CONFERENCE PROCEEDINGS

2nd ICSTR Singapore – International Conference on Science & Technology Research, 15-16 March 2019

15-16 March 2019

CONFERENCE VENUE

The National University of Singapore Society (NUSS) The Graduate Club, Suntec City Guild House, 3 Temasek Boulevard (Tower 5), #02- 401/402 Suntec City Mall, Singapore
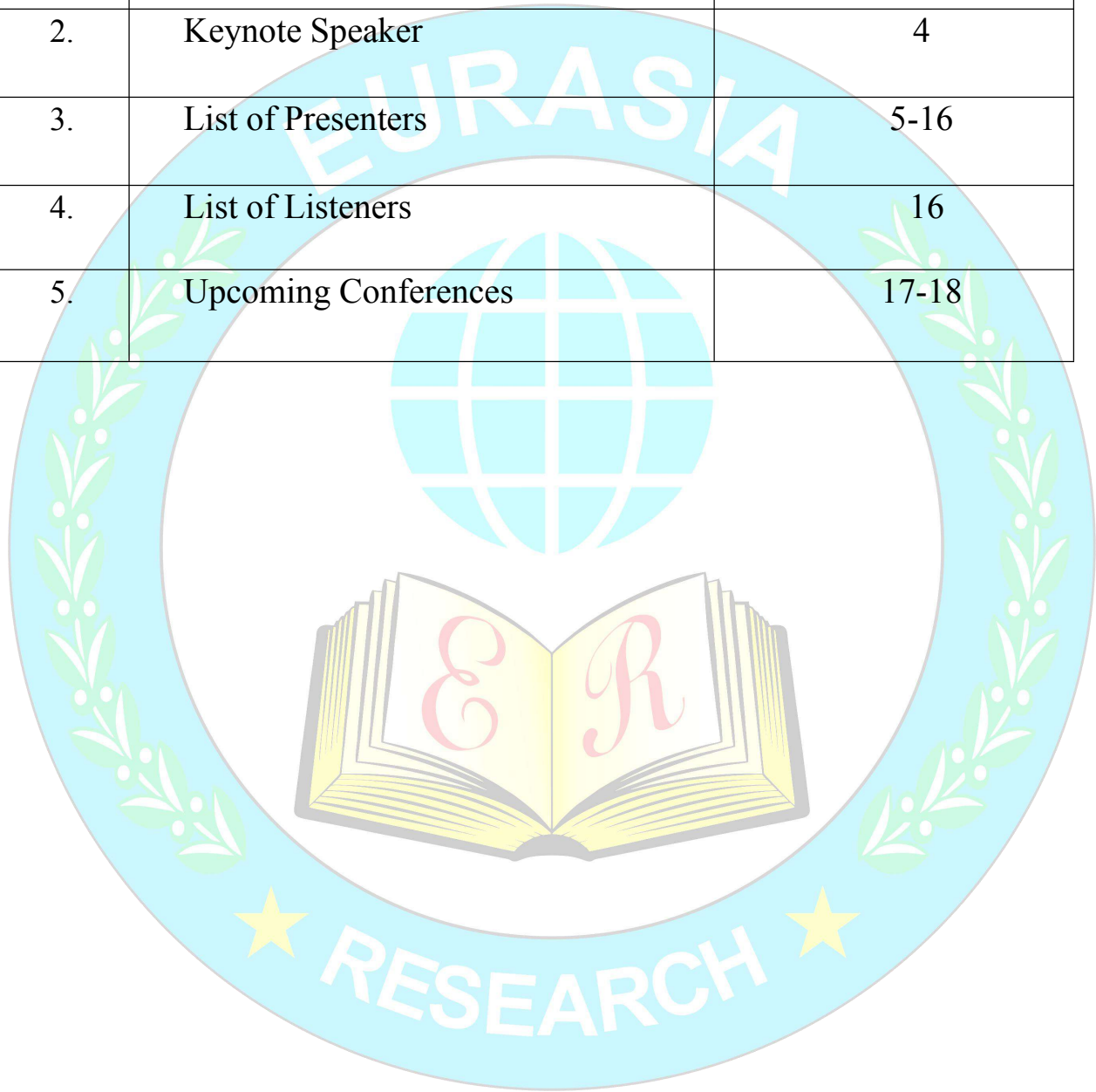
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Preface:

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KEYNOTE SPEAKER

Dr. W. G. Samanthi Konarasinghe

Institute of Mathematics and Management, Sri Lanka

Topic: Sama Circular Indicator on Measuring Risk of Returns

She has been involved in teaching Mathematics, Statistics; Research Methodology etc. for more than two decades at undergraduate and post graduate levels. Also she has engaged in research consultancy in the fields of; Medicine, Education, Management, Finance and many more. She is also a member of; American Statistical Association (ASA), Institute of Applied Statistics, Sri Lanka (IASSL) and National Science Foundation (NSF), Sri Lanka. Also an Editorial board member of American Journal of Theoretical and Applied Statistics (AJTAS). She has obtained; PhD (Statistics), MSc (Applied Statistics), MBA, PG Diploma (Industrial Mathematics) and BSc (Mathematics). She has introduced new Mathematical / Statistical techniques to the world. Some of them are; Circular Model, Circular Indicator, Coefficient of Stability and Sama Circular Model. She has shared her knowledge and experience as an invited speaker/ key note speaker; as the session chair in various international conferences. She is a scientist as well as an artist; a painter, musician, writer, drama producer and an actress. Her scientific and artistic lives are intertwined.

