 500 meters interval. The pressure transmitters are connected to the RTU at SCADA control room over wireless network. The pressure transmitters are wireless type powered through battery of suitable capacity and will be mounted inside the man holes along the pipe line. The transmitted distance of wireless network can be anywhere between a few meters (for example, a television's remote control) and thousands of kilometers (for example, radio communication). Some of the devices used for wireless communication are cordless telephones, mobiles, GPS units, wireless computer parts, and satellite television. But here the maximum distance is 25 km. The entire activity is control through SCADA located in control room. In supervisory control, it is required to monitor multiple systems from a central location, so a communication network is required to transport all the data collected from sensors. The SCADA system is designed based on client-server architecture using Windows operating platform over Ethernet TCP/IP LAN. The system has graphical user interface for visualization and operator guidance with dynamic mimics. The system configuration is comprised of state-of-the-art RTU to be located at SCADA Control Room. The SCADA has one master terminal unit (MTU) which could be called the brain of the system and one or more remote terminal units (RTU). RTUs are microcomputers that communicate with an array of objects such as factory machines, HMIs, sensors, and end devices. An RTU may consist of one complex circuit card consisting of various sections needed to do a custom fitted function or may consist of many circuit cards including CPU or processing with communications interface(s), and one or more of the following: (AI) analog input, (DI) digital (status) input, (DO/CO) digital (or control relay) output, or (AO) analog output card(s). The RTUs gather the data locally and send them to the which then issues suitable commands to be executed on site. A system of either standard or customized software called SCADA software which is process, distributes, display the data, interpret and manage the data & Issues controls accordingly (either automatically or at the request of human operators).

Keywords: SCADA; Wireless pressure transmitter; Ash slurry

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Development of IoT Based Air Pollution Detection and Monitoring System

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Abstract

The concept of INTERNET OF THINGS for real time monitor the air quality is one of the significant area of research and the different values of different pollutants present in atmosphere as well as the current temperature and humidity can be done .IoT (Internet of Things) is an advanced automation and analytics system which exploits networking, sensing, big data, and artificial intelligence technology to deliver complete systems for a product or service. These systems allow greater transparency, control, and performance when applied to any industry or system. IoT systems have applications across industries through their unique flexibility and ability to be suitable in any environment. They enhance data collection, automation, operations, and much more through smart devices and powerful enabling technology.

The primary objective of the work is to develop low cost air pollution detection and monitoring system and interface it with IOT compatible devices so that proper data analysis can be done eventually. In this paper the authors have explained about the developed model of IOT Based Air Pollution Monitoring System where the Air Quality is monitored. Here the information from the sensors are send to web server using internet and will trigger a alarm when the air quality goes down beyond a certain level, means when there are sufficient amount of harmful gases are present in the air like CO, smoke, dust, LPG. The air qualities in PPM on the LCD are shown and as well as on webpage the sensor parameters are monitored. This device is intended to provide the user with a cost-efficient means of determining air quality. Our sensor focuses on the five components of the Environmental Protection Agency's Air Quality Index: ozone, particulate matter, carbon monoxide, Sulphur dioxide, and nitrous oxide. The system is able to detect many pollutants except Sulphur dioxide. The device also includes a town gas sensor to alert the user to gas leaks or the presence of flammable gases. Furthermore, a temperature and humidity sensor is included as these conditions can impact the performance of the gas sensors. The calibration of the device is yet to be reported, extraction of data from sensor data sheets to make some preliminary estimations are executed and showed a satisfactory result. The sensors used are relatively inexpensive and vary greatly from component to component so they need to be calibrated with known concentrations of the target gasses. We have not yet had the opportunity do so. This is found to be very useful to find out the exact amount harmful gases in our surroundings. If it is implemented in a large commercial scale, it can be very helpful to control the air pollution .We can monitor the pollution level remotely from anywhere. Mainly, the researchers get the information of the gaseous pollutant by monitoring periodically .This system is cost efficient, so that can implemented with less effort.

Keywords: *IOT; PPM; LCD; Air Quality Index; temperature and humidity sensor*

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Integration of Intermittent Renewable Energy Sources In Grid With Optimum Pricing Using Particle Swarm Optimization

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Abstract

Incorporation of Renewable Energy sources such as wind and solar are quite challenging in terms of intermittency of generation, also standardizing the operating condition and the main challenge being their characteristics which disorganize the daily operation of electric grid. This paper presents an integration methodology of solar and wind energy Sources with modern power system in Smart Grid infrastructure to revamp the quality of electric power supplied and to optimize the cost of generation. The methodology ensures optimum utilization of the available resources in the smart grid infrastructure such as generator characteristics, demand response, RTU data for optimizing load curtailment, cost of generation, voltage profile. A Doubly Fed Induction Generator model has been used for wind turbine and with an approach of the incremental cost for the wind speed and incident radiation on solar panel as per NASA Surface Metrology and Solar Energy, the method effectively incorporates these nonconventional sources into OPF. For testing the methodology is worst possible conditions a 'Demand sensitive loss factor' (DSLFF) has been developed to identify the weakest bus of the system and subsequently the same has been loaded with active and reactive power loading. The simulation results of the system in intermittency of RES, worst possible loading and transmission line contingency reveals encouraging solutions for optimal scheduling of both generation and the demand side. The results are presented with integration of Renewable Energy Sources to demonstrate the performance of the system compared to conventional optimisation technique. A stochastic optimisation method has been used to convert the obtain a global solution to a complicated objective function in IEEE 30 bus.

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Development of DC Motor Speed control System Using Fuzzy Logic

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Abstract

Now in days in industry virtual instrumentation concept is very innovative idea because its consume money as well as reduces time and manpower. In industry DC motor is an important parameter so here we are develop the concept of controlling DC motor speed with in various ranges using fuzzy logic based on MATLAB. When we trying to control the DC motor speed manually then we can't get various range that means we can't control the motor speed in various range that for we developed the DC motor speed controller using fuzzy logic on MATLAB. We use the concept of fuzzy logic because we can get various ranges for control the speed of DC motor.

In our project we are controlling the speed of a DC motor with the help of Fuzzy logic using MATLAB. Here we are displaying the speed of the DC Motor at three different stages that includes Low, Medium and High speeds being controlled by the same.

The components being used in our project are as follows: 1. 12volt DC Motor 2. Inductive type proximity sensor 3. DAQ (Data Acquisition System) 4. Motor driver 5. Software- MATLAB .We have initiated our project by fixing the DC Motor on a strong cardboard using a clump and attached a metallic screw in the front knob of the DC Motor. For further progress of the project we have also fixed the inductive proximity sensor on the same cardboard using another clump so that the DC motor lies within the range of our inductive proximity sensor. Our circuit involves supplying power to the motor driver with the help DC current from power supply as a result of which the driver makes the motor rotate. Now the speed of rotation is detected by the proximity sensor that generates an Analog signal and sends it to the DAQ which in return converts the Analog signal into digital signal. This digital signal from the DAQ is sent to the Personal Computer where the actual speed of rotation is displayed on our software MATLAB. The software part involves declaring Voltage range of the rotation of DC Motor that will lie within 12volt to 20volt. Also stating the RPM (rotation per minute) of the rotation of DC Motor that will lie within 2500 to 4000rpm. Then we need to the conditions for FUZZY LOGIC on our software MATLAB. As discussed above the three conditions are: 1. When the speed is high the Voltage is low 2. When the speed is medium the voltage is medium 3. When the speed is low the voltage is high. Further the system can be more developed and the controller can be developed to neural based or neural fuzzy based controller.

Keywords: *FUZZY Logic; MATLAB; DAQ; rpm; proximity sensor*

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New Trends in Robotics for Agriculture

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Abstract

In the not-too distant future, our fields could be tilled, sown, tended and harvested entirely by fleets of co-operating autonomous machines by land and air. They will be working both day and night. Driverless tractors that can follow pre-programmed robot are already being deployed at large farms around the world. Today the demand is so strong for the electricity, so we have to find other ways how to produce it. Solar energy is a free source of energy. Agricultural fields are always associated with sunlight. The authors have developed an agricultural robot which has some good features like compactness, low cost and reliability. The device is operated over using sunlight; at it have solar plate in its structure. It has capability to plough the land, spread water and fertilizer. The system includes pH detector which will help to measure the pH of soil. The driving force behind this work is to reduce the human interference in the field of agriculture. Its efficiency is very high and it will be operated over solar energy. So, there will be also save our electricity. An on board solar-powered battery gives 10-12 hours of charge, so with a change of battery, it can work day and night. This type of pre-programmed robot can work on steep slopes without falling over and injuring the driver. As per research data available, we will need to produce 50% more food by 2050 if the global population continues to rise at its current pace. But the effects of climate change could see crop yields falling by more than a quarter. So this type of agricultural robots could help farmers produce more food, more sustainably at lower cost. This type of robots used to automate manual tasks, such as weed or bracken spraying, where the use of tractor's and other manned vehicles is too dangerous for the operators. So we have to grow agricultural robotics sectors in our country for more benefits. Autonomous robots are intelligent machines capable of performing tasks in the world by themselves, without explicit human control.

