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AREA: MECHANICAL ENGINEERING

ID 43: Optimization of Laser Cutting Parameters on 700MC Steel using Grey Relational Analysis

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Abstract— This paper presents an investigation of the optimization of laser cutting parameters on 700MC steel. The cutting parameters investigated in this study are focused on Laser power, cutting speed, and gas pressure. Full factorial design (3k) is employed as the random run of the experimental. Grey relational analysis is used to determine the optimization of these parameters. The experimental results show that the optimal cutting condition for laser power, cutting speed and gas pressure is 2600W, 1500 mm/min and 0.06 bars, respectively. In addition, the experimental validation provided the surface roughness and kerf width is 3.870 μm and 0.696 mm respectively.

Keywords— Laser cutting; Optimization parameter; Grey Relational Analysis

ID 49: Statistical Signal Analysis for Preliminary Chemical Liquid Characterization

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Abstract—Chemical liquid can be classified by several conventional methods which time consuming and complicated. This preliminary study integrates an alternative approach that can significantly characterize the chemical liquid property. A simple tapping excitation technique has been proposed and conducted to measure the tapping sound signal using test tube-microphone- data acquisition configuration. Four different types of chemical liquid are employed as a test piece. The tapping sound signal from the test tube has been analyzed using several statistical signal analysis parameters. The validity of the proposed preliminary classification of the chemical liquid is carried out by clustering method and a good characterization result was obtained.

Keywords— chemical liquid characterization; tapping excitation; statistical signal analysis, transient vibration

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ID: 50 Carburizing of Rolled and Non-Rolled High Manganese Steel

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Abstract—High manganese steel is a steel type with manganese content of 15 – 30 %. It is applied to various industries based on various properties inclusive of high strength ability. Problems or defects occur during the deformation of this steel include tearing and cracking. High loads applied during the deformation process lead to the increase the problems and damages of the machine components. In order to resolve this, carburizing was introduced. Carbon diffused into the steel surface changes the strength and microstructure. The research is carried out to reduce the load and defect of the product and machine component along the deformation process. In this paper, an experimental work was undertaken to compare the results of tensile test of pack carburizing (non-rolled) and gas carburizing (rolled). The objective of this work is to investigate the effect of carburizing on the strength-ductility properties of rolled and non-rolled Fe-24Mn steel. Investigation of the stress – strain relationships of three specimens for rolled and non-rolled with different carburizing time is the aim of this paper. For the purpose of achieving this aim, the measurements and evaluation of yield strength, ultimate tensile strength, elongation and hardness were performed on the steel samples subjected to tensile loading. The finding witnesses that the carbon improves the mechanical properties of this steel. The most commonly accepted method in evaluation of the mechanical properties of material would be the tensile test. This test explains the different results of stress-strain relationship with and without rolling processes with different carburizing time. Finally, this research indicates some future investigations required in order to support the quality of the findings.

Keywords— High Manganese Steel; Fe-24Mn; Gas and Pack Carburizing; Rolled and Non-rolled; Mechanical Properties

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ID 61: Operational Modal Analysis (OMA) in Detecting Simulated Crack in Epoxy Fiberglass

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Abstract—Composite materials with nonlinear properties are prone to subsurface damages such as core crack, delamination, etc., that are difficult to detect visually. Despite of vibration response as one of damage detection method that is widely used in engineering applications, its usage to nonlinear and non-homogenous properties especially in composite materials is still limited. This study successfully applies vibration based damage detection method specifically operational modal analysis (OMA) on fiberglass reinforced epoxy plate. OMA is used on undamaged fiberglass reinforced epoxy plate to extract the modal parameters and after which the procedure is extended to damage fiberglass reinforced epoxy plate. Both healthy and damaged composite material are tested for different boundary conditions i.e. free-free on 4 edges, 1 edge clamped, 2 edges clamped, 3 edges clamped and 4 edges clamped conditions. Then result of frequency from OMA was compared analytically with finite element method. Nastran software is employed in this study. Based on the results, it shows that a high deviation between OMA and finite element method can be observed. Though, result of frequency from OMA was then compared with Experimental Modal Analysis (EMA) to validate the effectiveness of OMA method. It shows that OMA can be validated experimentally using EMA. Results of modal parameters obtained OMA was then compared between healthy and degrees of damaged (1st degree, 2nd degree and 3rd degree of damaged simulated crack) specimen plates to detect damage using changes of modal parameters.

Keywords— operational modal analysis; frequency; finite element method; composite material component;

ID 84: Finite Element Analysis of Go-Kart Chassis

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Abstract—This paper aims to model, simulate and perform the static analysis of a go kart chassis consisting of circular beams. Modeling, simulations and analysis are performed using modeling software i.e. SolidWorks for Go Kart Challenges 2017 (GKC-17). The maximum stress and displacement is determined by performing static analysis. The result of maximum stress is compared to maximum yield strength of maximum stress whether the maximum stress is exceeding the maximum yield strength or not. It can also show the displacement where it shows the deformation of the chassis part when the load applied to the chassis.

Keywords— chassis; go kart; FEA; SolidWorks

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ID 86: Study of Piper Nigrum (Black Papper) Performance as Corrosion Inhibitor for Ductile Iron

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Abstract—The purpose of this study is to consider the effective of Piper Nigrum as green corrosion inhibitor towards ductile iron in 1M Sodium Hydroxide. Piper Nigrum, black pepper undergoes extraction process and the final product in the form of liquid which acts as inhibitor. The sample of this inhibitor was analyzed by Fourier Transform Infra-Red Spectroscopy (FTIR) in determining the bonding and the functional group of inhibitor. Meanwhile, the capability of Piper Nigrum to inhibit corrosion was tested based on concentration of inhibitors by using the gravimetric method. Ductile iron was exposed to 1M Sodium Hydroxide which acts as corrosive medium and inhibitor concentration of 0.1, 0.2 and 0.3 g/L respectively for three hours at constant temperature of 50oC. In addition, there is one ductile iron was exposed to 1M Sodium Hydroxide in the absence of inhibitor. Moreover, the ductile iron was visualize by the microstructure observation through microscope. For result, FTIR indicate that the presence of hetero atoms in alkaloids Piperine made Piper Nigrum have an ability in inhibit corrosion. Besides, Piper Nigrum can achieve maximum inhibition efficiency of 97.97% while the corrosion rate is only 0.8059 mm/year at 0.3 g/L inhibitor. Furthermore, in terms of microstructure, the concentration of inhibitor gives no significant effect on the microstructure. However, the morphology of ductile iron microstructure shows slightly difference when the ductile iron immersed in higher concentration of inhibitor. This proved that the higher concentration of inhibitor, the less corrosion occurred.

Keywords—Corrosion, Corrosion Inhibitor, Ductile Iron, Piper Nigrum, Gravimetric Test, Microstructure

International Conference on Engineering and Computing Technology (ICECT)

AREA: CIVIL ENGINEERING AND ANY FIELD RELATED TO SCIENCE & TECHNOLOGY

ID 16: Strength and Durability of Self Consolidating Concrete Containing Recycled Materials

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Abstract—Self Consolidating Concrete (SCC) is an emerging class of concrete materials that offers great potential for improved ease of positioning and scaled down cost through reduced time and labour. Generally, tonnes of Construction and Demolition Wastes (C&DW) are raised daily. For this reason, the search into the use of coarse recycled concrete aggregate produced from crushed concrete waste is looked into. Many researchers had found that waste materials have unique properties that could improve the quality of self consolidating concrete produced. Therefore, the reuse of RCA generated as the supplemental material for the replacement of aggregate are significant in reducing the environmental impact. This research was focused on the strength characteristic and the chloride permeability level of SCC containing RCA. The influence of RCA content in the range from 0% to 100% of Natural Aggregate (NA) to the strength characteristic and the chloride permeability level of SCC was identified and compared with SCC containing normal mixes. In this research, three (3) series of concrete specimens were cast with different water cement ratios (0.53, 0.49 and 0.45). The concrete specimens were subjected to strength at the age of 3, 7, 14, 21, 28, 56 and 90 days and durability at the age of 28, 56 and 90 days. The result indicated that the compressive strength and chloride permeability of SCC containing 100% RCA replacement give better performance than the 0% RCA replacement. Based on the finding, SCC containing 100% RCA replacement can be categorized same as a conventional concrete hence it can be utilized for construction purposes. RCA can also acts as an alternative replacement in concrete for replacing the NA.

Keywords—Strength Properties; Rapid Chloride Permeability Test; Self Consolidating Concrete; Recycled Concrete Aggregate;

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ID 36: Effect of Gluelines for Mengkulang Glulam Dowel-bearing Strength

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Abstract— Malaysia is one of the tropical countries around the world which is the pioneer in timber harvesting. Mengkulang is known for its strength and durability. In timber construction, connection is the most important part. The strength of timber has huge impact of the connection strength and the whole structure. Furthermore, timber strength connections also depend on the factor affecting which is bolt diameters and end distances. The objectives of this research are to determine the dowel-bearing strength for 12mm, 16mm and 20mm bolt diameter thus to compare the dowel-bearing strength between glue line and without glue line. The dowel-bearing strength test was tested on Mengkulang timber species for different dowel diameters which are 12mm, 16mm and 20mm for with and without glue line parallel to the grain using half-hole test. The dowel-bearing strength, F_y values of 5% diameter offset-load, $F_{5\%}$ are obtained from load versus displacement graph using ASTM D5764-97a. The dowel-bearing strength, F_y for 20mm diameter with glue line showed 14.71 N/mm² higher than 16mm diameter and 12mm diameter with 14.44 N/mm² and 11.63 N/mm² accordingly. While, the dowel-bearing strength, F_y for 20mm diameter without glue line showed 15.64 N/mm² higher than 16mm diameter and 12mm diameter with 14.71 N/mm² and 14.44 N/mm² respectively. In conclusion, the bigger diameter the higher dowel-bearing strength and the dowel-bearing strength for without glue line showed higher than dowel-bearing strength with glue line.