Assit Dr Sujittra Srisung ERCICSTR1904051	**The Impact of Silver Nanoparticles on Oryza Sativa L.CV. Kdml105, Oryza Sativa Var. Glutinosa Cv. Rd 6 and Ipomoea Aquatica Forsk. Var. Reptan**

Assit Dr Sujittra Srisung

Department of Chemistry, Faculty of Science, Srinakharinwirot University, Bangkok, Thailand

Abstract

Currently, agriculture is widely which the properties of silver nanoparticles (AgNPs) can be used as anti-bacterial and fungi. AgNPs may be released into the environment and impact on agricultural crops have been exposed. In this work, to investigate the effects of AgNPs to accumulate translocation and impact on three plants including rice (Oryza sativa L. cv. KDML 105), sticky rice (Oryza sativa var. glutinosa cv. RD 6) and Chinese water convolvulus (Ipomoea aquatic Forsk. Var. reptan). In the experiment, the AgNPs were synthesized by pure natural honey as a reducing agent. In addition, to study on the wet digestion of D1, D2 and D3 methods. Moreover, the three plants were exposed with AgNPs to various concentrations of 0.02, 0.05, 0.1 and 1 mg/L. After wet digestion the AgNPs were determined by graphite furnace atomic absorption spectroscopy (GFAAS). Therefore, the D2 method was the optimum wet digestion process for the determination of AgNPs in plants, resulting show the percent recovery of between 81.67 to 94.00. While the effect of AgNPs to aggregate and accumulate within the roots and shoots of three plants. The result showed that the roots of sticky rice at a concentration of 0.05 mg/L was accumulated and penetrated to the cell wall and cell in root lead to effect on structural features and transporting nutrients to the plants, including the development on the growth of plant cells.

Keywords: Silver nanoparticles, Rice (Oryza sativa L.cv. KDML105), Sticky rice (Oryza sativa var. glutinosa cv. RD 6), Chinese water convolvulus (Ipomoea aquaticaForsk. Var. reptan), Accumulation

Renelyn Banasihan ERCICSTR1904052	**Field Evaluation and Behavioral Response of Black Earwig, Chelisoches morio (Fabricius) (Dermaptera: Chelisochidae) to the Coconut Leaf Beetle, Brontispa longissima (Gestro) (Coleoptera: Chrysomelidae)**

Renelyn Banasihan
Department of Education, San Pablo City National High School, San Pablo City, Laguna Philippines

Stephanie Maris Cosico
Department of Education, San Pablo City National High School, San Pablo City, Laguna Philippines

Joseph De Ono
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Franchesca Lizette Ramos
Department of Education, San Pablo City National High School, San Pablo City, Laguna Philippines

Abstract

In the study of Black Earwig, Chelisoches morio (Fabricius) (Dermaptera: Chelisochidae) to its prey, Coconut Leaf Beetle, Brontispa longissima (Gestro) (Coleoptera: Chrysomelidae), field evaluation and behavioral response of the predator to its prey were conducted. In the observation of the behavioral response, it included its way of capturing the prey, productivity in eating the prey, and speed of eating the prey. Both predator and prey was provided by the National Crop Protection Center, University of the Philippines, Los Baños, Laguna.

The behavioral response showed that the female predator usually use their cerci for capturing their prey and thus, the female predator was efficient in eating their prey, the analysis was supported by the results of the average mean of 64.88 for the male per minute and average of 31.75 for female per minute, this indicates that female spent lesser time than the male in capturing the prey

In the field evaluation 40 trees were rated, twenty for the controlled group and another twenty for the experimental group. It was rated from a scale of 1-5 with its corresponding rate of damage. The analysis of the experimental group which is the predator-released group received greater changes than those of the controlled group. This analytical results were supported by the Wilcoxon Test.

Keywords: Black Earwig, Coconut Leaf Beetle, Field Evaluation, Behavioral Response

Babatunde James	**Formula Method For Bound State Problems**

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| Falaye ERCICSTR1904053 | Babatunde James Falaye Department of Physics, Directorate of Management Information System, Federal University Lafia, Nigeria |

Babatunde James Falaye
Department of Physics, Directorate of Management Information System, Federal University Lafia, Nigeria

We present a simple formula for finding bound state solution of any quantum wave equation which can be simplified to the form of $\Psi''(s) + \frac{k_1 - k_2 s}{s(1 - k_3 s)}\Psi'(s) + \frac{As^2 + Bs + C}{s^2(1 - k_3 s)^2}\Psi(s) = 0$. The two cases where $k_3 = 0$ and $k_3 \neq 0$ are studied. We derive an expression for the energy spectrum and the wave function in terms of generalized hypergeometric functions $2F_1(\alpha, \beta; \gamma; k_3 s)$. In order to show the accuracy of this proposed formula, we resort to obtaining bound state solutions for some existing eigenvalue problems in a rather more simplified way. This method has shown to be accurate, efficient, reliable and very easy to use particularly when applied to vast number of quantum potential models.

Application of nano-scale zinc oxide and tetramethylthiuram disulphide as an effective preservative system for concentrated natural rubber latex

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**Y. R. Somarathna
ERCICSTR1904055**

Abstract
Natural Rubber (NR) latex preserved with low ammonia as the primary preservative together with Tetramethylthiuram disulphide (TMTD) and Zinc Oxide (ZnO) as the secondary preservative widely known as LATZ is the most common preservative system used in the latex industry due to its low ammonia content with reduced cost and lesser hazards in the working environment. However, the LATZ preservation system has its inherent drawback as TMTD and ZnO, which are responsible for generation of carcinogenic nitrosamines during the product manufacturing and releasing Zn as a heavy metal to water sources adversely affecting the aquatic systems, respectively. Because of the growing human health and environment concerns, worldwide attention has been focused to find alternative less risk preservatives for NR latex. In this study, the current LATZ system was modified by replacing the conventional ZnO from nano-scale ZnO together with simultaneous reduction in the current dosage of TMTD in order to develop a greener preservative system. A series of mixtures of TMTD/ nano ZnO, containing equal proportions, with concentrations of 25%, 20%, 15%, 10% and 5% were used as the modified systems. The conventional 25% TMTD/ZnO dispersion was taken as the control. Both conventional and nano ZnO were first characterized using X-Ray powder diffraction (XRD) and scanning electron microscope (SEM). Raw latex properties including Dry Rubber Content (DRC), Total Solid Content (TSC), alkalinity, Volatile Fatty Acid number (VFA) and Mechanical Stability Time (MST) of centrifuged latex using above preservative systems were determined as per ISO standards. Tensile and tare strengths of vulcanized latex films, which are made according to a standard latex formula were also determined as per ISO standards. It was found that VFA numbers of all centrifuged latex preserved with modified systems after 55 days were below 0.020, whereas the control system exceeds this value after 35 days. This may be low due to increased anti-bacterial action of nano ZnO owing to its flake-like one dimensional (1-D) nano scale crystal morphology resulting very high surface area unlike the conventional ZnO. It was also revealed that MST values of NR latex preserved with modified systems are significantly increased with time, which may be due to reduction of ZnO thickening effect. Tensile and tare strengths of new systems are almost comparable with those of the control. According to overall results, nano- ZnO/TMTD could be used as an environmentally less risk and effective preservative system for NR latex especially for the applications where concentrated latex with high MST is required.
Keywords: natural rubber latex, preservation, nano ZnO, TMTD

| Prof. K R Genwa ERCICSTR1904059 | **Cell conversion Efficiency Enhancement in Dye Sensitized Solar Cell by Incorporation of Metals in Dye Solution** |