The primary objective of the device is fulfilled and more advanced device can be developed further which can work in industrial domain as well as in domestic usage. The system can further be advanced with IoT enabled features which can be remotely access by the users.

Keywords: pH detector; solar plate; Agricultural Robot; Pre-programmed Robot.

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Role of the Learners in Communicative English Classroom

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Abstract

The role of the learner in Communicative English classroom is of pivotal importance. "Learning is an episode in which a motivated individual attempts to adapt his behaviour so as to succeed in a situation which he perceives as requiring action to attain goal" (Robinson and Horrocks, 1967, P. 232). Unlike other fields of studies, the role of the learner is different in language classroom. Language cannot be taught, it has to be learnt. In traditional language classroom the teacher instructs, trains and teaches communicative English. In modern ESL classroom, the learners are motivated to develop communicative competence. The ambience of the classroom fosters the learners to learn and communicate in English. Unlike the old chalk-and-talk method, the learning environment today is technology driven and rapidly changing. The education system focuses more on the role of the learners than the role of the teacher. Collins and O'Brien propose a Student-Centred Learning (SCL) system that "is an instructional approach in which students influence the content, activities, materials and place of learning. This learning model places the student (Learner) in the centre of the learning process." Through this paper, modern research work on learners' role in ESL classroom has been analyzed. Various factors that influence the learners' roles in the learning process in a language classroom like motivation, attention and aptitude, etc., are also taken into consideration. The role of the learners, their tasks, their attitude to language learning, the opportunities available to them in the simulated linguistic environment, etc., are taken into account for the development of communication skill of the learner. Modern theories of ESL teaching/learning such as Functional Communicative Approach and Task-Based Language Teaching (TBLT) have been involved in this research paper. Unlike other fields of information-based studies, language teaching/learning requires different pedagogical methods and approaches. Task-Based Language Teaching (TBLT) focuses on the activities that involve real communication: an activity in which language is used for carrying out meaningful task. Language that is useful to the learner stimulates the learning process. Functional Communicative Approach too stresses on the importance of the active participation of the students in interactional language learning process in a classroom. Clarity, brevity and accuracy in hearing and speech are important. Speaking is "the process of building and sharing meaning through the use of verbal and non-verbal symbols in a variety of contexts" (Chaney, 1988, P.13). For the development of the speaking skill various tasks and the roles of learners in ESL classroom are identified. The role of the learners in various tasks like group discussion, brain-storming session, story-completion, word games, reporting and picture-description has been discussed. The behavioural aspects of the learners like their motivation, attention and aptitude and relations of these with the role of the learners in learning English as a second language have also been discussed in detail. The guidelines are however not prescriptive in nature rather the role of the learner is based on the cognitive theories of language learning that requires the active participation of the learner in the process of learning.

Keywords: *Role of the learner; ESL teaching/learning; Communicative English; Student-Centered Learning (SCL); Functional Communicative Approach; Task-Based Language Teaching (TBLT)*

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Language as Performance: Using Stanislavsky's Method Acting for English Language Teaching/Learning

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Abstract

English language teaching/learning process demands a psycho-physical stimulation of both the teacher and the learners. This paper aims to combine Stanislavsky's acting-manual *An Actor Prepares* with modern methods and approaches of ESL learning to make the learners capable of responding to multifarious linguistic situations that they are required to face in their life and professional fields. In the context of twentieth century the use of English language is not confined to syllabus and four basic skills required to excel in academic or professional fields. Even to sell a commodity or receive an order, for marketing and negotiations, for billing and financial transaction, or for social networking and public interactions, different types of English, different communication channels, and different mediums of communication (both verbal and non-verbal) are used. The field of research combines performance studies with psycho-linguistics and non-verbal communication (body language) for effective preparation of technical and management students to face different types of linguistic situations. The focus of the pedagogy has to innovate upon the traditional LSRW skill-training of the students and work through simulation of problem-solving linguistic environment where English language is the main medium of performance. Such simulation of activity-oriented situations effectively stimulates the mental and physical capabilities of the learners for a long-term benefit. The whole process involves the stimulation of mind and body through effective coordination of thought and language, input and output of language and interactional skills of the learners. These four basic skills – listening, speaking, reading and writing – are inculcated through a cognitive process that involves an internalization of language. Such internalization can effectively work upon the mind and senses of the learner whose linguistic behavior becomes naturalized like a competent actor who can switch over from one role to another by coordinating thought and action. Stanislavsky's Method Acting model can be used in the language learning classroom effectively for such a coordination of thought and language, mind and body, input and output. Language is basically a performance and through this paper a bridge between classroom pedagogy and actor-training method introduced by Stanislavsky has been made. The learners can thus play effectively of any stage of the world using English language for performance in life and profession. The students will be able to handle any situation in their practical life where thought must effectively coordinate with language with competence and speed. They would use their experiences to overcome any form of communication barrier through this process. This course delivery would demand more active participant of the learners the classroom and the teachers would show the path instead of prescribing rules. This method will have a positive impact on the learner and increase confidence and control on the use of both verbal and non-verbal communication. The learners would be motivated to use English language with élan like the uses of English as first language and never suffer from a stigma of incompetent communicator. The functional communicative purpose of English language shall be served along with the development of personality and intellect of the learner.

Keywords: Performance; Actor-training; psycho-physical communication; Method Acting; Stanislavsky; Cognitivism

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The Role of a Teacher in 21st Century Communicative English Classroom

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Abstract

The role of a teacher in a language classroom is multidimensional. The teacher should act not as an instructor but rather as facilitator and guide. The objective of this paper is to analyse the role of a teacher in a Communicative English classroom for the development of four basic skills of English language of learners of English as a Second Language (ESL). Keeping in mind, the new challenges in an age of ICT revolution which has made English language learning and teaching more popular and challenging than the previous era, the paper proposes to focus primarily of the role of tech-savvy English language instructor of modern age. Motivation plays a vital role for active and effective participation of the learner in a language class. The desire to learn the language for facing the challenges of the technocratic and corporate world should be properly inculcated and materialised among the learners of the technological and management course in India to reap the benefits of English as an international language. All the professions in a globalised world require linguistic competence specially in English. English has become the language of science, technology, economy, higher education, etc. The role of a teacher is to make the learner competent in four basic skills – listening, speaking, reading and writing (LSRW). These four basic skills can be developed with the active participation of a language teacher and the role of a teacher is as much pivotal as the active participation of a learner.

Through this study different aspects of teacher's role in ESL classroom have been identified: the teacher acts as a facilitator, maintains proper classroom ambience, has a knowledge of using teaching materials and aids, is tech savvy, creates confidence among the learners, allows the learners to use English in a simulated linguistic environment, and allows the learners to absorb intelligently the four basic skills of language. The teacher has to make the class learner-centric, rather than teacher-centric. To kill the monotony of instructional training and stress of memorisation the teacher is required to be flexible, playful, and entertaining while keeping in mind the main goal to improve the four basic skills of the learners. A major obstacle for effective output of language is the interference of mother tongue or First language. Using innovative methods and approaches the teacher can minimise mother tongue interference. A language teacher has to face the challenges of a rapidly changing linguistic environment and prepare the students to meet these challenges. In order to make the learner competent in target language (ESL), the fear-factor among the learners must be minimised through motivation and confidence building. The teacher must involve all the learners in task-based activities so that the fear-factor disappears. The teacher has to work as a motivator and role model. The innovative role of a facilitator in a language classroom is absolutely different from the role of a traditional teacher as an instructor and examiner. The activities that a teacher introduces are to be well orchestrated keeping in mind the composition of the class. In a traditional classroom, the learners are always in a firm grip of a teacher, while in a modern learner-centric language classroom the teacher is required to be strategically flexible. In the context of 21st century, a teacher is expected to overcome the obstacles of conventional teaching methods that are exam-oriented and prescriptive in nature.