Keywords— Mengkulang; connection; bolt diameters; dowel-bearing strength; half-hole test

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ID 63: Structural and Electronic Properties of CO and NO Gas Molecules on Pd-Doped Vacancy Graphene: A First Principles Study

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Abstract— Based on first principles of Density Functional Theory (DFT), the effect of CO and NO adsorption on vacancy graphene and Pd-doped vacancy graphene were investigated for structural and electronic properties. The density of states, the most stable adsorption site and adsorption energy of these small gas molecules on vacancy graphene and Pd-doped vacancy graphene are thoroughly discussed. It is found that Pd doping enhances the strength of interaction between CO and NO molecules and the modified vacancy graphene sheet. The most stable adsorption site for CO and NO on vacancy graphene and Pd-doped vacancy graphene are identified and reported. The result presents the potential of vacancy graphene and Pd-doped vacancy graphene for application molecules sensor.

Keywords— Density Functional Theory, Vacancy graphene, Pd-doped vacancy graphene, Defect

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ID 64: First Principle Study On Structural And Electronic Properties Of Ternary Co₂FeSi And Quaternary CoFeSiX (X=Ag,Pt) Heusler Alloys

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Abstract—The structural and electron properties of ternary Heusler alloys Co₂FeSi with an Fm₃m (space group No. 225) structure were investigated using density functional theory with pseudo-potential based within the local density approximation scheme. The calculated half-metallic gap of Co₂FeSi is quite small (approximately 0.17eV). The calculated lattice constant of Co₂FeSi are in good agreement with available experimental data. We also investigated the new series quaternary Heusler alloys CoFeSiX (X=Ag,Pt) with an F43m (space group No. 216) to compare with the Co₂FeSi.

Keywords—First principles; structural; electronic; Heusler alloy

ID 70: The Effect of Ground Granulated Blast Furnace Slag Content on Mechanical Properties of Polypropylene Fibre Engineered Cementitious Composites

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Abstract—This study investigated the effects of Ground Granulated Blast Furnace Slag (GGBS) content on mechanical properties of Engineered Cementitious Composites (ECC) made of Polypropylene (PP) fiber and local sands. Three different percentage of GGBS (50%, 60% and 70%) were used in the same series of PP fiber content in ECC mixtures. PP fiber varied at 1.5%, 2.0% and 2.5% in volume fraction. Compression test and three-point bending test were carried out after 28 days of curing. Test result demonstrated improved compressive strength and flexural behavior in ECC compared to normal concrete.

Keywords—ECC, GGBS, fiber, compression test, flexural test

ID 91: Structural and Optical Properties of Nd³⁺ doped Lead Borotellurite Glass Containing Silver

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Abstract—Nd³⁺ doped Lead Borotellurite Glasses Containing Silver were successfully prepared by conventional melt-quenching method with the chemical composition (69.5-x)TeO₂-20B₂O₃-10PbO-0.5Nd₂O₃-xAgNO₃ (where x = 0, 0.5, 1.0, 1.5, 2.0 and 2.5 mol %) by varying the silver nitrate content. The structural properties have been studied through X-ray diffraction (XRD) analysis and Fourier Transform Infrared (FTIR) spectroscopy. Meanwhile, the optical properties of the glass samples have been characterized by Shimadzu UV-1800 UV-Vis spectrophotometer in the range of 190 – 1100 nm. From the absorption spectra, absorption peaks will be obtained and band assignments of each peak can be determined. The XRD pattern has been used to confirm the amorphous nature of the glass samples. There are no sharp peaks were observed in XRD patterns of the glass samples which confirmed the amorphous nature of the glass. FTIR spectra were used to analyse the functional groups present in the glass samples. The FTIR spectra reveals the presence of Te-O-Te or O-Te-O, Ag-O, Te-O-Pb, BO₄ and characteristic of the hydrogen bond in the prepared glass samples.

Keywords—Borotellurite glasses, Neodymium, XRD, FTIR

AREA: COMPUTER SCIENCE

ID 12: m-Naslada: A Mobile Application for Black Pepper Crop Disease Information

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Abstract—This paper presents mobile application uses for agriculture advancement. Certain criteria needed for development of a mobile application are described. A mobile application known as m-Naslada was also proposed and highlighted. m-Naslada is an example of a mobile application prototype developed for agriculture purposes. The m-Naslada is specifically aimed at providing information concerning black pepper crop diseases. The m-Naslada is expected to play an effective role to black pepper crop farmers by meeting to their requirements and providing necessary information in relation to the diseases that may affect the crop. Feedback received from the evaluation conducted towards m-Naslada were also found positive. The work projected herein might be used as a baseline and aid in the continuation of various research scopes within the agriculture sector.

Keywords—Agriculture, Android, Complexity, Mobile Applications, Mobility, Simplicity.

ID 20: A management efficiently seeds rate by auction bandwidth in Content Centric Network with Provider Portal for Application (P4P)

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Abstract— A recently years, Hybrid Distribution Network (HCDN) was proposed to improve efficiency of CDN. However, CDN servers need to share bandwidth for all contents whose they provided, so performance of busy servers might not always be satisfied. Later, Content Centric Network (CCN) has been proposed to provide better client satisfaction based on content perspective. However, CCN exposes a problem in bandwidth management between clouds and clients.

In this paper, we proposed the new technique to improve efficiency of bandwidth management on CCN by using Provider Portal for Application (P4P) to raise the number of seeders for define a new group in peer to peer mode, we had made of another way to distribute some popular contents in CCN networks. The P4P consists of the appTracker and iTracker which help a main server to manage between requests and service clouds. Furthermore, we do use bandwidth auction to improve efficient and flexibility of clients' requests that made an appropriate number of clouds. For experimental results, we proposed technique shows improvement number of seeds and download bandwidths with fuzzy logic algorithm that made an average rate in 25 percent compared to HCDN and CCN.

Keywords—content centric network; Auction Bandwidth;

ID 23: Discovering Climate Change Patterns Using Hierarchical Clustering And Association Rules

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Abstract— Ozone analysis is the process of identifying meaningful patterns that would facilitate the prediction of future trends. One of the common techniques that have been used for ozone analysis is the clustering technique. Clustering is one of the popular methods which contributes significant knowledge for time series data mining by aggregating similar data in specific groups. However, identifying significant patterns regarding the ground-level ozone is quite challenging task especially after applying the clustering task. This paper aims to propose a pattern discovery method for ground-level ozone. The proposed method consists of an Agglomerative Hierarchical Clustering with Dynamic Time Warping (DTW) as a distance measure. AHC has been applied on a Malaysian Ozone change dataset collected from Putrajaya for year 2006. Consequentially, the patterns have been extracted using the Apriori Association Rules (AAR) algorithm. The experiment shows that the extracted patterns are related to CO which is an interesting relation in accordance to the literature.

Keywords— Hierarchical Clustering, Dynamic Time Warping, Ground-Level Ozone, Apriori Association Rules

ID 27: The Evolution of Information Dissemination, Communication Media and Technology in Malaysia

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Abstract—Information plays an important part in a human's life. With the availability of data and information, people could learn and comprehend about beneficial substances in life. Knowledge and dissemination of information have flourished today as the development of technology has intensified the way in which dissemination of information from traditional to modern means. With this increasingly evolving mass media, it has also inadvertently affected the distribution of information, expansively and flexibly. From this study, we can observe the evolution of the dissemination of information that began with printed materials to digital materials. Massive user growth has been evident from the method of reading printed materials, to the use of radio, television, Internet and mobile phone. The degree of tendency of using these methods is also comparable in terms of reliability of the information gained and accessibility of the audience through the media. Apparently, the interdependent use of the Internet and mobile phones has outperformed other media, especially in terms of information search, knowledge trustworthiness and audience accessibility.

Keywords - Information; information dissemination; communication media; communication technology; broadcasting; audience reach.

ID 65: Preliminary Study on Maintainability Evaluation Criteria in Service Oriented Architecture

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Abstract—Changes in software after its deployment is unavoidable due to various reasons thus maintaining software is a necessities to keep it relevant in its environment. Software instilled with high maintainability value can save lots of costs and efforts. Service oriented architecture (SOA) is a new paradigm that has been adopted in industry, where software can be developed using services offer from different organizations. Evaluating maintainability of SOA is considered underdeveloped when compared to other quality attributes. Evaluation process involved many elements and one of the elements is evaluation criteria. In this paper, we selected maintainability evaluation criteria based on recent studies and discusses on its applicability within the evaluation of maintainability in SOA. It will also serve to find gaps in related researches of SOA. Two categories of evaluation approaches are used to classify studies in this survey, which are qualitative evaluation approaches and quantitative evaluation approaches. These categories are then evaluated against the selected evaluation criteria. Based on the survey, there are gaps that can be explored by researchers in this area.