Prof. K R Genwa
Department of Chemistry, Faculty of Science, Jai Narain Vyas University, Jodhpur, India

Abstract
Dye Sensitized Solar Cell based on photovoltaic technique comprises three main components: the

semiconductor, composed of fluorine doped tin oxide (FTO) glass plate covered with TiO2 paste above which is Eosin dye (photosensitizer) adsorbed; Redox electrolyte is a liquid coupled electrolyte made my mixing potassium iodide and Iodine in a solvent and is placed sandwiched between semiconductor and counter electrode (platinum). In this cell Eosin B dye is dissolved in three different solvents (double distilled water, ethanol and Dimethyl Sulphoxide), each of which have four other types containing Cobalt Nitrate and Magnesium Sulphate along with Deoxycholic Acid in such a way that total twelve different type solutions are prepared. The cell containing solution of Co(NO3)2 and MgSO4 and DCA showed increased efficiency in all the solvents, evaluating the fact that Metallic solution provides the metallic moiety indirectly in easiest way and increases the efficiency which was found highest in ethanol with 0.794% conversion efficiency with Isc (short circuit current) and Voc (open circuit voltage) as 0.857mA and 1.627V respectively.

Keywords: Solar Cell; Conversion Efficiency; Semiconductor Electrode, Photosensitizer

Influence of Additives in Controlling Migration of Heavy Metals- A Case Study Solid Waste Disposal Site, Bengaluru

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**Dr. Megha Kulkarni
ERCICSTR1904060**

Abstract
Soil liners amended with bentonite can be used for the control and containment of pollutant migration from landfills. Clay liners are preferred because of low hydraulic conductivity and high absorptive characteristics. To know the rates of migration under combined influence of advection and diffusion the required diffusion coefficient and retardation factor of ions including conservative ions like Sodium and Potassium and heavy metals such as Lead and Iron in suggested soil has been assessed through laboratory column experiments. The breakthrough times of ions in a liner of thickness of 1m, 2m, 3m, under different transport phenomena, are compared. The breakthrough times under similar conditions are varied since process is influenced by the dominant transport mechanism.
Keywords: Advection, Breakthrough Time, Clay Liner, Diffusion, Retardation Factor

**Aminu Umar Imam
ERCICSTR1904061**

Determination of Antioxidant Vitamins and Chemical Properties of Monodora Myristica Seeds and Fruits (ORCHID TREE)

Aminu Umar Imam
Biochemistry Department, Faculty of Sciences, Sokoto State University, Nigeria, Sokoto State, Nigeria

Abstract
Palm oil (PO) and palm kernel oil (PKO) have a lot of nutritional benefit, industrial purpose and are good source of vitamins which may help in protection against oxidative damage. In the present study, antioxidant vitamins and chemical properties of two varieties of oils were determined. Vitamins were analyzed using spectrophotometry and chemical properties were analyzed using Standard analytical procedure. Results for Vitamins A, E & K analyzed in PKO were (478.33mg/dl, 48.73mg/dl, & 11.18mg/dl), whilst for vitamins A, E & K measured in PO were (496.02mg/dl, 48.64mg/dl & 1.63mg/dl). Vitamins content between the two oils have no significant difference at p< 0.05. However, values recorded for free fatty acids corresponded to the acid values; palm kernel oil was higher compared to palm oil, both oils had low peroxide values; PKO had the highest iodine value as compared to PO while Saponification values for the two oils were greater than 100, thus indicating that the oils can be used for making soap. The vitamins and chemical properties of PO determined are comparable to those of PKO and that the seed oils are not inferior to other edible oils used for cooking.
Keyword: Antioxidant Vitamins Peroxide Values Iodine Value Saponification Values Palm Oil and Palm Kernel Oil

**Nura Muhammad Bello
ERCICSTR1904062**

Proximate Composition and Aflatoxin Content in Some Varieties of Locally Produced Groudnut (Arachis Hypogaea L.) in Sokoto State, Nigeria

Nura Muhammad Bello
Department of Biochemistry Sokoto State University, Sokoto State Nigeria, Nigeria

Abstract

The Proximate composition of three (3) different varieties of groundnut (Arachis hypogaea L.) kwankwaso, Erdakar and Kampala was investigated using standard procedures. The sample was collected at Sokoto central market, Sokoto state and was dried at room temperature and homogenized using a blender, stored in an air tight container till time for the analysis. Proximate analysis was carried out on the sample in accordance with (AOAC, 2005) and aflatoxin content using ELISA method (Romer, 2015). Statistical analysis was carried out using graphpad Instat version 3 and the results were expressed in mean ± SEM and also ANOVA test was carried out on the sample at ($P<$ 0.05). Results showed that the groundnuts had 4.01-4.25% moisture, 1.50-2.03% ash, 15.77-23.01% fat, 50.72- 56.69% carbohydrate, 470.90-499.32 kcal of energy value and 2.92- 3.07% fibre. All the varieties analyzed showed an aflatoxin activities as 2.73-3.5ppb. The 3 different varieties shows a significant difference in their proximate and aflatoxin content except 2 pairs of the varieties having no significant difference based on their ash and aflatoxin content at ($P<$ 0.05). Thus, these groundnuts can be considered useful foodstuffs in minimizing protein-energy malnutrition (PEM) and a good source of nutrients in Nigeria if properly utilized and effective storage system is improved.
Keyword: Proximate Composition, Afflatoxin, Elisa and AOAC

