

**Paper ID 11****Author**

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**Title**

Malaysian Palm Oil Mill Sustainability Regulations: From Organisation Priority to Compliance Operation

**Abstract**

This paper aims to investigate the performance of Malaysian Palm Oil Mills (POMs) in complying with the regulations and voluntary standards for sustainability. Using survey instrument the priority of the organisations and the current achievement of the POMs compliance operation according to the 18 main regulations, policies, and voluntary standards related to environmental, social and economic dimensions. From the sample of 51 POMs, the results suggested that the Malaysian POMs complied with the regulations, and voluntary standard but there is a slight difference in terms of POMs priority and the current achievement of the mills. The binomial test results indicate that Roundtable Sustainability Palm Oil (RSPO) certification and social responsibility standard, ISO 26000, were unfavourable for Malaysian POMs' compliance performance. The study presented that sustainability-related regulations are one of the fundamental practices for the manufacturing organisation, in this case, palm oil, to achieve sustainability goal not only to the environment per se but to tackling economic aspect and protecting society at large.

**Paper ID 12****Author**

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**Title**

The Study of Material Mechanical Properties using I-kaz 4D Analysis Method via Piezofilm Sensor

**Abstract**

An alternative advanced statistical analysis method known as the I-kaz 4D or I-kaz 4 channels which using the sensor fusion concept by using four sensors to collect the vibration signals that excited by the impact hammer was introduced in this study. Mechanical properties of the material like Young Modulus and Poisson Ratio were obtained. The study carried for 2 types of metals i.e. copper and stainless steel. The specimens were in shape of circular, rectangular and square, where more material mechanical properties were obtained due to the variety of specimen shapes. The impact hammer used for the impact force with the range of different forces. The four piezofilm sensors have been placed at specimen surface to observe and record the vibration signal after the impact. The dynamic response technique also was used in this study and the obtained results been compared with the results obtained by I-kaz 4D method. Finally, correlation between I-kaz 4D coefficient and regression value being done to verify the result and justify the findings. The study adhered to ASTM E1876 standard.

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**Title**

Prioritizing Sustainability Impact of Failure Mode and Effect Analysis in the Palm Oil Mill using Analytical Hierarchy Process

**Abstract**

Analytical Hierarchy Process (AHP) model for prioritizing multi-criteria sustainability impact of Failure Mode and Effect Analysis (FMEA). It focuses on the Malaysian palm oil mills that have been widely criticized on various sustainability issues. The data collection for pair-wise comparison of decision judgement are taken from three experts of palm oil milling process and an additional expert from the academic background. The multi-criteria of each sustainability impacts (technical, economic, environmental, and social) are assessed for the weights of the occurrence, severity, and detection of the FMEA. The result of the study suggested that the degree of failure severity for social impact is considered as the highest priority for palm oil mills. This paper provides insights for management to improve organizations' sustainability performance at the operational level by considering sustainability impact in analyzing failure mode and effect of equipment.

**Paper ID 14****Author**

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**Title**

An Analysis of Energy Saving through Delamping Method

**Abstract**

Electrical energy consumption is one of the focus area in Green and Sustainable technology in the 21st century. Many energy consultant offers services to reduce the electricity consumption to the commercial consumer. Many proposals are focusing on selling their energy management system product which cost a lot of initial investment. The issue with this step is the building is not under construction. Installing the energy management system requires major renovation and modification of the existing wiring layout beside down time during the installation. In this paper, lighting system electricity consumption is reduced through delamping method. The delamping is strategize based on energy efficiency audit. This technique comply with the ASHRAE international standard for office building. The number of light reduced and electricity consumption from this exercise can translate into reduction of maintenance and electricity bill. The comparison of various energy saving techniques is discussed focusing on payback period and investment cost.

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**Title**

Optimization on the Nanoparticles Stability in Liquid Phased Condition by Using Taguchi Analysis

**Abstract**

The problem arises from the application of nanofluid is that the nanoparticles tend to agglomerate and sedimentation which affect the stability of nanofluid. The aim of the study is to investigate the effect of different surfactant agents and homogenize time on the stability of nanoparticle (SAE 15W 40). In this study, the nano-oil was prepared by dispersing the nanoparticles with an optimal composition of 0.5 vol.% 70 nm graphite, Al<sub>2</sub>O<sub>3</sub> and ZrO<sub>2</sub> in conventional engine oil (SAE 15W 40) grade by using ultrasonic homogenizer for 10-30 minutes. In order to determine the stability of the dispersion, Oleic Acid, SDBS Salt and Sodium chloride were utilized as a surfactant agent with an optimal composition of 0.3 vol.%. The stability test was conducted by using UV-spectrophotometer as quantitative test and observation of sedimentation by using the traditional method as a qualitative test. The collected data were analysed by using the Taguchi method to determine the optimum value of nanoparticle stability. The results of Taguchi analysis show that zirconia nanoparticle with SDBS agent is more stable compared with another sample. Unfortunately, Taguchi analysis analyzed on the alumina nanoparticle with an oleic acid agent is a less stable sample.