Keywords: *Learner-centric teaching; ESL; Communicative English; classroom activities; teacher's role*

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Influence of Modern Technology and Media on English Language Teaching

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Abstract

21st century is the age of technology and today technology has become an integral part of our daily life. We even cannot think of leading a life without the help of technology and its tools. The main focus of this paper is to investigate that how technology can be used for the betterment of English Language Teaching. English is considered as the second language of India. It has become a kind of necessary for our people to learn English not only in order to compete in the job market but also to make them competent enough to communicate in English.

The main benefit of teaching with the use of technology is that it helps to grow interest among the students about the subject. Use of technology actually helps to break the monotony and boredom of regular routine basis learning with the help of books, notebooks, boards etc. Using new ways of teaching also helps to grow curiosity among the students about the new process and they become more enthusiastic about learning. The use ICT with electronic gadgets such as mobiles, tabs, laptops, radios, etc. help us to connect with the world very easily. Technologies are even more authentic in some cases because they get updated on a regular basis. Using technology we also get to know about the viewpoints of different people spending minimal time.

The main focus of any language teaching course is to develop the four basic skills of the learner which are the listening skill, speaking skill, reading skill and writing skill. English language course is also intended towards such goals and using technology helps to develop the four basic skills of a learner very easily. For example in case of listening skill using technical tools such as mobiles, laptops and with the help of medias like you tube, iTunes etc one can easily develop his/ her listening skill. We can even use various apps to develop our pronunciation which also helps to develop our speaking skill. In case of reading skill development we can surely refer to PDF, EPUB software and many reading apps. And finally we can refer to software and apps like MS Office which through error connection helps to develop our grammar and vocabulary and ultimately our writing skill. Not only necessary for the LSRW development but using technology in case of ELT also helps to develop the personality of the learners.

There are some disadvantages also like when technologies are used those people who have easy access learns fast than those who don't have access, in some cases using technology also increases the gap between the teacher and the learners. Those disadvantages mentioned can easily be avoided if technologies are used wisely and in a proper manner. So the aim of my paper is to deal with the influence of modern technology on ELT and it also deals with the process of using technical tools and media.

Keywords: ICT; Communicative English; Technology; Use of gadgets in classroom; LSRW development

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Communication Skills: True Success in Time of Change

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Abstract

Communication means putting one's idea across to audience. It is an interdisciplinary concept as it is approached from different fields such as linguistic, psychology, mathematics, etc., enabling us to transmit and share facts, ideas, feelings, and attitudes. These acts help us not only to communicate but also to influence each other in various ways. Effective communicators enter professional situations in a well groomed manner; they take care of their personal appearance; walk confidently in a business like manner; use graceful gestures; maintain elegant sitting and standing postures; use hand movements to emphasize their ideas; display conviction and friendliness through their facial expression; maintain eye contact with their listeners throughout their speech and presentation. The ever changing impact of technology and style of management pay so much attention to soft skills. It has become absolutely essential for the success of the organizations and the individuals. Interpersonal Skills, these include the ability to lead, motivate and delegate. They are important at every level of organizational responsibility and should also be evident. Success in professional life comes with verbal and non-verbal communication, problem solving ability, decision making, assertiveness, listening skill, work under-pressure and adaptability. Skills such as listening, collaborating with others, presenting ideas and communicating with team members are all highly valued in the modern workplace. Hard Skills on the other hand, are more along the lines of what might appear on one's resume – your education, experience and level of expertise. The art of talking to anyone considers important as it shows your manners. Etiquette is a code of behaviour that delineates expectations for social behaviour according to contemporary conventional norms within a society, social class, or group. Non-verbal communication includes aspects such as body language and paralinguistic features. The paralinguistic features of communication such as volume, voice modulation, pronunciation, articulation, pause, etc. create the right kind impact on our listeners. Maintenance of Oculistics (facial expression), Kinesics (body language and gestures), Haptics (touch), Proxemics (space), Chronemics (time) plays crucial role in our modern day world. With every passing year, challenges the new generation to face escalate multi-fold. Skills that gives you confidence to step forward and fight for your dreams. It gives confidence to make the first step, and start striving towards success. Developing your communication skills can help all aspects of your life, from your professional life to social gatherings and everything in between. The ability to communicate accurately, clearly and as intended, is a vital life skill and something that should not be overlooked. It's never too late to work on your communication skills and by doing so improve your quality of life. Communication is a two way process, so improving communication involves both how we send and receive message.

Keywords: personal appearance; modern workplace; etiquette; life skill

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Can Indian Classrooms Go Mobile? : Exploring Trends and Scope of M-Learning in Collaborative Language Teaching

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Abstract

The basic essence of Collaborative Learning, noted by The Centre for Teaching Innovation, Cornell University, is grounded on the idea that “knowledge is a social construct”. It is a student-centred method of language learning where the teacher performs the role of a facilitator, rather than an instructor- an approach that involves learners in peer-group activities and intends to expose them to real-life situations which will develop in them faculties of critical thinking, logical reasoning. M-Learning or Mobile-Assisted Language Learning (MALL), a successor to Computer Assisted Language Learning (CALL) is one of the most recent trends in Collaborative Learning where language facilitators are harnessing the technological mobility and user-friendliness of these user-friendly gadgets to restructure the curriculum of language learning. Developed by the Stanford University learning lab in a Spanish learning program in 2001, there has been a consistent interest regarding the scope of MALL among language teachers and curriculum developers. With innovations in mobile phones and its mass availability, MALL is being seen as the future of language learning where mobile phones, presently a platform for delivering contents will participate in retention, utilization and honing linguistic talents of the learners.

Mobile Assisted Language Learning, as its name suggests, foregrounds a smart, mobile, ubiquitous approach and calls for effective content designing and teacher-training to ensure maximum student competency. The process of language teaching takes into account pre-learning objectives, curriculum and content design and evaluation of the language skills so targeted- with M-Learning, the entire domain of teaching- learning is undergoing a rapid change. Educational apps, e-books and e-libraries and academic podcasting form an integral part of MALL, but the real problem that has been identified is appropriate course design and effective teaching methodology. In a Beginner’s Guide to Mobile Learning in ELT, Amy Lightfoot explores opportunities for learning English by using mobile phones both inside and outside the classroom- targeting both productive and retentive capacities of a language learner.

My article intends to explore recent trends in MALL and how it is constantly evolving to cater to rapidly changing learner’s needs and expectations from language learning. The article will locate the growth and evolution of Mobile Assisted Language Learning, its trend worldwide and most significantly, attempt to assess its scope in Indian classrooms, keeping in mind the wide range of diversity that typifies and characterises it. It will try to explore present trends and innovations in the language classrooms of India and examine the scope of appropriate content preparation, instructional methodology and evaluation techniques that can be harnessed by the smartness of new-generation mobile phones.

Key words: Classroom, Collaborative Learning, Curriculum, Language Learning, Mobile-Assisted Language Learning.

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Innovative Learning Methods in English Language Learning

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Abstract

“Learning is not a spectator sport” – as goes the saying. The process of learning should not be bound within the four walls instead, it should have a realistic connection with the marginal world. So, we need to experiment with the innovative methods of learning that will gradually improve the status and also the skills of students. With the passage of time, the learning and adapting systems are also changing. Use of creative tools can be a boost to the thinking process of the students in learning the English language.

Students remember 90 percent of the work when they do it themselves. The mentors should advice the students to watch English movies and plays (for instance Shakespeare’s and Bernard Shaw’s stories may be suggested) for learning purpose. They can also listen to English songs as a mode of entertainment. Relating to the real-world learning, field trips can be arranged so that students gets the exposure to get outside the four walls of the classroom and get connected to the outer world. Demonstration of English journals can be presented in class for skill development. Excursions may also be arranged where the students will get to interact with people from various communities and also from various parts of that city and will be able to acquire the good hold of the knowledge of the condition of English language in various places and for local languages as well. Workshops should be arranged where very famous personalities from literary background or can visit and deliver the students the information which they can implement in their lives. Applications can be developed which will contain ample information regarding various writers and poets and also about the stories, plays, poems and novels written by them thus helping the students in improving their English language. Various puzzles and games related to English language like riddles and brainteasers can be introduced to students which will help them to know about English words and also increase their vocabulary easily without any hassle.