Keywords - maintainability evaluation approaches ; evaluation criteria ;SOA

ID 112: Market Basket Analysis for Customer Buying Pattern at Corm Café

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Abstract— Market Basket Analysis (MBA) or Association Rule Mining is a technique in data mining used to seek the co-occurrence set of items in a large dataset or database. It is usually used in mining transactions or basket data, especially in retail. This technique has been proven beneficial in understanding customer buying patterns and preferences. It has been widely used in multinational companies. Current business trends have changed dramatically, parallel with the advancement of technology. Changes in customer demand requires an improvement in accuracy of business operations. This paper proposes the implementation of MBA at a Small Medium Enterprise business, a case study at Corm Café. Daily transaction data taken from customer order sheets has been used. A detailed implementation is demonstrated in the paper. The results identify a trend in customer buying patterns, which is useful information for the owner in planning their business operation.

Keywords— Market Basket Analysis; Data Mining; Frequent Itemset Mining.

International Conference on Engineering and Computing Technology (ICECT)

ID 78: Student Students Attendance Management System based on RFID Technology

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Abstract— A student attendance was design by Management Base on RFID for record of teching time for teacher and student time in class to improve speed and reduce working time for teacher. The program has been developed on Web Application and Arduino with Internet Of Things (IoT). This product was help to improve the system. There is reduces the working time in the data record from attendance document-base to system and reduces the problem of the original system. For example, documents are lost or damaged. It also helps to reduces the student's right to attendance in classes By RFID card to record time sheet.

Keywords— Student Attendance Management Base on RFID System

ID 99: Privacy Awareness on Cloud Storage Among Students at Tertiary Level: A Case Study

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Abstract— In recent years, the usage on cloud storage has grown, including students at tertiary level. Cloud storage helps students to store and share academic materials without additional costs. However, not many studies investigate on the students' awareness level particularly in privacy related issues. This study examined the privacy awareness on cloud storage among students at Universiti Teknologi MARA (UiTM), Kuala Terengganu. The study examined the students' privacy awareness, through its level of agreement on the five elements which were cloud service awareness, privacy protection, risk analysis, security awareness and data availability participants. 90 respondents from three different programs were selected from the Faculty of Computer and Mathematical Sciences (FSKM). An independent t-test and ANOVA test were conducted using SPSS. The results revealed that there was no significance difference between both genders on the privacy awareness on cloud storage. While, there was a significance difference amongst the three different programs in FSKM about privacy protection. This study concluded that these Computer Science degree students were concerned and aware about the privacy on the cloud storage, but they were not aware about the privacy related issues in the cloud storage.

Keywords— Privacy awareness, cloud storage, cloud computing, user awareness, tertiary level

ID 108: Clonal Selection Algorithm For Low Quality Fingerprint Image Verification

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Abstract— Fingerprint verification has drawn a lot of attention to its approach in biometric since it is one of the most important biometric technologies nowadays and is widely used in several different applications and areas. It is applied in the forensic science area in order to identify the people that were involved in the criminal scenes such as the victims and the suspects. A human's fingerprint is unique and usually has its own patterns and ridges, which differs them from other's fingerprints. However, there are some drawbacks that can cause low accuracy and low performance of the verification. This occurs when the fingerprint images used are of low-quality and the fingerprints may be slightly incomplete (partial). Clonal Selection Algorithm (CSA) is known to be good in pattern matching and optimization of problems. Hence, this paper will discussed the finding of the implementation of CSA in fingerprint verification. There will be two main processes involved, which are features extraction using minutiae-based method and also the implementation of the CSA algorithm. Study shows that the FNMR result is 33.33% and the FMR is at the 16.67%. Further studies can be made by using the same algorithm, but focusing more on the feature extraction methods to improve the extraction of fingerprints.

Keywords— Clonal Selection Algorithm; CSA; Fingerprint Verification; Biometrics; Forensic Science

ID 110: Multidisciplinary Conference Management System (MdCMS): Requirement Analysis

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Abstract— An Online application and Report System for Tabung Pembangunan Akademik (e-TAPA) can be improve UiTM Kuala Terengganu, Campus Kuala Terengganu from old system into new system. The innovation of this system can give more benefits to all of users to make an online application system. It is hoped that this system will simply the processes of fill in detail in application form and also getting the approval from Staff HEA, Advisor, KPP and PR. The students can easily apply the application using the internet, other than that the student can make and submit the final report to the system. As the approval they can view, verify, review and support the application by using this system. For HEA they can get the final report after event in the system so that the file can save in the system. The users of this system can eventually evaluate the application from anytime and anywhere. The time consuming for the application form to be processed can be reduce. This system be able to cater the system for UiTM Cawangan Terengganu Kampus Kuala Terengganu.

Keywords— Multidisciplinary, Conference Management, requirement

AREA: APPLIED SCIENCE

ID 9: Inhibition Effect of 5-aza-2'-deoxycytidine on Oral Cancer Cell Line

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Abstract— Oral cancer is the sixth most common malignancy worldwide. 5-Aza-2'-deoxycytidine (5-Aza-dC) has been used to inhibit the growth of a variety of tumourous cells. Previous studies showed that 5-aza-dC can reverse the silencing of genes resulting from methylation. In this study, the inhibition effects of 5-Aza-dC towards proliferation of oral cancer cell lines, ORL-48T was examined using MTT assay. The results demonstrated the treatment with 20 μ M with 144 h and 40 μ M with 72 h of 5-aza-dC respectively showed a significant decrease of percentage of the cells viability ($P = 0.03$). This study provided an evidence of inhibitive effect of 5-Aza-dC towards proliferation of ORL-48T.

Keywords: Oral Cancer; Oral Cancer; 5-aza-2'-deoxycytidine; MTT Assay; Cell Viability.

ID 15: Assessing the selected heavy metals concentration on palm oil soil and fruit farm soil

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Abstract— This study was conducted at Felda Jengka 8, Pahang, Malaysia in order to find out the contents of particular heavy metals in palm oil soil and fruit farm soil and to estimate the pollution level. Four selected of heavy metals (Cu, Zn, Pb and Ni) in different soil sampling point were collected in triplicate and were analyzed by Inductively Coupled Plasma – Optical Emission Spectrometer (ICP-OES) after wet digestion. Contamination factor (CF) and geo-accumulation index (Igeo) were used to estimate the degree of contamination heavy metal in soil. Heavy metal concentration range were as follow; 0.910 – 2.000 mg/kg for Cu, 0.460 – 2.060 mg/kg for Zn, 0.080 – 0.220 mg/kg for Pb and 0.020 – 0.100 mg/kg for Ni. Cu and Zn concentration was found to be higher than other metal concentrations. The continuous application of chemical fertilizers possibly related to accumulation of heavy metals in soil. Results showed CF values were between moderate to considerable contaminant especially in palm oil soil. While, for Igeo values were indicated uncontaminated to fairly contaminated for the study sites. This recommends the utilization of chemical fertilizer is still in the monitoring. However, more physicochemical analyses are needed for metal analysis and determination of other heavy metal elements such as Cd, As, Se and Cr for further research.

Keywords—chemical fertilizer; contamination factor; geo-accumulation index; heavy metal

ID 28: Competitive Adsorption of Cu²⁺, Pb²⁺ and Ni²⁺ on Thiourea Modified Spent Grated Cocos nucifera

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Abstract— The behaviour of thiourea spent grated Cocos nucifera (TSGC) as an adsorbent for simultaneous removal of Cu²⁺, Pb²⁺ and Ni²⁺ from aqueous solutions in ternary system was investigated. TSGC was characterized by using a CHNOS analyser, a Fourier transform infrared (FTIR) spectrometer and a scanning electron microscope coupled with energy dispersive spectrometer (SEM-EDS). The -OH, -NH₂, -COO⁻, C-O-C, and C=S groups were present and participated in the adsorption of these heavy metal ions. Complexation was one of the main mechanisms involved as indicated by the FTIR spectra. The pseudo-second-order and Langmuir isotherm models best fitted to the adsorption experimental data. The maximum adsorption capacities (mmol.g⁻¹) of heavy metal ions by TSGC were in the order of Cu²⁺ (1.38) > Pb²⁺ (0.32) > Ni²⁺ (0.24). Overall, TSGC showed a higher selectivity for Cu²⁺. The mechanism and selective adsorption of TSGC could be explained by the hard-soft acid base (HSAB) theory, Pauling electronegativity values, and ionic radii of heavy metal ions.

Keywords—adsorption, Cocos nucifera, electronegativity, hard-soft acid base, ionic radii, selectivity

ID 31: Identification of Antioxidative Constituents and Essential Oils from Twig and Leaves of *Jasminium sambac*

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Abstract— This study aimed to investigate new essential oils and antioxidative constituents from twig and leaves of *Jasminium sambac* (Oleaceae family) from Jengka, Pahang, Malaysia as potent antioxidant sources. The antioxidant behaviour of each extracts from twig and leaves of *J. sambac* was assessed qualitatively by spraying the thin layer chromatography (TLC) of extracts with 2,2-diphenyl-1-picrylhydrazyl (DPPH) and quantitatively by DPPH radical scavenging method. The essential oils were collected from hydrodistillation process and solvent extraction method. Five new essential oils from twig of *J. sambac* were recognized as 1,1,2,2-tetrachloroethane, Estra-1,3,5(10)-trien-17 β -ol, Cholestan-3-one, cyclic 1,2-ethanediyl aetal, (5 β)-, 9,10-Secocholesta-5,7,10(19)-triene-1,3 β ,25-triol and 2-(3-acetoxy-4,4,14-trimethylandrosta-8-en-17-yl)-Propanoic acid. For leaves part, the essential oils were recognized as nonanal and 2-buten-1-one,trans- β -ionone, linalool,p-cymene, α -terpineol, isopropyl linoleate, linoleic acid ethyl ester, carveol, linalyl acetate,o-cymene, α -terpineol acetate, cis- β -farnesene, linoelaidic acid and linalyl isobutyrate. The collection of antioxidative constituents was carried out using centrifugal chromatography. The chemical structures of all constituents were identified from Gas Chromatography Mass Spectrometer (GCMS). The qualitative Thin Layer Chromatography (TLC) screening of antioxidants showed that all types of extracts from *J. sambac* leaves demonstrated moderate antioxidant behaviour as well as the extracts from twig parts. The quantitative DPPH radical scavenging activity of leaves and twig extracts revealed dichloromethane (DCM) extract scavenged DPPH free radicals more effective at IC₅₀ of 6.24 ppm and 5.22 ppm respectively compared to petroleum ether extract and methanol extract where both extracts exhibited IC₅₀ more than 100 ppm.