Reema Mathew A **ERCICSTR1904063**	**Analysis of Brain Tumors using Deep Neural Network Architectures** **Reema Mathew A** **Department of Electronics and Instrumentation, APJ Abdul Kalam Technological University, Vimal Jyothi Engineering College, Chemperi, Kannur, India** **Abstract** Brain tumor is a severe disease which cause even death. Early detection of this disease will help the doctors to diagnose and save the life of patients. But there is no ideal solution exists to solve this issue. This paper addresses this problem and tries to find out a solution using latest technologies. The power behind machine learning and deep neural network is explored in this paper in order to detect and classify the stages of brain tumor. A five layer convolutional neural network is implemented using Keras and Tensorflow and got an efficiency of 99%.
Sani Muhammad **ERCICSTR1904064**	**Comparative Study of Acid and Enzyme Hydrolysis for the Production of Bioethanol from Rice Straw** **Sani Muhammad** **Department of Chemistry, Sokoto State University, Sokoto State, Nigeria** **Abstract** Bioethanol was produced via acid hydrolysis at (1, 3, 5, 7 and 9% H_2SO_4) and enzyme hydrolysis with Bacillus firmus, Bacillus thuringiensis and Bacillus megaterium. Rice straw pretreated with 7% H_2SO_4 recorded the highest yield (81.25%) of reducing sugar in acid hydrolysis and Bacillus thuringiensis in enzyme hydrolysis (89.46%). The maximum ethanol yield was found to be 2.98%, hydrolyzed with 3% H_2SO_4 and 1.21%, hydrolyzed with Bacillus thuringiensis. Then from the acid and enzyme hydrolysis; 3% H_2SO_4 and Bacillus thuringiensis respectively were used to find the effect of some parameters for bioethanol production using rice straw as a substrate. Ethanol produced was analyzed in the present research and the reducing sugar content was recorded maximum at 24h. The effect of quantity of substrate (5, 10 and I5g), temperature (30, 35, 40 and 45°C), pH (3, 4, 5 and 6), time reaction (24, 48, 72 and 96h) and inoculums size (0.5, 1, 2 and 3ml) on ethanol concentration and yield from rice straw was estimated. Maximum effects with 3% H_2SO_4 was occurred at I5g, 30°C, pH5 and 72 h. While, with Bacillus thuringiensis occurred at I5g, 350C, pH 3, 96 h and 1ml. Key words: Rice straw, Acid, Enzyme, Hydrolysis, Bacillus firmus, Bacillus thuringiensis, Bacillus megaterium
Muhammad Sirajo **ERCICSTR1904065**	**Evaluation of Nutritional Potential of Ficus Carica Fruits** **Muhammad Sirajo** **Department of Chemistry, Sokoto State University, Sokoto State, Nigeria** **Abstract** The proximate, minerals, amino acids and anti- nutrients compositions of Ficus carica fruit were evaluated. The proximate analysis revealed the following: moisture 81.67%, ash 4.33%, crude lipid 11.67%, crude protein 4.42%, carbohydrates 75.75%, crude fiber 3.38% and energy value of

425.10kcal/100g on dry weight basis. Magnesium (182.55mg/100g), calcium (57.44mg/100g), and potassium (268.33mg/100g) were the predominant macro elements present in the fruit. Iron (17.50mg/100g), manganese (1.04mg/100g) and copper (1.98mg/100g) were the micro elements detected in appreciable amount. Essential amino acids were above the recommended level by Food and Agricultural Organization/World Health Organization (FAO/WHO) for adults. The results of anti-nutrients to nutrients molar ratios are below the critical levels known to inhibit the availability of some minerals element. The present investigation showed that Ficus carica fruits are rich source of many important nutrients that appear to have a very positive effect on human health.

Keywords: Ficus Carica, Fruit, Minerals, Amino Acids, Anti-Nutrient Agents

Azadrachea Indica Leaves Extract Assisted Green Synthesis of Ag@Tio2 for Degradation of Methylene Blue and Rhodamine B Dyes in Aqueous Medium

Muhammad Saeed
Department of Chemistry, Government College University Faisalabad, Faisalabad, Pakistan

**Muhammad Saeed
ERCICSTR1904069**

Abstract

Water pollution by textile industry is one of the important issues. Therefore, there is a need for methods to remove organic dyes from textile industrial effluents. Various metal oxides have been used as catalysts for degradation of these dyes. The catalytic efficiency of metal oxide can be enhanced by doping of metal oxides with metals. Here, we report the synthesis and characterization of Ag@TiO2 particles and investigation of their photo catalytic efficiency towards aqueous phase photo-degradation of methylene blue and rhodamine B dye under irradiation of light. TiO2 catalysts with 1, 2, 3 and 4% loading of Ag were prepared by green methods using Azadrachea Indica leaves extract as reducing agent and titanium dioxide and silver nitrate as precursor materials. Prepared catalysts were characterized by different characterization techniques like scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD). Catalytic degradation of Methylene blue and Rhodamine B were carried out in Pyrex glass batch reactor. Deposition of Ag greatly enhanced the catalytic efficiency of TiO2 towards degradation of dyes. Irradiation of catalyst excites electrons from conduction band of catalyst to valence band yielding an electron-hole pair. These photo excited electrons and positive hole undergo secondary reaction and produce OH radicals. These active radicals take part in degradation of dyes. More than 90% dyes were degraded in 120 minutes. It was found that there was no loss catalytic efficiency of prepared Ag@TiO2 after recycling it for two times. Effect of various parameters like agitation speed, temperature, catalyst dose, concentration of dyes and time were studied under visible irradiation, dark and ultra violet radiations.