Thus, the need for introducing such innovative learning methods is very essential to motivate the learners to get acquainted with the language as it is the one and only standard mode of communication compared to other languages. It is very important for English language teachers to implement innovative ideas in their teaching process as still now in India, most of the students learn English as a second language. The authors in this paper takes an effort to experiment with different innovative methods of learning which is expected to help the students in understanding the English language in a very flexible way. This paper aims to bring out the scope for English language learning with the help of real life experiences by using different apps, fun games and field activities.

Keywords: Excursion; App; Workshop; Real – World Learning; Puzzles and Games

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Making of a Young Corporate Professional: Role of a Language Teacher in Developing Professional Communication and Corporate Etiquettes

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Abstract

English as a Language has always been an effective foreign language for several reasons and distinct conventions. Communication skills are a part of its dynamic nature and almost everyone recognizes and accepts the prominent and paramount international significance of English Language. This wide recognition is primarily because of the international acceptance and usage of English language in all over the world. But in the modern scenario, its importance has increased to a complete and indispensable subject of study for technical and management students or professionals. If someone is not proficient in this skill that will certainly create some inadequacy in one's professional as well as social and personal life. Therefore mastering the art of communication is of paramount importance in today's world of rigorous competition especially in professional spheres. Adequate knowledge about techniques and field related skills are important but insufficient in today's corporate world, if an individual wants to sustain and excel in this era, Communication skills play an imperative role in the life of professionals. Multi-National Companies are taking rapid strides with their head offices in one country and are prospering with their ever growing number of branches in other countries. All this has been possible only because of the international presence and acceptance of English language as one of the prime concerns of its employees. The countries which have recognized the importance of English language have definitely become superiors in the revolutionized business scenario. The importance of understanding nonverbal as well as verbal communication has been emphasized by social scientists for decades. Experts in the field describe nonverbal concepts to explain conflict in behaviours and guide practitioners to adapt the techniques in an efficient manner. Professional authorities in Multi National companies always expect that their employees should possess good communication skills along with strong leadership skills. The success of the employees depends on the effectiveness with which they absorb and spreads information with an amalgamation of uniqueness and proficiency. In this era of globalization, we have to communicate globally to negotiate, to deal and to reach out the targeted audience. The ability to communicate effectively with others having some knowledge in corporate etiquettes will certainly be an advantage for the young professionals. Corporate etiquette is the connecting link between academia and technical skills which are referred to as a set of rules that allow communication and interaction in a civilized manner. It encompasses not only a refined professional attitude but also appearance, the ability to influence with an individual representation.

Thus, mastering effective communication skills along with knowledge in corporate etiquettes allow the students to have almost full control over how others perceive them in the corporate environment. This paper strives to explore how a language teacher can enhance the overall development of the students to become young corporate professionals by incorporating multiple skills.

Keywords: *EFL; Communication Skills; ELT; Corporate world; Corporate Etiquettes*

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Whose Language Is It? : Role of English in Constructing Students' Manners & Behaviours

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Abstract

The anti-hegemonic spirit of post-colonial studies notwithstanding, the fact cannot be denied that in the age of globalization, more than the previous couple of centuries, English is unanimously conflated with rationality, knowledge and modernity.

The language has become the daily bread earner of the society. We cannot deny the fact that English language has adopted the Lingua-franca and has become the status symbol of modern times. During the time of liberalization and privatization, the world has become a global village. Modern business oriented professional market demands employees who are efficient in English.

While knowledge in English is essential to survive in a globalized socio-economic spectrum, there is also a tendency to associate English with 'good sense' and 'good behaviour'.

With knowledge of English, people also develop a false sense of superiority. Among teenagers especially it becomes quite evident when they look down upon their friends who are not well versed in the language and try to shun them out of their lives.

These days, educational board like the Central Board of Secondary Education & Indian Council of Secondary Education gives a lot of focus on the English language while framing its curriculum.

Thus students studying in schools under these boards are groomed to talk, speak and even think in English from a very young age. Vernacular languages are rejected and at times there are even penalties for its usage. Quite naturally, after a while some students develop a psychology that the language itself is the tool to succeed.

Eventually students coming from vernacular and English medium have a stark difference towards their approach to the language. This diversity at times also depends on the socioeconomic status of the individual. In other cases, it depends on the way they are introduced to it.

However, because of this varying approach some students get to ride up the ladder of success quicker than those who fail to grasp the same. Those who start lagging also have to cope with peer pressure and that creates an inferiority complex within them. That creates a fear among them that limits them from learning the language and also using it.

As far as communicating through the language is concerned, there are many who are inclined towards a shy behavior and can't speak when they are in the limelight. Also in many cases it's not that they don't understand the language. Rather it's because they are unable to make themselves understood to other through the given medium.

Keeping in mind these perspectives, the paper would seek to explore the difference (or similarity) in which students coming to engineering institutes, from vernacular schools and English medium schools, approach English and the sense of superiority that comes along with it.

Keywords: globalization; superiority; approach; behavior

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Communication Perspectives for Engineers

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Abstract

The man-made world which consists of machines and devices arouses curiosity in the mind of people. People often ponder over how a machine operates. They also think that the creators of these machines must have been magicians. And the reason grows along their age. Despite this, people still believe that engineers are the last remaining practitioners of this art in an increasingly modernized world. They continue to captivate and amaze the world with their creations. An engineer needs to work not only with machines but with people too. There are a lot of surveys made that reveal apart from an excellent academic result, employers look for someone who possesses good communication skills along with required domain knowledge. The ability to communicate effectively builds rapport, convinces others of one's position or ideas without alienating them, and gets along with a wide variety of people. It also helps a professional to be an effective contributor in a team and lead team to achieve their goals with exceptional outcomes. Engineer is not one who only stuffs their life with equipments because success of an engineer does not depend only on man-machine interaction but also on interaction among human beings. In different stages of their life engineers are intricately embedded with communication and its associate skills. In the whole process of being a professional and a responsible citizen an engineer's life and career are significantly depended on effective communication skills. Engineers have to communicate on daily basis – with each other, with supervisors, with employees in different departments, and even with clients. Their work is complex and technical, but not everyone they work with has the same technical expertise, which makes the situation more intricate and thus, enhances the importance of good communication and interpersonal skills among the workers. Now - a-days the lack of employability factors in engineers has become a serious concern for employers. It is not that they are technically not sound but they lack in communication skills. As communication is the life of all the organizations, labourers or employees give considerable value and respect to those engineers who have a set of skills. Problem solving, management skills and so on require good communication skills. Students often fail to understand the importance of communication in the corporate world and ignore communication skills which can endanger understanding. Importance has been placed on communication skills internationally. Knowledge is necessary but this needs to be presented in a correct manner which is only possible by means of good communication. An engineer with good communication skills can handle situations more easily than an engineer with great knowledge. Proper communication skills are keys to success for any team building or team work. Communication skills are the biggest factor to determine the success or failure of an engineer. This paper strives to present the fact that effective communication is an integral and indispensable part of an engineer's professional life and how it can prove itself to be a crucial factor in both success and failure of a professional.

Keywords: communication; interpersonal skills; employability; engineers; teamwork

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English Communication for Professionals

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Abstract

English plays a vital role in our everyday lives. We may say that English is a global language. All the professions throughout the world needs the help of English communication. Communication is a process of expressing ideas, thoughts, feelings, expressions etc in English. We can communicate in many languages but communication in English gives an extraordinary look. This does not mean that people should forget their mother tongue. This means that English should be used in professions.

The professionals like doctor, engineers, lawyers, teacher, professors and other students from general streams go through a busy lifestyle where they do not have enough time to think about language. They forget that apart from the skills in their own fields, there is another skill called language skill. For presenting a topic in front of the audience they need the help of English. Communication in English is based on technical communication. The types of technical communication are:

- **Subject competence:** In order to place the actual view of the person in a competent area English communication is necessary.
- **Linguistic competence:** More the person listens, speaks, read and write more the linguistic development will occur which will help the person to compete with others.
- **Organizational communication:** Organizational communication occurs in professional areas where certain meetings, seminars, conference etc takes place. More the person develops his or her communication skills more he or she will succeed in their own fields.
- The importance of audience is necessary while communication . The receiver's point of view must be respected. Effective planning and script writing is very much essential before communication.
- But today also many people tumble while communicating in English. If the person does not take immediate action to improve their communication then having degree also they will be defeated by others who know English communication.
- Here are some suggestions to improve English:
- Vocabulary can be increased by-
 - **Listening to music or watching movies:** Collect new words from English songs as well as English movies which can increase vocabulary.
 - **Speaking:** No matter how many times the person stuck while speaking they must stand in front of a mirror to concentrate and talk to themselves which will gain confidence in the person to speak in front of the audience.
 - **Reading:** Reading story books or English newspapers may help to increase the vocabulary. This will occur by underlining unknown words and finding out the meanings from dictionary.
 - **Writing:** In leisure time one can consider themselves as an author and practice writing stories or about a situation in their lives in English language.