The antioxidative constituents isolated from DCM extract of twig of *J. sambac* were recognized as isoamyl nitrite and benzophenone whereby benzophenone was also found in DCM extract of *J.sambac* leaves. Thus, *J. sambac* can be considered as a promising source of bioactive compounds with potent antioxidant properties which can be utilize as baseline information to overcome health disorders.

Keywords: Antioxidant activity, radical scavenging, essential oil, *J.sambac*, Oleaceae

ID 47: Synthesis and Characterization of Hybrid Magnetic Nanoparticle-Functionalized Polythiophene and its Potential as a Sorbent to Remove Phthalates

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Abstract— Magnetic nanoparticle, magnetic polythiophene and magnetic poly-3-hexylthiophene were successfully synthesized. FTIR data suggested the presence of functionalized polythiophenes in the nanocomposites. XRD peaks confirmed the entire characteristic peak for Fe₃O₄ presence in all prepared nanocomposites. From the vibrating sample magnetometry hysteresis loop P3Th-coated MNPs (MNP@P3Th) demonstrated high magnetization saturation compares to other nanocomposites. BET results showed decreasing trend of pore size due to addition of polymer coating. The thermograms of nanocomposite indicated that all the nanocomposites were stable up to 210 °C. TEM images of MNP and PTh-coated MNPs exhibited a sphere-shaped geometry. The synthesized material were screened for the extraction of commonly-used phthalates namely di-n-octyl phthalate (DNOP) butyl phthalate (DBP), and butyl benzyl phthalate (BBP) and P3Th-coated MNPs (MNP@P3Th) showed highest extraction concentration for all tested phthalates.

Keywords—functionalized polythiophene; magnetic nanoparticles; phthalates

ID 51: Fabrication and Characterization of Jackfruit Seed Powder and Polyvinyl Alcohol Blend as Biodegradable Plastic

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Abstract— The biodegradable plastics (BGP) were fabricated from the blend of jackfruit seed powder starch and polyvinyl alcohol (PVA). Development of BGP is highly recommended and getting extensively interest to develop an environmentally friendly material that can be replaced the petro-chemical plastics that widely use nowadays. The aim of this research is to fabricate the BGP from the jackfruit seeds/PVA blend and characterize the mechanical and biodegradability properties. Mechanical properties of the fabricated BGP show that by increasing the composition of jackfruit seed powder starch was significantly decreased the tensile strength of the BGP. The biodegradability properties of the samples were determined by monitoring the structure of fabricated BGP by using Fourier Transform Infrared Spectroscopy (FTIR). Results shows that the structural properties were changed after 8 weeks soil burial test by comparing with control samples. BGP with high amount of jackfruit seed powder starch shows better biodegradability characteristics.

Keywords—jackfruit seed; polyvinyl alcohol; mechanical properties; FTIR spectroscopy; biodegradable plastic(BGP)

ID 54: The Effects of Equinox Phenomenon on Climate Change

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Abstract— In the recent years, Malaysia has been experienced with the weather changes especially in increasing of the temperature. The highest temperature usually occurs during equinox. Equinox is the phenomenon when the sun is directly above the Earth's equator and this happens two times a year. This study is carried out to determine the effects of equinox on climate change for five consecutive years. The information regarding of this study were obtained from Malaysian Meteorological Department. The study areas cover the state in Peninsular Malaysia which is Alor Setar, Kedah, Kota Bharu Kelantan, Johor Bahru, Johor and Kuala Lumpur. These states were chosen based on the location in North, East, South and West Peninsular Malaysia. As a result, the overall mean temperature at all stations is in the range of 27°C to 30°C. The analysis revealed that the mean temperature in March showed significant increase from year 2011 to 2015 in all station with Alor Setar recorded the highest mean temperature compared to September. However, other factors also need to be considered to the rising of the temperature such as El Nino phenomenon, amount of rainfall, number of rain days, southwest and north-eastern monsoon and other factors.

Keywords—Equinox, climate change, peninsular Malaysia, temperature

ID 57: Characterisation and Anti-Corrosion Study on Different Substituents of Ni(II) Dithiocarbamate Complexes

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Abstract—Ni(II) N-methylcyclohexyl dithiocarbamate, Ni[MeCycHexdtc]₂ and Ni(II) N-ethylcyclohexyldithiocarbamate, Ni[EtCycHexdtc]₂ complexes were synthesised through direct synthetic method at room temperature and characterised using the Elemental Analyser (CHNS), Infrared (FTIR-ATR), Ultraviolet-Visible (UV-Vis), Nuclear Magnetic Resonance (NMR), molar conductivity, and gravimetric analysis. The Ni[MeCycHexdtc]₂ complex had indicated a square planar geometry but it was not the case for Ni[EtCycHexdtc]₂ complex which showed a tetrahedral geometry. The value of molar conductivity of Ni[MeCycHexdtc]₂ and Ni[EtCycHexdtc]₂ were noted as 2.0 $\mu\text{S}/\text{cm}$ and 1.8 $\mu\text{S}/\text{cm}$ respectively indicated that the synthesised complexes are a non-electrolyte. The percentage of metal of Ni[MeCycHexdtc]₂ is 12.8% while for Ni[EtCycHexdtc]₂ is 12.25%. The complexes showed two types of electronic transition which are $n \rightarrow \pi^*$ and $\pi \rightarrow \pi^*$. The Ni[MeCycHexdtc]₂ showed two absorption band of $\nu(\text{C} \equiv \text{N})$ and $\nu(\text{C} \equiv \text{S})$ at 1497 cm^{-1} and 1008 cm^{-1} respectively while for Ni[EtCycHexdtc]₂ are 1484 cm^{-1} and 1006 cm^{-1} . The synthesised complexes were investigated as corrosion inhibitors in an acidic environment; 1 M HCl and 1 M H₂SO₄. The efficiency of the synthesised inhibitors was studied in different concentrations; 0.001 M, 0.01 M, and 0.1 M at room temperature. As a result, as the inhibitor's concentration decreased, the efficiency of the corrosion inhibitor also moved in a descending order at a constant temperature.

Keywords—concentration, corrosion inhibitor, dithiocarbamate, mild steel

ID 66: Isolation and identification of *Vibrio parahaemolyticus* from flower crab (*Portunus pelagicus*) in Negeri Sembilan and Selangor

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Abstract—This study was conducted to determine the presence of *Vibrio parahaemolyticus* on 30 samples of flower crab (*Portunus pelagicus*) collected from Negeri Sembilan (n = 15) and Selangor (n = 15) from March to July 2014. A total of 193 isolates of *Vibrio* sp. were isolated from the thiosulphate citrate bile-salt (TCBS) agar medium. Of 79 *Vibrio* isolates were identified as *V. parahaemolyticus* through biochemical testing methods. In the identification of *V. parahaemolyticus* by detection of regulatory gene *toxR*, 51 (64.6%) of 79 isolates contained *toxR* gene while none of the isolates contained virulence gene of *tdh* dan *trh*. by targeting *toxR* gene which produced amplicons of 368 bp molecular weight. All *V. parahaemolyticus* isolates were negative for *tdh* and *trh* genes.

Keywords—*Vibrio parahaemolyticus*, flower crab, *toxR*, *trh*, *tdh*

ID 95: Solar Photocatalytic Degradation of Food Dye (Tartrazine) Using Zinc Oxide Catalyst

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Abstract—Food dyes are used in food processing industries as coloring and additive so that the food can be stored for a long time. The effluent discharged from the industries has become a serious issue as it can cause water pollution. Solar photocatalytic degradation was widely used to degrade most of the dyes in wastewater due to its high effectiveness. The main objective of this study was to investigate the effectiveness of degradation of Tartrazine using the photocatalytic process by using ZnO as photocatalyst and sunlight as the irradiation source. This study also was conducted to compare the percentage degradation of Tartrazine at different conditions which are amount of catalyst, pH of dye solution, exposure time and presence and absence of sunlight and photocatalyst. The degradation of Tartrazine was analyzed by using UV-Vis spectrophotometer. A laboratory set-up was designed to evaluate the optimum weight of ZnO, optimum pH of Tartrazine solutions, optimum time exposure and also was operated in the presence of ZnO as photocatalyst and sunlight as the irradiation source. The result showed that, the photocatalytic degradation of Tartrazine proved to be effective under solar radiation by using ZnO as photocatalyst. The optimum photodegradation occurred at optimum weight of ZnO, pH of Tartrazine and time of radiation. The optimum weight of ZnO was 20 mg, and the optimum pH of Tartrazine solution was pH 6. The most effective condition for photodegradation of Tartrazine was degradation with ZnO catalyst and with solar radiation. The radiation time was 1 hour with (93.91±0.57) % degradation. The formation of OH· required both the presence of catalyst and solar radiation.