Keywords: TiO2; Ag@TiO2; Methylene Blue; Rhodamine B; Photo Degradation

Synthesis and Characterization of Ag-Fe3O4 Nanoparticles and Evaluation of their Photo Catalytic Activity
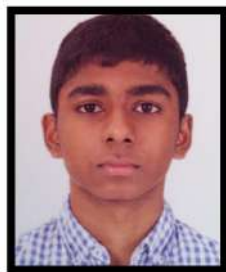
Abstract

Fe3O4 known as magnetite is one of the oxides of iron which plays a major role in various fields of sciences. Fe3O4 was synthesized precipitation method using $FeCl_3 \cdot 6H_2O$, $FeCl_2 \cdot 4H_2O$ and $NH_3 \cdot H_2O$ as precursor materials. The synthesized Fe3O4 nanoparticles were used as photo catalyst for aqueous phase photo degradation of methylene blue. The photo catalytic activity of Fe3O4 was remarkably enhanced by doping of Fe3O4 with Ag nanoparticles. Ag nanoparticles were immobilized on Fe3O4 by green method using leaves extract of Calotropis gigantea plant. The synthesized nanoparticles were characterized by advanced techniques, XRD, EDX, TGA and SEM. The synthesized Ag-Fe3O4 were successfully tested as photo catalyst for aqueous phase degradation of methylene blue dye under visible irradiation. The degradation of 0.0188 M (50 mL) methylene blue dye solution obtained after treatment of dye with Fe3O4 and Ag-Fe3O4 for 120 minutes was 41 and 73% respectively. The degradation kinetics in present study was described by Eley–Rideal mechanism. The rate constants were determined as 0.0076, 0.0102 and 0.0131 per minutes at 30, 40 and 50 °C respectively. 22.2 kJ/mol was calculated as energy of activation using the Arrhenius plot. Similarly, 0.0207, 0.0138 and 0.0102 per minutes were determined as rate constants with 0.0063, 0.0125 and 0.0188 M as initial concentration of dye respectively. High concentration of dye imparts an intense color to solution which suppress the infiltration of photon to the solution resulting a decrease in rate of reaction.

	Keyword: Ag-Fe3O4, Calotropis Gigantea, Methylene Blue, Photo Catalysis, Eley–Rideal Mechanism
Mayooran Thevaraja ERCICSTR1904070	**Regression Analysis based on Copula Theory- By Using Gaussian Family Copula** **Mayooran Thevaraja** **Department of Interdisciplinary Studies, Faculty of Engineering, University of Jaffna, Sri Lanka** **Abstract** Researchers are often interested to study in the relationships between one variable and several other variables. Regression analysis is the statistical method for investigating such relationship and it is one of the most commonly used statistical Methods in many scientific fields such as financial data analysis, medicine, biology, agriculture, economics, engineering, sociology, geology, etc. But basic form of the regression analysis, ordinary least squares (OLS) is not suitable for actuarial applications because the relationships are often nonlinear, and the probability distribution of the response variable may be non-Gaussian distribution. One of the method that has been successful in overcoming these challenges is the generalized linear model (GLM), which requires that the response variable have a distribution from the exponential family. In this research work, we study copula regression as an alternative method to OLS and GLM. The major advantage of a copula regression is that there are no restrictions on the probability distributions that can be used. First part of this study, we will briefly discuss about copula regression by using several varieties of marginal copula functions and copula regression is the most appropriate method in non-Gaussian variable (violated normality assumption) regression model fitting. Also, we validated our results by using real world example data and random generated (50000 observations) data. Keywords: Regression, Ordinary Least Squares (OLS), Multivariate Gaussian Copula, Copula Regression Generalized Linear Models (GLM)
Sanmati Shrikant Patil ERCICSTR1904073	**CFD Analysis on Effect of In-cylinder Temperature on Emission Characteristics of Biogas on CI Engine** **Sanmati Shrikant Patil** **Department of Mechanical Engineering, Mangalore Institute of Technology and Engineering, Moodabidri, Visvevaraya Technological University, Karnataka, India** **Abstract** The current pattern of energy consumption which is heavily dependent on fossil fuels cannot be sustained because of two major constraints:the environmental impact of fossil fuel uses and the depletion of their reserves.One of the most effective approaches to mitigating emissions would be reducing consumption of fossil fuels,by substituting them with renewable energy resources such as biomass.Biogas derived from organic waste is a promising alternative renewable and gaseous fuel for internal combustion engines (IC) and could even substitute for fossil fuels.It is a biomass derived fuel which can be used in internal combustion (IC) engines, because of its better mixing ability with air and clean burning nature.Biogas is produced by anaerobic digestion of various organic substances such as kitchen wastes, agricultural wastes, municipal solid wastes, animal wastes etc., which offers low cost and low emissions than any other secondary fuels.Biogas in diesel is normally operated in dual-fuel mode where biogas acts as primary fuel and diesel acts as pilot fuel.The aim of the project is to study the diesel as well as the biogas-diesel dual fuel engine performance and emission characteristics by experimental methods and to validate the results with CFD analysis.The best suited design of dual-fuel CI engine cylinder is modeled so as to obtain optimum results. Keywords: Biogas, Renewable Energy, IC Engines
Abdullahi Usman Garin Gabbas ERCICSTR1904078	**Impact Strength, Water Absorption and Mechanical Properties of HDPE-Waste Filled with Bambara Nut Shell Powder and Eggshell Powder (BNSP/ESP)** **Abdullahi Usman Garin Gabbas** **Department of Science Laboratory Technology, Hussaini Adamu Federal Polytechnic, Kazaure, Nigeria** **Abstract** Over the past years, bio-fillers are used in the production of biodegradable polymer composites that can replace the non-biodegradable synthetic polymers that poses serious threat to the environment. In

this work, Bambara nut shell powder (BNSP) and eggshell powder (ESP) were incorporated to reinforce HDPE-waste resulting in the formation of a biodegradable hybrid composite. The impact strength, water absorption and mechanical properties of the neat HDPE-waste and that of the HDPE-waste/BNSP/ESP hybrid composite were then investigated. Characterizations of the composites were accomplished using Fourier transformed infrared spectroscopy (FT-IR), Differential scanning calorimetry (DSC) and Thermogravimetric analysis (TGA). The addition of these bio-fillers showed a significant increase in the impact strength, water absorption, elongation at break and flexural modulus of the hybrid composite as compared to that of the neat HDPE-waste. The two bio-fillers were successfully used as reinforcement for the HDPE-waste and offers new opportunity in the production of new materials for advanced application.