There is a proverb called "When there is will there is a way". If the people listen, speak, read and write then they will definitely succeed in overcoming the problems related to English communication. This abstract expects to help the professionals in gaining competence in English communication.

Keywords: Global language; Technical Communication; Linguistic competence; Organizational communication;

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Body Language: A Vital Aspect of Communication

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Abstract

In the world of communication, Body Language is one of the most important parameter. Body Language is a part of Non-verbal Communication Skills and is a way of expressing a certain meaning in a kind of silent language by its elements such as eye contact, gestures, posture, smile, movements, and expressions which are important medium through which people communicate with each other. In the EFL teaching, teachers can use the bodily movements to create a vivid and realistic atmosphere in the classroom, and make the teaching-learning interesting.

Our body movements express our actual inner feelings by the way we sit, stand, and move, etc, which is more prominent than by words. Our body send out messages constantly, and often we communicate a lot more than we realize. Foreign language teachers need to be more expressive and should not simply deliver the lessons by standing on a dais, rather should move amongst the students and make them feel comfortable. If the teacher can use Body Language appropriately, accurately, and proficiently to assist the teaching process in the classroom, it can not only draw the students' attention and bring up their own study interest, but also enable them to develop accurate understanding of language contents, and make them build their knowledge by themselves consciously.

Eyesight, Countenance, Gesture, and Manner are the four key attributes of Non-verbal communication. Body Language will help determine whether the teachers successfully gain and hold the student's interest. The importance of non-verbal communication is vital when we come across a different culture, especially in situations when we do not speak the language very well and we need to use our expressions in order to give support to our word stock. Sometimes the signals sent through body language are not very clear; however, we should not ignore the power of non-verbal communication. These minute gestures can have even powerful meaning than one may assume in comparison to their own culture. Therefore, we should focus on the body language and try to interpret even the minute detail in the non-verbal communication of an individual.

This paper will focus on certain aspects of body language with reference to gestures, postures, facial expressions and eye contact. This work aims to blend the non-verbal cues with the verbal communication at the time of classroom lectures and it is expected that the sessions designed in this concept will make the teaching more effective.

Keywords: *EFL; Non-verbal communication; Body Language; EFL*

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Unaccustomed Ways to Learn English

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Abstract

In 21st century the third mostly used primary language English has enriched the culture, broadened our outlook on life and abolished the communication barrier in the third world country like India. Nearly there are 375 million people across the globe and more than 50 English speaking countries, where English is either the official or the primary language. So this is being one of the main reasons that English should be learned. A language that is so widespread and popular it is used in every aspect of our daily life but in India very few, just 1% of the population can speak English with good mastery. But, much bigger population, say of Indians can understand English and can speak English in everyday situations with limited proficiency. Ever wondered how we can acquire the language by not only studying the fundamental text and grammar books but also by watching movies, cartoon (for kids), and listening to songs as well.

In today's world any language can be learned with sheer concentration and bit of hard work. The ways by which we can learn English is by using the most valuable senses i.e. seeing, listening, and speaking. We may start off with reading short stories as they help in building concentration and one's interest towards the language. Also, one may take a self target to complete reading a book within a scheduled time. Then there are thousands of movies through which we can learn and speak English. Watching movies also promote accent enhancement and contribute to the development of vocabulary. The learners in the elementary level can be given tasks of watching short length English movies along with subtitles and they may try to repeat what is being said in the movie. In this way one can catch up that accent. Then go onto movies with larger time period and choose the genre of their preference. Let us consider detective films as our domain. After watching ten or twenty movies, we'll start to learn vocabulary related to the context or subject of the film and also keep a notebook near and note down the words whose meanings are unknown. Then after few days the same exercise may be tried without the subtitles. An effort should be taken to use such words in our everyday life. Listening to songs in English also helps one because it give one knowledge of a cultural heritage, idea of how to express, culture and knowledge.

This work is based on our practical experiences of learning English in an unaccustomed manner. To start with movies like A BEAUTIFUL MIND, THE IMITATION GAME, THE MARTIANS and also some songs like BEAUTIFUL DAY (by U2), OUR HORSE (by madness) and GET UP STAND UP (by Bob Marley) can be used. As melodies goes into one's mind faster as compared to monotonous lectures, thus it would also help to generate learner motivation towards the subject. There is considerable scientific evidence that demonstrates how music and movies can help second language learners to acquire grammar and vocabulary and improve spelling. These methods discussed above might open up further scope of research work which will lead to learning of English language beyond the classroom through innovative methods.

"If you are not willing to learn no one can help you. If you are determined no one can stop you."

Keywords: *English songs; movies, story books; vocabulary building; accent development*

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Innovation in Language Learning

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Abstract

An innovative environment is one that is capable of evolving and adapting as educational practices evolve and change- thus remaining future focused. A learning environment includes the physical, social and pedagogical context in which learning occurs. An innovative environment supports strengths-based teaching and learning. It offers students and teachers flexibility, agency, ubiquity and connectedness. In past we used the term “Modern Learning Environment (MLE)”, but nowadays it is termed as “Innovative Learning Environment (ISE)”.

Innovative learning also helps us in processing and analyzing every situation, which in turn increases our usage of writing vocabulary. It includes fosters creativity, learning, cultivates social and emotional intelligence. It helps students socialize more and ignites passion for lifelong learning. However it hardly has any disadvantages rather than seeing it from monetary aspects.

Innovative learning methods provide a detailed richly effective curriculum that responds to and enhances the child language development phase, from early childhood through college. Creative students are not afraid of change; they are more confident and flexible. Students who use imagination to find new ways of solving different problems are able to memorize information without the need of cramming ideas. They can easily make connections and look at usual things with a fresh eye.

WAYS OF INNOVATIVE TEACHING:-

1. Audio Visual Tools:-It acts as an aid to exercise our senses which help students remember longer.
2. “Real World” Learning:-Getting students to know about the recent events happening around the world and in turn keep them updated.
3. Brainstorm:-Helping students to deal with real life problems and be spontaneous where students can think clearly without hesitating about their views.
4. Role Play:-It builds confidence, creative communication, physical development and problem solving. It also allows students get into character and act out real life roles or fictional performances.
5. Welcome New Ideas:-The more new ideas are welcomed the more the institution, students, and teachers are benefited.
6. Teamwork:-It blends complimentary strength, builds trust, teaches conflict resolution skills and promotes a wider sense of healthy risk taking.
7. Multimedia assignments:-To get accustomed to new technologies through one’s own effort

There should be a class where only questions should be taken and answers should be given by students only. This is how students will get to know how to solve problems and how others call to mind. We use innovative and expensive learning methods in subjects related to science and commerce but not for language classes. If we use innovative learning methods in language classes as well, students will show more enthusiasm and effort for that particular language. In fact students will use more of their senses rather than only using their brains. With a fast growth of information technology, the ways of teaching students demand fundamental changes. The process should be creative and captivating in learning; hence, teachers have to take advantage of educational innovations in order to keep abreast with recent developments especially in language classes.

Keywords: innovation; creativity; future focused; captivating; ignites passion.

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Impact of English in Everyday Life

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Abstract

English has hugely emerged as a universal language in the modern era of globalization. It is spoken by a quarter of the earth's population. It actually did enable a true single market in knowledge and ideas. English has now become the language of this global village and is spreading gradually to non-native speakers- who today outnumber the native English speakers. In our everyday life it provides a very strong competitive advantage in culture, diplomacy, commerce, media, academia and IT and also in the use and practice of soft power. For developing and emerging economies there is large demand for English in public education systems to boost up stability, employability and prosperity. The impact of globalisation has made English a language of enormous opportunities and a vital means of improving a person's prospects for handsome salaried jobs. The world needs to be able to respond to its demand by continuing to attract young people into teaching English and also by investing in sharing English. The rise of English especially with the advent of the internet as a worldwide communication channel with very few boundaries is mutually reinforcing trends. Emerging economies and developing countries like India are increasingly recognising the economic value of producing large numbers of skilled graduates competent with technical and soft skills. A focus on improved language skills, which integrates English into the curriculum from the primary or even pre-school days helps attract foreign investors, further, it also opens up new avenues of employment. A strong export in sector services helps create middle-class, strengthening spending and growing the national economy and GDP.