Keywords—Solar Photocatalytic, Tartrazine, Food Dyes, Wastewater treatment, catalyst Zinc Oxide

AREA: CHEMICAL ENGINEERING

ID 7: Mechanism and Kinetics Study in Homogenous Epoxidation of Vegetable Oil

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Abstract— Epoxide is an important chemical precursor for the production of alcohols, glycols and polymers like polyesters and epoxy resin. Commercial epoxides available in the market are mainly petroleum and animal based which are non-environmental friendly. Oleic acid (C18:1) derived from vegetables oil contains the unsaturation double bond (C=C) in its long alkyl chain makes it an attractive fatty acid for the production of eco-friendly epoxide. The epoxidation of oleic acid was carried out by using in situ generated performic acid (HCOOOH) to produce epoxidized oleic acid. Performic acid was formed by mixing formic acid (as oxygen carrier) and hydrogen peroxide (as oxygen donor). The rate constant for epoxidation of oleic acid was found to be in the order of $4.203 \times 10^{-5} \text{ mol}^{-1} \text{ s}^{-1}$ and activation energy is $7.58 \text{ kcal.mol}^{-1}$. In addition, thermodynamic parameters such as enthalpy, entropy and free energy of activation of $6.83 \text{ kcal.mol}^{-1}$, $-57.36 \text{ cal.mol}^{-1} \text{ K}^{-1}$ and $22.96 \text{ kcal.mol}^{-1}$ respectively.

Keywords—Oleic acid, epoxidation, kinetics study, vegetables oil

ID 55: Performance-Properties of Poly (Vinylidene Fluoride)-Surfactant Ultrafiltration Membranes Based on Protein Separation

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Abstract—The effect of sodium dodecyl sulfate (SDS), Triton X-100 and Tween 80 in the Poly(vinylidene fluoride)/ Polyethylene glycol (PVDF/PEG) phase inversion ultrafiltration membrane were evaluated in term of flux and solute rejection. The morphological profile of resultant membranes was observed using Scanning Electron Microscopy (SEM). Experimental data showed that the additions of surfactant additive have significantly affected the permeability, flux as well as protein rejection. Moreover, surfactant additive was found promoting the formation of larger macrovoid and finger-like membranes structures.

Keywords—Ultrafiltration (UF); poly(vinylidene fluoride); surfactant; protein rejection; macrovoid

ID 56: Assessment the Performance and Thermal Properties of Nanofiltration-Surfactant Membrane

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Abstract—A newly nanofiltration-surfactant membrane was fabricated via dry/wet phase inversion process with a polymer concentration ranging from 17% to 21%. The influence of two types of surfactant, anionic (Sodium Dodecyl Sulphate (SDS)) and cationic (Cetyl trimethylammonium bromide (CTAB)), on thermal analysis and performance of nanofiltration membrane was investigated. The thermal analysis was studied by using Thermogravimetric Analysis (TGA), while the performance membrane was obtained from the separation test in terms of permeation flux and percentage of 0.01M sodium chloride rejection. Experimental data revealed that the addition of CTAB in the polymer solution increased percentage of salt rejection up to 84%. The MPC membrane with the polymer concentration of 21 wt% was found to be the optimum concentration for production of high performance membrane with good thermal properties.

Keywords—Nanofiltration; surfactant; salt rejection; permeation flux; thermal properties

ID 72: Preparation and Characterization of Citric Acid Modified Cellulose in Remediation of Acid Mine Drainage

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Abstract— Mining activities, industrial activity and increasing water usage worldwide have led to the release of various pollutants, such as toxic heavy metals and nutrients, into the aquatic environment. Modified cellulose adsorption materials have the potential to remove these contaminants from aqueous solutions. Limited application of pure cellulose has brought this research in citric acid modification to produce substances that have different properties from cellulose, yet they are of renewable origin, biodegradable and have significant enhancement of their adsorption capabilities. In this study, cellulose was modified with citric acid in high temperature. Structure of modified cellulose was characterized by using Fourier-Transform Infrared Spectroscopy (FTIR) spectra, Thermal Gravimetric Analysis (TGA) and Optical Microscope. FTIR results shows that there is two main important band existed in Citric Acid Modified Cellulose (CAMC) which are hydroxyl (–OH) band at 3345 cm⁻¹ and carboxyl (CO) band at 1725 cm⁻¹, while TGA study shows that the mass loss attributed by the decomposition of CAMC occur at 300oC. Crystallinity and open pore structure that is clearly shown in the microstructure of CAMC suggesting the suitability of using this CAMC in the remediation of acid mine drainage.

Keywords—biodegradable, modification, thermal decomposition, ex-mining lake

ID 98: Phytoremediation of Ex Mining Lake Water in Constructed Wetland by *Scirpus grosus* and *Eleocharis dulcis*

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Abstract—Tasik Puteri in Bukit Besi, Dungun, Terengganu is suitable for recreational activities during dry season. However, this lake containing heavy metals which can harm people that directly get into contact with its water. This study investigated the phytoremediation potential of locally emergent aquatic plants in the lake water treatment process. *Scirpus grosus* and *Eleocharis dulcis* were planted in constructed wetlands (CWs) for a period of 28 days to treat the effluent. Five water parameters were analysed using standard laboratory procedures, which include total iron (TI), total phosphorus (TP), chemical oxygen demand (COD), electrical conductivity (EC) and turbidity. After 28 days, the physical observation shown that *S. grosus* was healthier than *E. dulcis*. Considerable decrements in concentration were recorded in TI, TP, COD and EC, but fluctuation in turbidity value was observed. *S. grosus* was more effective in removing TI, EC and turbidity of the mining lake which 95.45%, 32.89% and 40.00% of removal activity, respectively. *E. dulcis* was more effective in removing COD with 65.28% removal. Both plants demonstrated almost similar TP removal with 92.04% and 91.04% by *S. grosus* and *E. dulcis* respectively. In conclusion, both plants showed the capability in removing different heavy metals and contaminants. *S. grosus* is proven as the more effective plant as the phytoremediation agent. The authors would like to express their gratitude to Universiti Teknologi MARA (Terengganu) (UiTM(T)) for granting this project through 600-UiTMKD (PJI/RMU/ST/DANA SIG 5/2/1) Dst (13/2016), Dana Kecemerlangan SIG UiTM (Terengganu).

Keywords—bioremediation, emergent plant, constructed wetland, mining effluent

ID 109: Biodegradable Cellulose-based Hydrogel and Aerogel Prepared from Recycled Paper

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Abstract— The increasing amount of recycled paper generated around the world has caused disposal problems to the environment. Valuable material such as cellulose can be extracted from these recycled papers. In this study, cellulose from recycled paper was extracted using deep eutectic solvent (DES), which composed choline chloride and urea. Then, hydrogels was prepared from extracted cellulose in NaOH/Urea solvent by using epichlorohydrin (ECH) as a cross-linker. The cellulose-based aerogels from recycled paper also was prepared using NaOH/Urea solvent. Characterization and chemical analysis of extracted and produced materials were carried out with Fourier Transform Infrared spectroscopy (FTIR) and thermogravimetric analysis (TGA). Based on FTIR result, the peak at 891 cm⁻¹ was observed which is attributed to the glucose ring stretching. Meanwhile, TGA thermogram shows cellulose successfully extracted since it's decomposition temperature is 350 oC. FTIR spectrum observed the band 925.62 cm⁻¹. This peak related to the chemical crosslinking of cellulose with ECH producing ether-based linkage. TGA thermogram of prepared hydrogel shows the weight loss was 12% at 100°C. The absorption testing and swelling ratios of hydrogel was obtained at average 49.00%. Meanwhile, the water intake for cellulose-based aerogel was obtained at average 90.10 %.

Keywords—adsorbent; biomaterial; water; crosslinking; deep eutectic solvent; environment

AREA: MATHEMATICS AND COMPUTER SCIENCE

ID 14: Comparison between genetic algorithm and simulated annealing for vehicle routing problem

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Abstract— Vehicle Routing Problem (VRP) is a combinatorial optimization that consists of finding an optimal route from a finite set of routes. The main objective for VRP is to determine the network route to minimize the total cost, distance or time. There are a few methods that can be used to solve this VRP. The objective of this research is to make a comparison between two heuristic methods, which are Genetic Algorithm (GA) and Simulated Annealing (SA) that can be used to solve Vehicle Routing Problem. Normally, Genetic Algorithm are simulation programs which create an environment where populations of data can compute and only the fittest survive while Simulated Annealing was originally inspired from the annealing process in metal work.