Keywords: HDPE-Waste, Bambara Nut Shell Powder, Eggshell Powder, Bio-Filler, Hybrid Composite, Mechanical Properties

Hazel Oliquino **ERCICSTR1904079**	**Duriboard: Synthesis and Acoustic Properties of Durian (Durio Zibethinus) Peel-Based Sound Damping Fiberboard** **Hazel Oliquino** **Department of Education, Caraga Regional Science High School, Surigao City, Philippines** **Abstract** Sound damping material is an emerging in-demand product that is used to control noise pollution. This study aimed to produce a sound damping fiberboard made from ground durian peel that is efficient, cost effective and environmentally friendly that serves as an alternative to commercial sound damping materials. Thirty (30) grams of ground durian peeling were mixed in a solution of seventy-five (75) ml of sodium silicate and seventy-five (75) ml of tap water. The mixture was sun dried for three (3) days for drying process. Two (2) sample and one (1) control setup were prepared to identify the difference of sound reduction in high and low frequencies. Results revealed that DuriBoard was more effective against the commonly used sound damping material which is egg carton under low frequency with a decibel drop difference averaging at 14 dB with a significant difference established between them; furthermore, statistics also revealed a significant difference between their pores' diameter with the DuriBoard having a median pore diameter of 147 µm against 43.7 µm of that of the egg carton resulting to the better performance of the former. The Sound Damping Test was done at Biochemistry Laboratory of Caraga Regional Science High School and the Pore Diameter Test was done at the Ateneo de Davao University Chemistry Analytical and Research Laboratory. Moreover, One-Way Analysis of Variance (ANOVA) was used as a statistical tool in identifying the significant difference between the samples. Based on the results, it can be deduced that DuriBoard works the same as the egg carton under high frequency and works better under low frequency. Further, the researchers proposed to conduct another series of experimentation to improve the quality of the product as well as to consider other factors that are essential in improving the quality of DuriBoard such as strength and density.
Adonis Briones **ERCICSTR1904080**	**Evaluation of Anti-Angiogenic Activity and Teratogenicity of Peperomia Pellucida Ethanolic Extracts Using Duck-Chorioallantoic Membrane Assay** **Adonis Briones** **Senior High School Department, Caraga Regional Science High School, Surigao City, Philippines** **Abstract** Traditional and medicinal plants are bound to have anti-cancer properties in them. To fully assess its capacity for anti-angiogenesis, Duck-chorioallantoic membrane (CAM) assay is a quick, low-cost model that allows visible screening of how the plant extract contributes to the growth of blood vessels in the CAM. Pansit-pansitan (Peperomia pellucida) is known by the local Surigaonons to exhibit healing for wounds, burns and skin inflammation. Thus, this study aimed to evaluate the anti-angiogenic potential and teratogenic effect of the P. pellucida ethanolic extract through chorioallantoic membrane (CAM) vascularity and teratogenicity assays in duck embryos. The set-ups were composed of heparin sodium as positive control, distilled water as negative control, and P. pellucida ethanolic extract in 1 mg/mL, 1.5 mg/mL, and 2 mg/mL concentrations. With a volume of 0.10 µL, each of the five treatments was injected in the CAM by drilling a tiny hole into the air sac of 8-day-old embryos that were incubated for 37ºC. On the 10th day, the eggs were examined for CAMs vascular growth.

The observed blood vessels were counted manually and to ensure all are counted, the 3-fold technique was used and the eggs were divided into 4 quadrants. On the 11th day of incubation, the embryos were examined for gross external morphological abnormalities. Statistical analysis shows that there is a substantial difference in the effect of P. pellucida ethanolic extract on the vascularization of the embryos. It also showed that the greater the dosage, the lesser the branched points observed. Furthermore, P. pellucida ethanolic extract contributes no abnormalities to the embryos. Thus, these findings of the study indicated that Peperomia pellucida ethanolic extract might have a promising antiangiogenic potential and are not teratogenic. It warrants further studies as a potential source of herbal medicine and drugs for anti-angiogenic cancer therapy.

Keywords: Angiogenesis, Teratogenicity, Duck-Chorioallantoic Membrane Assay, Peperomia Pellucida Ethanolic Extracts

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Rhea D. Makinano
ERCICSTR1904054

Reduction of Production Delay in Vape Manufacturing through Process Improvement

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Abstract

The study aims to help Vape Manufacturing Company minimize the production delay by improving the existing production processes. The General Manager, who is also the company's owner, identified delay as the number one concern. The researcher uses Process Capability Index (CPI) to statistically measures process capability to justify the existing problem of the company. In addition, in order to determine and divide into parts the potential causes of the problem, the researcher constructed and conducted a Root-Cause Analysis and survey. The survey results were treated using Weighted Mean and Chi-square Test for Associations and underwent validation by the General Manager.

The following were identified as the significant factors causing delay: (1) No proper training of machine operators, (2) Lack of work force, (3) Long set-up time of machines, (4) Not finalized product design, (5) Inappropriate production layout, and (6) Excessive motions during process and Interrupted operations because of the "inserted items". Hence, the primary applications utilized in this study to reduce delay were various process methodologies; Time and Motion Study, Process Capability Test, Cause and Effect Analysis, Facilities Planning and Layout, etc.