English creates magnanimous scope for career building which is otherwise impossible. For the native English speaking countries, the English language is a very critical component of trust, trade and prosperity. To sustain in this competitive world we must continue to nurture in English for extracting the best benefits and value it adds to our business, or creative industries, or our culture and people. If one does not bring this under consideration, then we might risk losing the economic, social and cultural values derived from one of the greatest assets of the world of English. Today the nations which were once colonized by the language are rapidly adjusting to the rich variety of English language & literature and adopting the use of it in different domains. In this abstract, one gets to understand how English has deeply impacted its influence in our daily lives and how one could benefit from it by keeping in mind the ever changing scenario of the world.

Keywords: Globalisation; skilled graduates; soft skills; employability

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Use of Authentic Materials In The Classroom Promote Learner Autonomy

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Abstract

In an ideal classroom, one needs to focus on the major classroom components: Teacher, Learner, Materials and Environment. This paper will primarily deal with the importance of materials in the classroom. Materials are tools that provide support to the teacher and the learner and enable the teaching and learning in a systematic way. An effective learning of a lesson depends considerably upon the quality of the material used. A well structured material may help in motivating the learner; on the other hand a weakly woven material might also discourage the learners. Authentic materials are mostly produced from real life situations which are inexpensive and easily available. These materials help to generate interest in the learners and help them to develop their creative instincts. Learner autonomy refers to a student's ability to set specific objectives of learning under the guidance of the teacher. In a conventional classroom it is the teacher who sets the goal for the students, however the classroom would foster more learner involvement if the teacher gives the students a series of tasks and activities by the use of authentic materials. There are various sources for compiling authentic materials which are readily available all around us. The experimental devices like newspapers, advertisements and visual aids have already been used by the author. The experiments were conducted by a series of Pre test, Post Test and classroom activities. It has been observed that learning becomes interesting and productive by the use of authentic materials. Besides these the other materials can be digital resources, realia, scaffolds etc.. These techniques help the learners in discovering resources formulating hypothesis and testing them and in the process they master in the subject matter. It stimulates the classroom environment and creates a secured atmosphere especially for the slow learners and thus maximum participation from the students can be ensured. Real objects promote better understanding of the subject. The concept of ZPD (Zone of Proximal Development) propounded by Vygotsky also states that a support mechanism helps a learner to perform a task successfully. Learning becomes more meaningful and effective when it is connected with real life contexts. It helps to create a positive impact which is ingrained in the learner's mind. Moreover it stimulates the learner to set their own goals of learning. Howard Gardner's Theory of Multiple Intelligence has been influential in language teaching circles where he spoke about eight different types of intelligences which do not confine one's knowledge only to linguistic attributes but the aspects of Kinaesthetic, intrapersonal and visual intelligence is also prioritized. Therefore combining the concepts of using authentic materials and teaching the learners by the approach of multiple intelligence would expand the scope of learner autonomy. The application of this innovative process of teaching & evaluation and use of real life materials enhance the process as well as the product of teaching – learning in the language classrooms.

Keywords: authentic materials; learner autonomy; multiple intelligence; realia

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Soft Skill: The Indispensable Requisite for Job Aspirants

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Abstract

One of the trendy terms in vogue these days is “soft skills”. Soft Skills are defined as “the ability to do something well”. Soft skills are basically the social attributes which help an individual to communicate in the society with right attitude and manners. Soft skills are identified to be the most important skills in the present global scenario especially in the job world. The management leaders relate this to emotional quotient and define soft skills as ‘a cluster of personality traits’ which includes leadership, motivation, punctuality, negotiation skills and many more. These personality traits make an individual a sociable creature in job interviews, business meetings, client visits and in any social occasions. In all these situations, lack of soft skills will create a negative impression, no matter how technically smart you are. Now the question is how do we develop the soft skills? Is it an inherent skill with which an individual is born with or do we need to learn it through acquisition?

For a student engaged in professional course the prime objective is to get a decent job for which he/she needs to crack the job interviews. As such, HR interviews are more of a witty conversation, and this is possible if one possess strong interpersonal and communication skills. The companies now-a-days don’t look for a hard working candidate but seek a smart worker. Moreover a candidate with excellent knowledge in technical domain but poor soft skills will not be considered employable. Employers look for those candidates who can adapt quickly to any situation and work as a team to achieve the organizational target. Besides this Soft skills also promote a healthy work environment by resolving the conflicts and enhance the bonding between the employees.

The business world is all about interacting, so if one has effective soft skills, then the sky is the limit. The employment market is constantly changing and to stand out in this market, it really requires us to flex our soft skills like behavioral skill, time management and dressing sense. Hard skills or the technical competence, are easily quantifiable and measurable, however the soft skills help to shape the personality of a budding professional and make him/her stronger and sharper. The job aspirants generally pay least focus on the soft skills required for a successful personality. This paper tries to throw light on the necessity of Soft Skills which is inevitable for a rewarding career.

Keywords: *soft skills; employable; job-interviews; interpersonal skills*

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The Process of Teaching and Learning English in the Digital Era

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Abstract

Various concepts like digital media , digital India , digital era and now digital education has very recently touched the technological expertise of man .Now a days people mostly prefer to read books , magazines , newspapers , journals through electronic devices . In this respect internet plays a vital role to meet and fulfil the literary thirst of the common busy man who can now even have an access to the internet through their smart phones. Online educational tools are now becoming an effective instrument in the ongoing teaching learning process. The online journals on multidisciplinary topics provide valuable information both to the teachers , students and researchers .Rapid changes in language form and function in the digital environments present teachers and students of second languages alike with conundrums as to language and discourse standards.(Heather and alike with conundrums as to language and discourse standards.(Heather and Yejun , 2004).

Language teaching has become very easy and linear owing to online facilities , compact discs and various other digital aids .Advanced studies in ELT in technological institutions has become more rampant through digital media .Teaching and learning of English in the digital era has recently gained widespread currency and momentum and it has a bright future .Broadcasting through wikis, Webinar , Skype , You tube , Blogs , and multimedia language labs are doing well in the present day and it is clearly evident that there will be up gradation of these technologies in the future .English in the digital era has visualised all round growth and development .” Today’s technologies allow children to engage with digital texts on a regular basis outside schools. However the extra school skills that are required from interacting and communicating with digital text remain unexplored .Digital texts incorporates the four macro – skills of listening , speaking , reading and writing but requires additional skills including frequent use of visuals , dynamic information and interaction “. (Buckingham & Willett, 2006).Schools , colleges ,universities and other educational institutions have been upgrading their technology driven sections so that they can be widely connected with other educational institutions globally and can attain global recognition.

Over the last few years there has been mushrooming of technological and management institutions across the country new institutions that have come up over twenty to thirty years earlier have now grown up into brand names due to the advancement of digitalization. Technological institutions use digital method of teaching and learning process not only in English but also in conducting crash courses in German , Japanese , Russian and other foreign languages.

The future of Digital era is bright. The time will not be far when Language teachers will get respite as they would become only mentors in future due to learners automatic aptitude to language acquisition made easier by digitalization.

Keywords: *Digital education; webinar; wikis; language teaching; digital era.*

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Non Verbal Cues and Their Role in Effective Communication

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Abstract

Ideally defined as an ‘act of conveying intended meanings from one group to another through the use of mutually understood signs and semiotic rules’, verbal communication has always been one of the building blocks of the human civilization. Like a body followed by its own shadow, the signs or words of verbal communication has always been accompanied by the unspoken on its heels. This can be termed as “non-verbal communication.” Every act of verbal communication has an array of different ‘actions’ that constitute and give a complete meaning to the entire process. From the knot of the eyebrows to pointing a finger or maintaining eye contact while communicating and to a smile on the speaker’s face, it is impossible to fully drive home the intended meaning to the recipient without the help of these ‘unspoken’ friends. Scientists have identified them as a number of different forms of non-verbal communication, among which the most important ones are:

1. Facial expressions
2. Proxemics (distance)
3. Paralanguage (appearance and tone of voice)
4. Kinesics (body language)
5. Haptics (touch)

According to Peter F. Drucker, ‘The most important thing in communication is to hear what is not being said.’ That’s why one pays more attention to how something is said than to what exactly is being said which though sometimes might lead to misinterpretation, but mostly helps to judge the intentions of the speaker and have a proper understanding of the subject.