Keywords—vehicle routing problem; genetic algorithm; simulated annealing; route

ID 53: Partial Robust M-Regression Estimator when both Multicollinearity and Vertical Outliers are Present

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Abstract— In regression, the objective is to explain the variation in one or more response variables, by associating this variation with proportional variation in one or more explanatory variables, but if the independent variables are many, they tend to be highly collinear. This phenomenon is called multicollinearity. Multicollinearity increases chance of independent variable to be rejected from regression model as an insignificant variable and may cause the estimated OLS coefficients to be statistically insignificant despite high R-square value. It may yield unstable results due to the increasing standard error of their estimated coefficients. Ridge regression (RR), principal component regression (PCR) and partial least squares regression (PLSR) are popular prediction methods in handling dataset with multicollinearity problem. Another problem that arises is the existence of outlying objects in a dataset. Therefore, robust regression methods are introduced to reduce or remove the effect of outlying data points in the presence of multicollinearity problem. Partial Robust M-Regression (PRM) is a recently studied robust PLSR that can deal multicollinearity and outliers simultaneously and will be employed in this study. In this paper, OLS, RR, PCR, PLSR and PRM regression will be compared to find the best method in their predictive ability. The algorithm is described and to compare the five regression methods, a simulation study had been done. For comparison purposes, the mean square error of β estimate (MSE(β)) was calculated. The simulation results show that PRM outperforms other method in the presence of multicollinearity, outliers and leverage points.

Keywords—partial least squares, partial robust m-regression, ridge, principal component, robust regression, outliers, vertical outliers, multicollinearity

ID 59: Spiral Batik With Rational Bezier Curve

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Abstract— Spiral is one of the commercial designs that use in designing Batik patterns. There are many types of spiral motifs that can be design the beautiful batik patterns. In this paper, one of the spiral shape choose as a reference figure to regenerate using rational Bezier curve. The rational Bezier curve is an alternative method that proposed in this paper was used to develop spiral Batik design. This curve is well known areas of research in Computer Aided and Geometric Design (CAGD). This paper deal with generating the spiral batik design and manipulation of weight magnitude to regenerate the design closet to the reference figure and produce new and variety design by manipulating the value of weight in the curve. From the result, its shows the cubic curve was generated the spiral batik design close to the reference figure and also can produced more designs of the spiral Batik compare to the quadratic curve. This method is to improve the batik industry by using CAGD in generating the design by introduced the simple and less cost method of generating Batik's design by manipulating a variable which is the weight in the curve. Lastly the result show this curve has potential to improvise the Batik design industry.

Keywords— Spiral Batik, Rational, Quadratic, Cubic, Bezier curve

ID 80: Shape Parameter Of Extended Uniform Cubic B-Spline In Designing Three Dimensional Objects

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Abstract— In Computer Aided Geometric Design (CAGD), B-spline curves are piecewise polynomial parametric curves that play an important role. CAGD have been widely used which brings the good impact of computers to industries such as automobile. In order to meet engineering requirements, extended cubic B-spline is proposed to be applied in creating new objects. Furthermore, three dimensional objects such as rod, bottle and others can be generated from extended cubic B-spline curves by using translation method. In this research, the three dimensional objects is formed by transform extended cubic B-spline with degree 4 by using translation method. The advantage of extended cubic uniform b-spline is the curve can be modified by changing the value of shape parameter. Variety shape of three dimensional objects can be formed by using variety of shape parameter. The smoothness of three dimensional objects is analysing for shape parameter value from 0.1 to 1.

Keywords— Translation, Extended Cubic, B-spline curve

ID 116: Evolution of Artificial Neural Network using Modified Conjugate Gradient Algorithms

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Abstract— The word evolution refer to a gradual changes or something in progression towards a complete modifications or end upheaval through a certain process or a system structure. The evolution of Artificial Neural Network (ANN) begins in 1940s when McCulloch and Pitts published research articles in 1943 discussing about the idea of neural network in general. Basically, the concept of ANN has been inspired by biological human brain model. Then, the concept being transformed into a mathematical formulation. By using the formula, algorithm and computer program can be constructed. Artificial neural network had undergone many changes on its algorithm also its execution. Otherwise, areas of applications are numerous involving different techniques and approaches. Nowadays, neural network algorithm use optimization techniques as a way to find the best outcome based on the problem to be solved. Conjugate Gradient (CG) is one of the popular optimization practices used in ANN to improve learning algorithm. Therefore, this paper is intended to find out the evolution of neural network applied in modified conjugate gradient method and potential related approaches through the age of its advancement. This paper also projected to give an outlook of ANN with CG method especially on modified CG algorithm and overall performances of the models.

Keywords—Evolution; Optimization; Modified Conjugate Gradient Model; Learning Algorithm; Artificial Neural Network

ID 77: Bio-inspired Fuzzy Analytical Hierarchy Process Algorithm in Multi-Criteria Successor Selection Framework

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Abstract—Recently, bio-inspired algorithms are ascertained successful in obtaining optimal solutions in solving many multi-objective optimization problems. Multi-criteria decision making (MCDM) involved multiple conflicting criteria that need to be evaluated and problems to rank a finite set of alternatives criteria with multi-objectives have to be optimized simultaneously for both complexity and uncertainty. Analytical Hierarchy Process (AHP) is a structured technique deal with complex decisions that provides a comprehensive and rational framework for structuring a problem in evaluating alternative solutions. Due to vagueness and uncertainty, fuzzy set theory based AHP (FAHP) would be considered as alternative in decision making judgments, because it can handle uncertainty easily. Succession planning is a subset of talent management where the successor selection dealing with multi-criteria, multi-objective and uncertainty which is quite complex, ambiguous, fuzziness and very difficult to solve. Current approaches are based on assumptions, which are largely unevidenced and insufficiently flexible to meet the demands of adaptive organisations and careers. Due to those reasons, the enhancement of bio-inspired algorithms in objective function formulation together with fuzzy AHP to handle uncertainty issues for successor selection is highly required. This study is divided into three phases consist of knowledge acquisition and data preparation phase; model development and algorithm enhancement phase; and testing and evaluation phase. As a result, this research will propose a fuzzy multi-criteria successor selection model and the enhancement of bio-inspired algorithm that hybrid with the proposed model. In future, this proposed algorithm can be used as a multi-criteria selection mechanism in many areas such as in resource allocation, recruitment planning, enrollment task, career path planning and etc.

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Keywords—Bio-inspired Algorithm, Fuzzy Analytical Hierarchy Process (FAHP), Multi-criteria Decision Making, Successor Succession, Academic Leadersh

AREA: ELECTRICAL & ELECTRONICS ENGINEERING

ID 26: Human Detection And Classification Using Passive Forward Scattering Radar

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Abstract—Passive forward scattering radar is a system that can detect any present object that is passing through between the transmitter and receiver. The technique used for detection of human is called forward scattering technique. It is used to detect human who passes within the range of forward scatter region. Moreover, passive radar system doesn't have its own transmitter but it can receive the power signal from any commercial transmitters. For this research work, commercial transmitters that transmit frequency of Long-Term Evolution (LTE) which is 1.8 GHz were used. When a human passes through between the transmitter and receiver, a wave called the Doppler signal is produced in the forward scatter region, and it is then captured by the passive radar receiver. For data acquisition, 3 individuals of different height were involved, which is Person 1 (1.57m), Person 2 (1.56m) and Person 3 (1.47m), and the location of the experimental work was constructed in the real environment at the seaside of Morib, Malaysia. The reason the seaside was chosen was based on past cases of intruders crossing the border of Malaysia through the seaside at Lahad Datu, Sabah. All of the data was collected and analyzed using Matlab software. From the experiment results, it was shown that the passive forward scattering radar system successfully detected and classified the human presence while walking and running, where running was more easily classified because of the increasing speed compared to walking.

Keywords— LTE, forward scatter, passive radar, human detection, classification

ID 29: Low Power CIC Filter Design for $\Delta\Sigma$ ADC

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Abstract—This paper presents the power-optimized third-order cascaded integrator comb (CIC) Filter for the Delta-Sigma ($\Delta\Sigma$) Analog-to-Digital Converter (ADC). The CIC Filter refers to a type of decimation filter used in ADC to remove quantization error caused by the modulator. It also occupies less area, when compared to other decimation filter, due to the absence of multiplier. In $\Delta\Sigma$ ADC, the power consumption is mainly driven by the decimation filter. Hence, careful optimization of the decimation filter is necessary to design an ADC with low power. In this paper, the True Single Phase Clocked (TSPC) D-Flip Flop, which is made up of split-output latches, was applied as the register, instead of conventional D-Flip Flops. The proposed design displayed a significant reduction in power consumption. The proposed architecture was realized by using the CMOS 0.13 μ m technology. At 256kHz of sampling rate, the CIC Filter only consumed 47.99 μ W power. The supply voltage used at 1.5V and 13-bit of resolution had been achieved by using 32 oversampling ratio. The layout for 1-bit third-order CIC Filter was also realized with the size of 105.580 $\times$ 29.930 μ m².

Keywords— $\Delta\Sigma$ Analog to Digital Converter, Decimation Filter, Cascaded Integrator Comb, Integrator, Differentiator

ID 32: Performance Analysis of Full Adders in CIC Decimation Filter

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Abstract—This article presents analysis of various full adder architecture on Cascaded Integrator-Comb (CIC) filter of Delta-Sigma ($\Delta\Sigma$) ADC. The structure of CIC filter consists of an integrator and a differentiator stage that is built from a cascaded full adder and delay element. Since each of the element within CIC filter has its own low-power architecture, full adder is one of the block that consumes huge amount of power compared to others. In this paper, four different type of full adder's architecture is designed and simulated with CIC decimation filter. There are 28T conventional, pseudo-NMOS adder, 16T hybrid adder and modified 14T hybrid adder. The performance parameters such as delay, total power dissipation and power delay product (PDP) of CIC filter were compared. This analysis shows that 16T hybrid full adder CIC filter has improved 38.15% of power consumption and 39.18% of power product delay reduction compared to conventional adder. Hence, a complete 1-bit third order of 16T hybrid adder CIC filter is implemented with size area of $118.23\mu\text{m} \times 22.38\mu\text{m}$.