M. Darmawansyah Aprianto
ERCICSTR1904068

Framework Development of Planning and Controlling Cost Contingency in Highrise Building Project

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Abstract

The growth of construction in Indonesia is growing fast. Many of technology has been found to help the quality of construction or cost efficiency. The performance of project via the cost, is one of the key factor of a successful project. In Highrise building project sometimes have cost overrun within the project caused by cost contingency. This study is to develop a framework of planning and controlling cost contingency to minimize the cost overrun. This study conducted by identified risks related to cost so that the project can including the amount of cost contingency from beginning of the project to avoid the cost overrun. The research method with statictic analysis using monte carlo simulation and risk analysis approach based on method conducted by study of literature, interviewing, survey, and expert validation. This study determines the contingency cost estimation to determine the greatest risk that influence and relationship to the value of contingency in highrise building projects based on the risk register (a list that contains risks, mitigation of risks, impacts, and risk frequencies that may occur in highrise building projects. Cost contingency obtained will be an estimation model for highrise building project

Keyword: Cost Contingency, Risk Analysis, Cost Overrun

Chiral Woodpile Morphology Optimization for Plasmonic Enhanced Enantiomeric Detection in Pharmacology Quality Management

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Gautam Ramasamy
ERCICSTR1904075

Abstract
One who is even vaguely familiar with the pharmaceutical industry would be able to recall the Softenon disaster in the 1950s which taught us the importance of the chirality (handedness) and enantiomeric purity of drugs. By the time they realised that only the R-enantiomer of the mass-produced sedative used by pregnant women (Thalidomide) had the intended pharmaceutical effect, the S-enantiomer had already caused thousands of birth defects. Since then, the detection of enantiomeric purity has advanced tremendously from chemical methods to circular dichroism (CD) spectroscopy, which permits precise measurement of the chiral signatures of enantiomers. Recently, plasmonic-enhanced metamaterials have been employed to boost the natural chiroptical effects, shown by chiral molecules, through the employment of superchiral near fields. However, the fundamental principle by which they are generated is largely left unexplained beyond the phrase 'plasmon-plasmon coupling'. This paper, for the first time, proposes a revolutionary and intuitive mechanism, verified by simulation data gathered using a 3D Maxwell solver called FDTD Solutions (which uses a finite-difference-time-domain method), to expound upon the foundation of the exceptionally pronounced CD spectrum shown by a self-developed woodpile nanostructure, which yields a positive CD peak 1206% greater than other currently used gammadion arrays in the same wavelength region. This knowledge will potentially elucidate the generation of superchiral fields in other complex nanostructures, which might enable the design of more effective superchiral-field-generating metamaterials, like the presented woodpile. Ultimately, this study advances the precision of circular dichroic measurements of enantiomeric excess, benefitting quality management in chiral drug production and increasing safety in drug consumption. Additionally, it may lead to earlier detection of HIV and other viruses.
Keywords: Plasmonic Enhanced Circular Dichroism, Chiral Metamaterials

Advent of Augmented Reality Experience in Retail and Online Shopping and its Influencing Significance in Future

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Abstract
Augmented Reality (AR) is a trending technology that augments or superimposes an image generated by a computer system virtually into the real world environment for the user's viewpoint using a smart phone or other hand held devices. AR shows recent advancements in the shopping domain with various implementation trails and refinement. The simplicity and flexibility in online shopping where people stay in their own place and do shopping brought a great challenge to retail shopping environment today. Retail stores are now struggling a lot to bring in the customers and the foot traffic has been greatly reduced due to which online sales are boosting and retail sales are stalling. This necessitates to bring new technological innovations to offline shopping to attract people. With the use of AR, it is possible to merge digital component to physical products in the store to stimulate the engagement of the shopping experience with more fun and joy. On the other hand, in the online shopping, though user reviews and product showcase aids the customers to analyze the quality, look and feel of diverse products, the buyer still cannot see how exactly the product fits in a real environment or how it works. Here plays AR a vital role in online shopping where it uses animations and visualization techniques to offer more value to their shoppers virtually aiding to see exactly the look of the product in user environment. This paper explains the advancement of AR in both retail and online shopping of various product domains with an implementation model of ShopAR for Online shopping and AR significance in near future.
Keywords: Augmented Reality(AR); E-commerce; Retail Shopping; Online Shopping; Visualization; Smart Phone

Dr. Amanpreet Kaur
ERCICSTR1904081

A novel approach to classify the shoulder motion of upper limb amputees

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Abstract

Myoelectric signals offer critical perceptions in translating the motion intention in upper limb amputation with various feature extraction techniques. In the upper limb amputation, the initial step for controlling the prosthetic deviceis to extract the attribute from the Surface electro myography signal and then classify the signal for driving the different arm/hand movements. The main aim of this paper is to describe the classification of different shoulder movements of the upper limb amputee using the various machine learning techniques. A new transformation method is proposed to make the feature vector used for classification. The performance of different trained classifiers such as Naïve Bayes, k-nearest Neighbor, Decision Tree, Random Forest, and Support Vector Machine are compared using different parameters such as sensitivity, accuracy, and F-measure. The combination of data transformation for feature extraction employing random forest classifier performed best with 98% accuracy for the classification of different shoulder motions.
Keywords: Surface electro myography, Support vector Machine, Naïve Bayes, Random forest, Decision tree, Upper limb Amputation

An Expert System of MRI Spinal Cord Tumor Types Using GLCM Features for Classification Techniques

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Abstract
Automatic detection and classification of abnormal medical images are very challenging in computer assisted identification of anomaly which helps the physician and the experts. The work presented in this paper attempted integrated method for automatic classification of spinal cord tumor by determining feature values of the Sample image. The integration of algorithm such as Gray Level Co-occurrence Matrix (GLCM) with Multivariate Support Vector Machine (MSVM) and K-Nearest Neighbour (KNN) classifiers approaches are producing effective results in spinal cord tumor classification. In the feature extraction stage, Gray Level Co-occurrence Matrix (GLCM) is used to compute the discriminative features. In the classification stage, the obtained features provide as input for the classification algorithm. Both approaches will classify the abnormal images along with its three types which are based on the location of the tumor existence in the spinal cord in an automatic process. Features extracted with GLCM integrated with MSVM produced 96% accuracy results. Similarly GLCM combined with KNN produced 86.5% accuracy during the classification. The performance shows the efficiency and adeptness of the integrated model.