A case in point could be a job interview during which, it is extremely important for the interviewee to not be slouching on the chair or keep shaking his legs or speak very rapidly as that might actually cost him the coveted job for the interviewer would inevitably be thinking of him as a nervous and not so interested candidate.

Also, in the modern world, the appearance of a certain person and the way he dresses and presents himself to his audience leaves a very important message. So, one might not just prepare hard the content for the important presentation in office but should also be equally meticulous about how he should be looking while making the presentation.

Thus, it is a very important duty of the teachers to make their students understand and use non-verbal communication properly to gain success in all possible spheres. Through this article the authors have tried to elaborate the importance of Nonverbal Communication in human society and point out how to use them most efficiently ensuring the best possible sharing of ideas.

Keywords: *Communication; non-verbal communication; Meaning; Society*

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Body Language: An Effective Communication Tool

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Abstract

We can compare teaching to a theatre performance. Even though different in several aspects, both the classroom and the stage revolve around a credible presentation of content. Just like actors, teachers need to fulfil their tasks by being physically present and interacting and by winning over an audience that is hard to predict – all of this within a limited time frame, challenge which requires teachers to have conviction, a professional understanding of their role and an appreciative attitude towards their students.

An encouraging smile, a sceptical frown, a negating shake of the head: body language is very diverse and effective and can set a better equation between students and teachers and thus enhance the teaching learning ambience. The education scientist explains that these tasks are based on an ideal standard of successful teaching. In everyday practice they are often hard to reconcile with the formal and social requirements the school system has to meet. Exposure to such contradictory aspects produces a variety of reactions from the teachers and, in the worst case, stagnation. In a classroom, there is constant interaction between teachers and students. Elements such as gestures, facial or corporal expressions that do not, as a rule, attract much attention are of great importance in the process. In concrete terms, the scholars identified several typical teaching strategies in this basic research project. Teachers alternate between these strategies in order to fulfil requirements that are impossible to meet simultaneously. This will also become manifest in physical expressions, when teachers, for instance, play down certain things in order to balance the situation. In such cases, the teachers' words and their body language will drift apart, and the students notice that. As a consequence, both sides are annoyed or frustrated and end up creating distance.

Successful classroom teaching can create an open learning environment through authentic, convincing and motivated pedagogical engagement along with the usage of proper body language used by the facilitator. Eye contact encourages students to take part in speech easily since teachers can nominate and invite responses by eye. Thus students are more motivated and concentrated on subjects and attempts to examine the topic more closely. The use of eyes and facial expressions are considered as having disciplinary function in most of the sources and are reported as having many related functions which help teachers in managing classrooms. Nonverbal communication is also used to check that the students understanding. Student's eyes and student's tone go parallel with each other.

This paper aims at helping English teachers understand the application of body language in teaching, and encouraging them to try using body language in classes in order to assist their teaching. The English teachers in new times should use body language properly in their class teaching and bring its function in language teaching into full play to achieve the best teaching effects.

Keywords: Classroom; Body language; Teacher; Student.

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Digital Humanities

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Abstract

Digital humanities are an area of scholarly activity at the intersection of computing or digital technologies and the disciplines of the humanities. It includes the systematic use of digital resources in the humanities as well as the reflection on their application...So it has no particular definition, the definition of the digital humanities is being continually formulated by scholars and practitioners because the field is constantly growing and developing.

Digital humanities is not a sudden work its origin reaches back to the late 1940s in the pioneering work of Jesuit scholar Roberto Busa and the women he employed in collaboration with *IBM*, they created a computer-generated concordance to Thomas Aquinas' writings known as the *Index Thomisticus*. Other scholars began using mainframe computers to automate tasks like word-searching, sorting, and counting, which was much faster than processing information from texts with handwritten or typed index cards. The first specialized journal in the digital humanities was *Computers and the Humanities*, which debuted in 1966. *The Association for Literary and Linguistic Computer (ALLC)* and the *Association for Computers and the Humanities (ACH)* were then founded in 1977 and 1978, respectively.

Digital Humanities scholars use computational methods either to answer existing research questions or to challenge existing theoretical paradigms, generating new questions and pioneering new approaches. As engineering students we often refer to or can upload project works on the web which again is an example of *DH*. Again if we look at the NP-TEL program, it is an example of *DH* where they did make video portal of different classes and send them online to their you tube channel and we just subscribe that channel and able to see that video. This type of virtual classes helps us, many things we don't understand from class we can take help from that kind of videos. Again when we appear for any competitive examination we are not able to go particular centre for practicing the mock question so now days the institution like gate-academy, GRE-Edge published their practice set online so we can give examination online and they show our result immediately. Digital money transaction is also an example of *DH*.

Digital Humanities projects are, more likely than traditional humanities projects. The main projects are *digital archive, cultural analytics, textual mining analysis and visualization, online publishing, online study etc.* There is also adverse effect of digital humanities, though it is mainly digital world base so there will be some forgery like *negative publicity, black box, cultural criticism etc.*

Over all digital humanities helps us a lot. It has a huge application to the digital world. It reduces time and we can use it from anywhere via internet.

Keywords: *Digital Humanities; Digital archive; online publishing; Negative publicity*

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Necessity of English for Engineers

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Abstract

Communication is the lifeline of social as well as corporate world. We exist because we communicate. The ever growing need for good communication skills in English has created a huge demand in the corporate field. English language has developed its importance all over the world in various areas. It's use is so frequent that it can almost be called the official language of the world. The use of English has also become ambitious, for the correct code of conduct and while we speak it also depicts our persona and our nature, both formally and informally.

Engineering, like the brilliant language of English, has changed in many ways. It is no longer limited to just working in the fields or sitting in front of the computers for long hours. It also requires the new generation students to speak and write correct English, that too in a fluent and orderly manner. This is because behind every engineering jargon, known or unknown to us, lies a plan- that has to be presented, talked about and accepted. The skills to be adopted in English needs to be precise, as it may attract clients to the industry, get new projects to work on and help in submitting proposals, reports and presentations. Hence, English paves a new path towards engineering success as well.

English language is universally accepted all over the world and that is the reason English does play a very important role in the sectors of industry, commerce, law, medicine and many others. Therefore English being the lingua franca will always assist the job aspirants find a better or higher quality job rather than other students who are not conversant in English adequately. In today's world the competition in the professional world is increasing with each passing day. Therefore it has become immensely important for people to equip themselves with adequate skills and knowledge of English language is of utmost importance besides the technical skills. This paper is based on the personal experiences of the authors as they feel that being an Engineer it requires cooperating and communicating with different people around the world. It has been observed that living in a digital world where we make the software and have to deal with technologies and internet, English language is indispensable. The latest version of applications and programs in the new era where peer to peer, social media networks, websites and all software instructions are usually available in English first before having made available in any other language.

For years, English has been a global language and its importance will expand in the near future too. For this reason whenever there is any development of new applications and technologies which will led to modernization of the ever-increasing digital world, knowledge of English will be required.

Keywords: *digital communication; global language; engineering ;professional communication*

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Application of Video Clips During ELT for Business and Technical Purposes.

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Abstract

The paper aims at evaluating the effectiveness of deviating from the main stream techniques of teaching spoken English. Its objective is to engage the students in an alternative methodology of teaching. This paper will display an innovative use of functional communicative approach, incorporating video clips, for improving and boosting up the confidence of the learners for business and technical purposes.

English, a global language, has become one of the dominant medium in politics, economy and education internationally. It has become the major medium to communicate with the whole world and the main language used for international trade and study. But a frequently observed characteristic is that a person is either shy or not confident enough to articulate their thoughts or simply speak in English. They often find themselves in difficulty when interacting in English-speaking social context.

It is found out that using 'chalk and talk' to teach is not enough now a days. One should change the teaching ideas. In this modern era of information and technology; English language teaching has evolved as an integral part of our educational scenario. Information and communication technology has become an essential part because technology has brought in several changes. According to the English teaching in the business and management colleges, one has to improve the students' ability to use English at the same time enhance the comprehensive cultural qualities to fulfil the country's economic development and international exchanges.

ICT allows the exciting combination of computer's hardware and software that grants the permission to integrate video, animation, audio, and graphics to develop effective results.