Keywords—Delta sigma ADC; low power design; CIC decimation filter; full adder

ID 46: Designing of Input/Output Port Based on FPGA With Handshaking Capability

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Abstract— Input/output (I/O) port is a collection of interfaces that different functional systems of an information processing system use to communicate with each other. I/O port with handshaking capability is one of the powerful configurations to enable digital communication. The main intention of this project is to design prototype of an input/output port with handshaking capability based on Field Programmable Gate Array (FPGA). The main reason of using the FPGA technology is it has unlimited number reprogrammed, cuts developing cost and development time. Xilinx Foundation 2.1i Series software in VHDL description is used as a development tool in this project. The VHDL codes are integrated into a design and development environment for performing many subtasks such as FPGA synthesis, optimization, placement, and routing. The successful design is translated, mapped, routed, and placed onto FPGA Demo Board. XC4010XLPC84 Xilinx FPGA from XC4000XL family is used as a target board. In design prototype, the FPGA pins are connected to a parallel printer port by using a coupled a 25-pin DB connector, with a 36-pin Centronics connector cable. The outputs signals are observed and analyzed by using a logic analyzer.

Keywords—FPGA; handshaking; input/output;

ID 62: A Study on AC Breakdown Voltage for Local Vegetable Oils Under Presence of Additive TiO₂ with Different Gap Distance

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Abstract—High voltage power transformers commonly used petroleum-based mineral oil for cooling and insulation purposes. Researchers are looking for suitable vegetable oils as alternatives to mineral oil used as transformer oil. The alternative vegetable oils are biodegradable, non-toxic and environmentally friendly. They may require some processing and modification to improve some of their properties to ascertain their safe use in power and distribution transformers as well as in high voltage equipment. This paper presents a study on the AC breakdown voltages of Palm Oil (PO) and Coconut Oil (CO) with presence of an additive. PO and CO are chosen as they are locally produced oils in Malaysia and easily obtained. The type of additive used in this study is Titanium oxide TiO₂. TiO₂ nanoparticles was added into PO and CO at volume concentration of 0.1% to 0.5%. The effect of different gap distance of electrode 1.5mm, 2.5mm and 3.5mm was studied. The temperature of oil is controlled at 30°C. This paper provides a comparative assessment of breakdown properties through experimental investigation of PO and CO before and after the additive is added according to ASTM D1816 standard.

Keywords—AC Breakdown Voltage, Transformer, Partial Discharge, Palm Oil, Coconut Oil, TiO₂.

ID 73: Coverage Maximization of Wireless Sensor Networks using Simulated Kalman Filter Optimization Algorithm

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Abstract—Simulated Kalman Filter (SKF) is a population based optimization algorithm inspired by the Kalman filtering method. It had been successfully used for optimization of many engineering problems. In this work SKF is applied for wireless sensor networks (WSN) coverage optimization problem, where the objective is to maximize the area covered by the sensors in a region of interest. Coverage is an important issue in WSN. It is used as one of the measurement metric for a WSN's quality of service. Many metaheuristics algorithms had been applied for this problem. Here, SKF is tested over several WSN and found to be able to performed better than particle swarm optimization (PSO) and genetic algorithm (GA) in improving WSN coverage.

Keywords—coverage, binary sensing model, simulated Kalman filter, wireless sensor networks

AREA: APPLIED SCIENCE

ID 8: Extraction of Naphthenic Acids from Acidic Petroleum Crude Oil utilizing 2-Methylimidazole with the aid of Ca/Al₂O₃ And Ce/Al₂O₃ Catalysts

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Abstract— Naphthenic acids (NAs) is one of the major sources of corrosion in oil pipelines and distillation units in crude oil refineries. Removing NA compounds from crude oils is regarded as one of the most crucial processes in heavy oil upgrading. Catalytic deacidification method had been developed in order to reduce the total acid number values in crude oil. Crude oil from Petronas Penapisan Melaka had been chosen to be studied with original total acid number (TAN) of 2.43 mg KOH/g. The parameters used were different catalyst calcination temperatures, catalyst loading, reagent concentration, reaction times and reaction temperature. A reagent of 2-methylimidazole in ethanol was used as acid removal agent and monometallic calcium and cerium doped with alumina as catalysts. The results showed that with the aid of catalyst, the TAN can be reduced to lower than 1 mg KOH/g. Catalyst of Ca/Al₂O₃ with a calcination temperature of 900°C gave a better reduction than Ce/Al₂O₃ with 83.54% of TAN reduction (2.43 to 0.4) for Ca/Al₂O₃ catalyst and 71.19% (2.43 to 0.7) for Ce/Al₂O₃ catalyst. The best catalyst underwent several characterization methods such as X-Ray Diffraction Spectroscopy (XRD), Fourier Transform Infrared Spectroscopy (FTIR) and Thermogravimetry Analysis (TGA-DTA) for its physicochemical properties. It can be concluded that catalytic deacidification method was effective in extracting NAs from the crude oil thus lowered the TAN value to less than 1 mg KOH/g.

Keywords— Naphthenic acids; Crude oil; Catalysts

ID 30: Optimum Pulp and Paper Properties of Kenaf from APMP Pulping Process using RSM

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Abstract—In this particular research, the kenaf whole stalk variety of V 36 has been pulped using Alkaline Peroxide Mechanical Pulping (APMP). Three pulping parameters were studied for instances the percentages of hydrogen peroxide, sodium hydroxide and soaking time. The regression equation was obtained to determine the fitness of the quadratic model. The range of the sodium hydroxide (NaOH) used was between 6 % to 12 % and the hydrogen peroxide (H₂O₂) in 30 % concentration was in range 5 % to 10 %. The time of soaking was set between 45 and 90 minutes. The temperature is at 70 °C constant at each experimental runs. The design of experiment (DOE) was analyzed and determined to produce 17 experimental design runs. The statistical analysis and experimental runs was done by using Response Surface Methodology (RSM) and by applying Design Expert 6. The paper properties that studied were physical properties for instances tensile, tear and burst strength. The optical properties were brightness and opacity. The optimum condition for the pulping parameter that has been obtained was: hydrogen peroxide (H₂O₂) at 8.33 %, sodium hydroxide (NaOH) at 6.05 % and soaking time at 55.75 minutes. The responses produced to achieve the optimum paper properties for tensile is at 30.586319.4135 Nm²/g, tear strength at 16.1584 mNm²/g, bursting strength at 3.30927 kPa, and brightness at 64.9269 % and opacity at 90.1997 %.

Keywords—Alkaline Peroxide Mechanical Pulping (APMP), sodium hydroxide (NaOH), hydrogen peroxide (H₂O₂), Response Surface Methodology (RSM), Optimum, Kenaf.

ID 33: The Effect of Different Concentration of 2-Methyl-4-Chlorophenoxy Acetate Acid on Graphite Oxide Intercalation Nanohybrid

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Abstract—In this study, the effect of different concentration of 2-methyl-4-chlorophenoxy acetate acid (MCPA) was investigated to synthesis the successful intercalated herbicide nanohybrid by using graphite oxide (GO) as a nanocarrier. This experiment was done through ion-exchange method and graphite powder as a starting material. A well-organized nanohybrid was obtained at the concentration of 0.3 M of MCPA. 2-methyl-4-chlorophenoxy acetate acid- graphite oxide (MCGO) nanohybrid was characterized by using Fourier Transform Infrared Spectroscopy (FTIR), Powder X-Ray Diffraction (PXRD) and Carbon, Hydrogen, Nitrogen and Sulphur elemental analyzer (CHNS). From the results obtained, the expansion of d-spacing of MCGO nanohybrid at 9.7 Å has indicated the presence of MCPA in the GO interlayer and the loading percentage of MCPA was calculated to be around 98 %. Besides, FTIR spectra of the nanohybrid shown a resemblance peaks of the MCPA and GO that could confirm the formation of nanohybrid. Furthermore, the release of MCPA into sodium carbonate solution (Na₂CO₃) was found to be reliant on concentration of Na₂CO₃ solution which were 0.1 M and 0.01 M

Keywords—Graphite oxide; MCPA; Nanohybrid; Concentration; Herbicide

ID 37: Synthesis and Physiochemical properties of Zinc Layered Hydroxide- Cinnamate

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Abstract—The intercalations of cinnamic acid into zinc layered hydroxide were synthesized by using simple direct method due to the less usage used and simple preparation steps. The physiochemical studies were done to determine the ability of zinc layered hydroxide to traps cinnamic acid in between its interlayer region. The FTIR shows new generation of peak such as OH group, C=O, C=C, C-O and trans C=C at 3379 cm⁻¹, 1643 cm⁻¹, 1578cm⁻¹, 1253 cm⁻¹ and 873 cm⁻¹. and increases in basal spacing at 22.06Å indicate the intercalations of cinnamic acid into the zinc layered hydroxide were presence. The morphological surfaces show new changes toward the surfaces of the intercalated compounds.