Indian Green Rated Buildings with various Rating Systems and its Response in Climate

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Manju Arjunan ERCICSTR1904083

Abstract
Globalization and different rating systems are established in Asian countries , Europen , America etc to provide sustainable way of construction projects and responsive to climate change . It involves various criteria and have been followed to provide the sustainable development .This paper aim to develop a systematic critical analysis of the different rating systems and its objectives in sustainability and Climate impact ,specially IGBC LEED (Indian green building council and Leader hip in energy and Environment , GRIHA (Green rated in habited Assessment).Also analysing salient features in CASBEE (Comprehensive Assessment System for Building Environmental Efficiency) from Japan and Green Star Australia were analysed in this paper. This Asian rating systems developed and derived from BREEAM (BuildingResearch Establishment Assessment Method)& U SLEED (Leadership in Energy and Environmental design) Among these various rating systems were initiated in different contexts with different standards in Asian countries. In common phenomenon all ratings established with Indoor Environment Quality, Energy, and Material are core common categories for all. It focussed more on public buildings and industrial ,residential, institutional factors to improve the capability of green rating systems for sustainability. Further in research it is meticulously focus more on Commercial and Industrial factors and need to improve the capability of different rating systems for sustainable assessment methods for a period of ten years and its climate impact
Keywords: Sustainable, LEED, IGBC, BREEAM, GRIHA, CASBEE

Ramesh Chand Meena ERCICSTR1904084	**Photo chemical process for conversion ans storage of solar energy. Congo Red glycerin system**

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Abstract

Photogalvanic effect was studied in photogalvanic cell containing glycerol as reductant and Congo red as photo sensitizer. The potential and photocurrent generated were 587.0mV and 110.0 uA respectively. The power of the cell was 45.0uW at its power point. The observed conversion efficiency was 0.66 % and fill factor was determined as 0.74. The photogalvanic cell can be used in dark for 40 min. showing the storage capacity of the cell against charging time was 180 min. The effects of different parameters' on electrical output of the cell were observed. Present work is carried out using Congo red dye (LOBA), glycerol (ASSES) and NaOH solutions of (S.D.fine). The stock solutions of chemicals were prepared in doubly distilled water and were kept away from the sun or in amber colours bottles. The photosensitive solutions i.e. mixture of solution glycerol, Congo red and sodium hydroxide is filled into the consisting of an H- shaped glass tube. The cell is either painted black or in covered with a black glaze paper leaving a window in one arm. A Pt electrode of 1.0 * 1.0 cm2 is dipped into one arm and in another arm saturated calomel electrode (SCE) was placed.
Keywords: Photogalvanic Cell, Photo Sensitizer, Cell Efficiency, Congo Red

Dr. Arockiasamy Clementking ERCICSTR1904085	**Cognitive Load Prediction and Optimization Model for Cognitive Communication Disorder using Neural Networks**

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Abstract

The cognitive computational models are attempting to resolve the human intelligent issues and mimic multiple processes. The complexity of the model demands high level of computing and prediction in dynamic environments. The integrated process of cognitive and artificial intelligent computing systems together achieve a human model for functional and thinking process as well. The cognitive task analysis and its functional optimization supports the human to act as normal and to solve the human disorders. It leads to brain functional mapping, optimizing tasks that are challenging while mimic the human thinking. The functional process of human disorder based on human functionalities such as Attention, Memory, Perception, Insight , Judgment, Organization, Orientation, Language, Processing speed, Problem solving ,Reasoning, Executive functioning and Metacognition.

Cognitive Task Analysis (CTA) understands the tasks that require numerous cognitive activities to integrate human functional process. The integration mismatch process leads to cognitive communication disorder based on Cognitive Task Load (CTL). Cognitive Task Load (CTL) plays human functions mapping and balancing mental effort to act as a normal human being. The cognitive communication disorder remedied using conversation therapy, visual attention therapy, spaced retrieval therapy, number therapy, and category therapy. However, the balances between providing these therapies are having challenges to predict while treating the affected person with brain injury.

The computational process such as Clustering, Classification, Neural Network models from Data Mining, Machine Learning and Deep Learning techniques are aiding to optimize the solutions according to the nature of the problem. The neural network model supports to optimize the process and enhance performance while computing optimum solution. The static and dynamic domain environment variables are influencing the learning and responding process in cognitive models. The proposed research aims to develop a cognitive load-balancing model, which predicts human behavior under specific circumstances. The model aids to enhance human-machine inference prediction which could be applied in the real time environment to resolve cognitive communication disorder. The study leads to map the applicability of cognitive process into learning environment to enhance the knowledge acquisition applications. The mapping process focus to use the cognitive tools for knowledge gathering, processing and its effective activities. This research work also predict cognitive task for human functional process to identify the balancing ratio of therapies based on Master Slave Back Propagation Neural Network Model.

The proposed model expected to use computing technology to mimic human inference with abled process devices to overcome cognitive communication disorder issues and effectively understand tasks

that require lots of user cognitive activity, such as decision-making, problem-solving, memory, attention and judgment.

Keywords: Cognitive Computational Model, Cognitive Communication, Cognitive Analysis, Cognitive Task Analysis, Data Mining, Cognitive Load Prediction, Neural Network Model

Conceptual View of AI in Biomedical System

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Abstract

Medical artificial intelligence is primarily concerned with the construction of artificial intelligent (AI) programs that perform diagnosis and make therapy recommendations. Medical AI programs such as statistical and probabilistic methods are based on symbolic models of disease entities and their relationship to patient factors and clinical manifestations. The use of AI in healthcare in India is increasing with new startups and large ICT companies offering AI solutions for healthcare challenges in the country. The challenges to the use of AI in healthcare were identified predominantly through a review of literature, interviews and roundtable inputs. AI solutions in health include artificial intelligence, machine learning, neural networks, multi-agent systems, innovation in healthcare and fuzzy logic. The term health includes health, healthcare, diagnostics, hospitals, telemedicine, pharmaceuticals, medical equipment and supplies, and health insurance, clinical data. The emerging use cases of AI in the healthcare sector can be seen as a collection of technologies enabling machines to sense, comprehend, act and learn so they can perform administrative and for training purposes. The integration of AI in healthcare in India has been seen as a key technology towards improving the efficiency, quality, cost, and reach of healthcare. There are several promising applications of AI in the medical devices sector and professionals are looking for advantage on the impact of this technology. This paper attempt to figure AI in Biomedical system and with this knowledge new innovations will come up in future.

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