THE MATERIALS REQUIRED ARE:

- Laptop
- Microphone
- Speakers
- Audio-visual clips
- Led projector

THE METHODOLOGY INCLUDES:

- Karaoke
- Action-speech modulation
- Dialogue improvisation
- Enactment

In this paper I will try to explain the benefits and the methods of effective integration of audio-visual clips for the 'English Language Teaching' process.

Keywords: ELT, Audio Video Clips, Animation, ICT

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The Reality of Language: What does Language Even Mean?

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Abstract

The relationship between Language and the Reality it tries to represent has found various expressions in the myriad literatures and philosophies propounded down the ages. However, in the 1960s there occurred a revolutionary change in the perception of the structure of Language, and, by extension, in how Reality was perceived. A key theorist, of what came to be known as Structuralism, was Ferdinand de Saussure, who divided language into *Lingue* and *Parole* – *Lingue* meaning the rules and grammar of sentence construction; *Parole* meaning the particular contexts in which speech finds its nativity. In his second move, Saussure proposed a relational theory of language where meaning emerges in the difference or opposition between words. For example, ‘cat’ is ‘cat’ because it is not ‘bat’ or ‘hat’. Finally, in a decisive third move, Saussure suggests that words and their meanings are not natural but created through repeated use and convention. The word ‘cat’ does not ‘naturally’ refer to a furry four-legged animal of a particular kind. We have come to associate the two through long use and repetition. Therefore the ‘signifier’ (here the word ‘cat’) is connected to the signified (the animal) in a purely arbitrary relationship. In a critical contention he was therefore undermining the very notion of language by proposing the relationship between words and meanings as arbitrary. But even though the connection is arbitrary, sense is still made of it because it is different from other words that are equally arbitrary in their relationship with things. It is from this that one comes to the understanding that words in a language do not refer to any ‘reality’ but to other words from which they are different. Language is, therefore, a system that constantly refers only to itself. In a deconstructive turn, Jacques Derrida progresses further into Poststructuralism that flourished in response to previous theories of Structuralism. Derrida’s early work built upon the Saussurean notions of language and signification, but took them to radical extremes. Derrida argued that if the relation between signifier and signified is arbitrary and all language is relational then the process of ‘reading’ or even communication is really a movement from one signifier to another. Every signifier therefore refers to another signifier in an endless process of postponement of meaning. We never arrive – we are only projected towards an endless path of meaning-making. There is no final ‘signified’-- the object we are referring to-- because even that signified is constituted of more signifiers. Derrida further proposed that each signifier is made up of absences – absences of other signifiers from which it is different. Synthesising his twin moves of asserting ‘difference’ and ‘deference’ (postponement), Derrida announced that all writing and Language is ‘différance’. Poststructuralists came to the understanding that any attempt at meaning-making can only happen through language, a language that constantly refers back to itself and not to any reality outside. It is a meaning stuck within the play of signifiers, without any possibility of closure. Thus, looking at Language as a ‘text’ to be participated in, Derrida offered his epoch-making statement that would go on to be the yardstick for future generations of research – “There is nothing outside the text”. There is nothing outside Language.

Keywords: *Signifier; Signified; Language; Structuralism; Poststructuralism; Difference.*

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Growth and Importance of Mobile Banking in Indian Perspective – A Review

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Abstract

The aim of this paper is to identify the main motivating factor of consumers' behavior in accepting the willingness to use Mobile Banking. We know that the Indian culture is a minimum risk taking culture. Banks, being a financial institution play a very important role in protecting the cash related risk of the general public. The latest and the fast growing innovations in technology advancement and globalization have changed the whole process of banking industry. Brick and mortar system are now replaced by click and portal system. All banking services such as opening an account, transaction processing, record maintenance and information providing have been changed by using information technology. The following new emerging concepts have helped to customized services by means of ATM, Internet banking, mobile banking, and plastic money. In spite of these facilities, one critical problem was left behind i.e. Customer's Queue in banks. So m-banking was a new advanced step taken by banks to resolve this issue. M-banking is the result of recent telecommunication growth and innovation, which provide a new access point to the customer. M-banking is a kind of m-commerce in which bank customer interact with bank through mobile and enjoying all facilities and services provided by banks via mobile applications. Financial cost, usefulness, self-efficacy and credibility are the factors which influence consumer behaviour regarding m-banking adaptation

An initial survey was taken from respondents in questionnaire form mainly with the following points: awareness of M- Banking, its convenience, cost, acceptability and danger. Correlation and hierarchical multiple regression analysis was used to establish whether the abovementioned factors influenced customers' approach and intent to use M-Banking.

India is one of the highest budding countries in terms of use of mobile. Other than the medium of communication, now it is also used extensively for many mobile service. The m-banking is fast growing with its massive features offered with mobile apps and internet banking. In the recent past, banks have launched mobile websites and banking apps for providing their services through mobile. M-banking is a term used for performing banking transactions, payments, etc. with mobile devices. With the help of Mobile, Banking user can transfer funds, and pay bills, checking account balance, study their recent transaction, block their ATM card, etc. Mobile Banking is cost-effective, and Banks offer this service at less cost to the customers. The main reason of increasing in trend of m-banking is that it helps to perform banking activities at anytime and anywhere. M-banking ensures customers can take advantage of banking services 24 hrs a day and wherever they need. It not only saves time for costumers but also reduce cost for banks.

Keywords: *Mobile Banking; Consumers' behaviour; fund transfer*

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Role of Major Financial Institutions to Growth of Micro Finance in India – A Review

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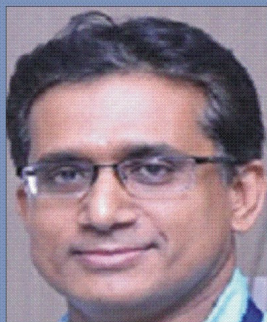
Abstract

Microfinance can be called a novel approach to provide savings and investment facility to the poor around world. Improved access and efficient provision of savings, credit, and insurance facilities in particular can enable the poor to smoothen their consumption, manage their risks better, gradually build their asset base, develop their business, enhance their income earning capacity, and enjoy an improved quality of life. In a country like India where 70 percent of its population lives in rural area and 60 percent depend on agriculture (according to the World Bank reports), micro-finance can play a vital role in providing financial services to the poor and low income individuals. Before the microfinance industry, people around the world have been borrowing and saving using various sources outside of the formal financial sector. Informal financial services ranging from loan sharks, community members and saving groups were once the only source for low income individuals who were unbanked or under banked. Such sources are still commonly used in both rural and urban areas, but now microfinance is a new source for loans, savings and insurance for the estimated of Indians who do not have access to any type of financial services and the Indians who might be unhappy with the informal financial services they use. The concept of microfinance is not new in India. Traditionally, people have saved with and taken small loans from individuals and groups within the context of self-help to start businesses or farming ventures. Majority of poor are excluded from financial services. Microfinance is a program to support the poor rural people to pay its debt and maintain social and economic status in the villages. Microfinance is an important tool for improving the standard of living of poor. Microfinance is the form of a broad range of financial services such as deposits, loans, payment services, money transfers, insurance, savings, micro-credit etc. to the poor and low income individuals. The importance of micro-finance in the developing economies like India cannot be undermined, where a large size of population is living under poverty and large number of people does not have an access to formal banking facilities. There are two broad approaches that characterize the microfinance sector in India is Self Help Groups (SHGs)-Bank linkage program and Microfinance Institution (MFIs). In India, the beginning of microfinance movement could be traced to Self Help Group (SHG) – Bank Linkage Program (SBLP) started as a pilot project in 1992 by NABARD. This program proved to be very successful and has also developed as the most popular model of microfinance in India. The regulatory framework for microfinance in India is not unified. Microfinance is provided by commercial banks, Regional Rural Banks (RRBs), the SHG's, cooperative societies and institutions (MFIs) that take various forms, including those of NGO's and Non-Bank Financial Institutions (NBFI's). Banks and NBFIs are governed by the Reserve Bank of India (RBI), SHGs are regulated by NABARD, and the cooperatives are governed by Registrar of Cooperative Societies (RCS) etc..The present paper aims at identifying the current status and role of microfinance in the development of India. The purpose of this paper is to examine the role and performance of various institutions that are associated with the microfinance activity in India. An attempt is made here to examine the performance of some of the major contributing agencies.

Keywords: Microfinance; SHGs; MFIs; NABARD

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