Keywords—Zinc layered hydroxide; intercalations; cinnamate

ID 39: Zinc Oxide Nanorods Growth Morphology by Au-catalyzed Thermal Vapor Deposition Method

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Abstract—A relatively low-temperature growth of ZnO nanorods using Au-catalyzed thermal chemical vapor deposition is reported. The parameters varied in this work were deposition temperature, pre-deposition Au-catalyst annealing time and the type of substrates. The deposition temperature was ranged from 400 to 500 °C and the nanorods growth was observed at 500 °C. The 15-nm thick Au catalyst was annealed with the annealing time varied from 0 (non-annealed) to 30 min, using two types of substrate, glass and indium tin oxide (ITO) coated glass. ZnO nanorods growth was seen only from the 15-min annealed Au catalyst on glass substrate while for ITO substrates, ZnO nanorods were obtained from all annealing time conditions. These suggest that not only the deposition temperature has the influence on the ZnO nanorods growth, but the type of substrates and catalyst annealing time also plays an important role.

Keywords—Zinc Oxide Nanorods; Thermal Chemical Vapor Deposition; Deposition Temperature; Au Catalyst; Substrates Effect.

ID 117: An Overview of Kinetics Study of Epoxidation of Vegetable Oil

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Abstract— There is an enormous growth in the epoxidation base on vegetables oil in recent year due to the rising demand for greener and eco-friendly epoxides. The aims of this review to give an insight on kinetics from various type of vegetable oils published in scientific journals, major proceedings and books. It was observed that most of these articles published during the recent years with the number of articles increasing yearly whereby the leading topic are kinetics study of epoxidation. The methodologies followed and mathematical approaches by the research to attain their objectives have been discussed.

Keywords— Epoxidation; Vegetables Oils; Kinetics Study

International Conference on Engineering and Computing Technology (ICECT)

ID 40: Breakfast Habits and Supplement Intake among Health Science Students In Universiti Teknologi MARA, Selangor

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Abstract—Breakfast skipping is associated with overweight and obesity issues. There are high numbers of supplement usage among students with lack of knowledge regarding their side effects and health benefits. The purpose of this study is to assess the supplement usage and breakfast habits among undergraduate students. A total of 138 students participated in this study. Respondents completed a questionnaire on breakfast habits and supplement usage. Less than half of the respondents consume supplements (34.8%). Most of the respondents consume supplement to improve energy and vitality (64.15%). Vitamin C is the most popular type of supplement consumed (79.5%). All students consume breakfast but 54.34% of them tend to skip breakfast due to lack of time (65.3%) and prefer to sleep longer (46.67%). The respondents also prefer to have ready to eat meals like bread, toast, hot drinks and cereal. A majority of the respondents regard breakfast as the first meal of the day (83.3%) and the reason to have breakfast is to give them energy (90%). Present findings propose the necessity for an intervention program to promote nutrition education for every student regardless of educational background to increase knowledge on supplement and breakfast intake among students.

Keywords—supplement usage; breakfast habits; students; knowledge

AREA: ANY FIELD RELATED TO SCIENCE & TECHNOLOGY

ID 90: An Application of Cellular Manufacturing System for a Refrigerator Door Gaskets Processing Improvement: A Case Study

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Abstract—This paper aims to study the processing improvement on electrical industry in Thailand. The case study of manufacturer is an electrical part assembly factory. The main product of this manufacturer is a refrigerator door gasket. In the past several month, that factory had a high production cost and the productivity on the production line is quite down. Therefore, this paper applies the processing improvement approach that is cellular manufacturing system with the ECRS principal for the production line. The results illustrate that the propose improvement approach is more efficient for a refrigerator door gasket production line.

Keywords— Cellular Manufacturing System; Refrigerator Door Gaskets; The ECRS Principal; Processing Improvement

ID 89: Effect of Growth Temperature on ZnO Nanostructures Thin Film Fabricated using TCVD Method

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Abstract— In this study, ZnO nanostructures were deposited on ITO coated glass. In order to deposit the ZnO nanostructures, double furnace system of thermal chemical vapor deposition (TCVD) was applied. During growing process, the growth temperatures were varied in 50 °C interval temperature (500 °C-650 °C). This was done to study the influence of the growth temperature on ZnO surface morphology, electrical and optical properties. Parameter of growth time, precursor temperature, annealing temperature and annealing time were set at a constant rate. Field emission scanning electron microscope (FESEM) was used to examine the surface morphology of ZnO nanostructures, while the thickness of the film was measured by surface profiler. In addition, I-V measurement was conducted to determine the electrical properties of the deposited film, while optical properties was confirmed based on results of Ultraviolet-Visible (UV-Vis) spectrometer. All growth temperature shows a formation of nanotetrapod ZnO film. The highest of growth temperature exhibited long and thin leg of nanotetrapod. As the growth temperatures increase, ZnO nanostructures change with the decreasing thickness value. Based on the results obtained, lowest growth temperature shows highest thickness, which is 33.83 nm. While I-V results reveal that resistivity of the films increase when the growth temperatures were raised, so as the optical energy band gap values. Highest growth temperature shows highest value of resistivity and optical band gap with the value of $32.49 \times 10^{10} \Omega \cdot \text{cm}$ and 3.32 Eg.

Keywords—nanostructures; TCVD; growth; precursor; annealing

ID 94: Lock Unlock Door System using Student's Card

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Abstract—Nowadays, there are a lot of burglary cases happened at student's hostel. Besides that, some student is cheating by staying in the hostel without getting permission from the warden. Therefore, this project mainly to help students in preventing them from being a victim to such cases and make sure no student can enter hostel unless permission is given. In this project, student's card is use as the main key to enter the hostel room. The member of each room need to register their student's card and details about that student will be save especially their room number. This project enables to detect the room member and automatically allow the door to open to members only. By using this method, students are one step ahead from being a victim to the burglary and at the same time can prevent the strangers from entering the hostel without permission. Student's card is the main key for students to enter the room and others card is not function to unlock the door. It is found that the door is successfully open if the correct student's card is scan at the barcode scanner while it is still lock if others card is uses.

Keywords— Arduino, infrared, student's card, burglary, safety

ID 101: Porous TiO₂ thin film for EGFET pH sensing application

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Abstract—Porous TiO₂ thin film with nanostructure branches were produced through etching-immersion method. TiO₂ thin film was first fabricated using sol-gel spin coating and immersed in 5 M NaOH solution to obtain the porous structure. The branches have uniform size of 9.01 nm-11.39 nm while the distance between branches varied between 16.64 nm-83.04 nm. Using AFM, roughness of porous film on the surface is 5.049 nm, higher than bare TiO₂ sample. The porous film was then applied as sensing membrane for detecting H⁺ ions in pH buffer solutions (pH 4, pH 7, pH 10). pH sensitivity of the porous film is 19.30 mV/pH with linearity of 0.9550

Keywords—titanium dioxide; pH sensor; porous; etching

ID 120: Possible effects of IR4.0 on Malaysia's TN50

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Abstract—Malaysia's development since 1970 has been guided by well formulated national development blueprints starting with the New Economic Policy followed by the National Vision Plan. The next stage of Malaysia's development will span year 2021-2050 and shall be charted by TN50. The latest blueprint is currently being formulated using the bottom-up approach. The period for TN50 is also the era of IR4.0 where disruptive technologies are driving major changes in business models and sustainability. Malaysia will be strongly affected by these changes. Malaysia has done well so far based on production factors tied to low cost of labour and high level of incentive and subsidies. The next level of Malaysia's development journey requires higher level factors that are tied to competitive advantages such innovation, entrepreneurship, speed and integrity. These factors are required to ensure continuous presence of manufacturing and trade activities in Malaysia and allow Malaysia to benefits form developments related to IR4.0.

Keywords—Malaysia; IR4.0; TN50; disruptive; technologies

ID 71: One Step process of producing Reduced Graphene Oxide from Silantek Sub-bituminous Coal Using Microwave Irradiation Heating

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Abstract—Reduced graphene oxide (rGO) was prepared from purified Silantek sub-bituminous coal by using microwave irradiation heating in the presence of FeCl₃ and ZnCl₂ as graphitizing and activating agents, respectively. The preparation was carried out at microwave power level ranging from 600 to 1000W. The results showed that rGO produced from sub-bituminous coal has same characteristics as produced from graphite. X-ray Diffraction (XRD) spectra showed that the sharp peak presence at $2\theta = 26^\circ$ had decreased and broaden after microwave irradiation heating due to the removal of various oxide groups with interlayer distance reduced to 3.37Å similar to that of graphite. Further, Raman spectra showed a high degree graphitization of rGO produced at 900W of microwave irradiation power level and 30 minutes of irradiation times. Moreover, the degree of crystallinity of rGO produced from coal is 1.31 and is similar to rGO produced from graphite. Thus, this suggest that purified Silantek sub-bituminous coal upon heating using microwave irradiation method is potentially to be used as a carbon precursor to produce rGO.

Keywords—Reduced graphene oxide; sub-bituminous coal; microwave irradiation system; graphene; graphitization; crystal structure

ID 76: Inventory Control System Using Waterfall Development Model

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Abstract— Nowadays, innovation, progress is turning out to be speedier and simpler to use. In any case, there are a few organizations that still utilize the customary route in preparing their information and one of them is the Finance Department, UiTM Kampus Kuala Terengganu. Conducting the manual process whereby the staffs are required to fulfill and submit the form to the storekeeper and officer for approval and validation. The storekeeper will verify the availability of the item in the store. Using manual process consumes a lot of time, high risk of human error and involves a lot of papers as well as files. Therefore, Bendahari Inventory Control System (BICS) was proposed to help the Finance Department be more systematic in handling the inventory control. The implementation of the Waterfall Model in this research is very useful and appropriate to build up this system.

Keywords—component inventory control, monitoring, waterfall model