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**Title**

Flood Disaster Indicator of Water Level Monitoring System

## **Abstract**

The early warning systems for flood management have been developed rapidly with the growth of technologies. These system help to alert people early with the used of Short Message Service (SMS) via Global System for Mobile Communications (GSM). This paper presents a simple, portable and low cost of early warning system using Arduino board, which is used to control the whole system and GSM shields to send the data. System has been designed and implemented based on two components which is hardware and software. The model determines the water level using float switch sensors, then it analyzes the collected data and determine the type of danger present. The detected level is translated into an alert message and sent to the user The GSM network is used to connect the overall system units via SMS. Index Terms— Arduino board, flood, float switch sensors, GSM network

## **Paper ID 20**

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### **Title**

Development of Automatic Healthcare Instruction System Using Movement Gesture Sensor for Paralysis Patient

## **Abstract**

This paper presented an automatic healthcare system where the system can help and facilitates the paralysis patient to complete their daily life. When the patient suffers of a paralysis attack, the whole or their partial body disabled to move which means their movement is restricted and they also barely to communicate with anyone because they are not able to speak like a normal person. It will be hard for nurse or doctor to understand what they want to convey and help them manage their daily needs such as eating, drinking, bathing and etc. By developing this project, the health officer will assist the paralyzed patient when they are alerted by the message from patient via GSM. There are several instruction of movement gesture sensor presented in this paper in order to assist health officer helping the paralyzed patient to complete their needs. Whenever the patient gives the simple hand movement instruction, then it will be delivered through SMS and the alerted notice will be displayed on notification board to alert the health officers for assisting the patient.

## **Paper ID 24**

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**Title**

Development of an Automatic Can Crusher Using Programmable Logic Controller

**Abstract**

The invention of a can crusher machine in this project is to reduce the wasted storage space occupied by the tremendous amount of use aluminium can at the commercial establishment like in the restaurant, cafeteria and bar. Basically, can crusher machine is operated in manual effort and time in the can crushing process. A can crusher can be stated as “a device used for crushing the aluminium can for making it easier to be stored in recycling bins, thereby giving much more space by flattening of cans”. The objectives of this project are shrinking the initial volume of empty used-aluminium cans down to 70% in more effective, faster and effortless way, as well as to develop a low-cost device that is suitable for the small-industry usage. An automated process is executed in this can crusher machine due to the automation in the modern world is inevitable and nominal to be used. The automatic can crusher run by a Programmable Logic Controller (PLC) with the aid of an inductive and capacitive sensor, where it is applied to detect whether the object is metal or non-metal. Overall, the system can be controlled manually through the push start and stop button as well as using the Human Machine Interface (HMI) for displaying the total of cans being crushed per day. The design of the pneumatic usage in recycling aluminium wastes and meanwhile helps in maintaining an eco-friendly environment in the world.

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**Title**

Development of Pattern Classification for Empty Fruit Bunch (EFB) Based on the Age Profile of Oil Palm Tree Using Neural Network

## **Abstract**

Malaysian Palm Oil Board (MPOB) found that empty fruit bunch (EFB) has different amount of fiber based on the age of the oil palm tree. The different fiber quality make use by different type of industry. In general, EFB-fiber obtained from mature (8 year-old and above) oil palm trees are stronger than immature (7 year-old and below) trees. At present, the EFB was not segregated that caused the EFB cannot be sold to its specific industry. This is very crucial issue since the price is higher for EFB that has been segregated and this can become additional income to the palm oil company. Thus, this paper is proposing a method for pattern classification system for EFB, which was obtained from different age profile of oil palm trees. One method to identify the age of EFB is by measuring the length of the EFB. Different age of EFB has different length. Data of EFB's length for different ages has been taken from MPOB. Neural network was used to process the data and decide the class for the EFB. There will be three classes which are class 1 (less than 7 years), class 2 (8 to 17 years) and class 3 (more than 17 years). Result from the simulation shown that more than 90% data is successful been classified to its class.

## **Paper ID 34**

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### **Title**

The Investigation on Defect Recognition System Using Gaussian Smoothing for Gluing Application

### **Abstract**

This paper investigates various approaches for automated inspection of gluing process using shape-based matching application. A new supervised defect detection approach to detect a class of defects in gluing application is proposed. Creating of region of interest in important region of object is

discussed. Gaussian smoothing features in determining better image processing is proposed. Template matching in differentiates between reference and tested image are proposed. This scheme provides high computational savings and results in high defect detection recognition rate. The defects are broadly classified into three classes: 1) gap defect; 2) bumper defect; 3) bubble defect. A new low-cost solution for gluing inspection is also included in this paper. This technique does not only reduce execution time, but also produce high accuracy in defect detection rate. The recognition efficiency will achieve more than 95.77% with defect's data for further process.

#### **Paper ID 37**

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##### **Title**

The Development of a Single Camera Stereo Vision System for Starfruit Inspection System

##### **Abstract**

In this paper, we proposed the application of monocular stereo vision system which specific for starfruit quality inspection purpose. The system only uses one camera and a moving conveyor belt for producing a stereo pairs in generating the depth value of the starfruit. Since most of the fruit quality inspection only involve in one camera and a conveyor belt system for checking the quality, the proposed system can be easy to be apply in existing machine vision system. The single camera setup also made the camera calibration system become simple compare to binocular stereo vision system. With only taken two images on moving object, the depth value can be obtained successfully.

#### **Paper ID 38**

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**Title**

On-Line Microwave Moisture Technique Performance of Ferronickel

**Abstract**

The capability of monitoring water content or moisture of minerals, then control it in an actual real-time basis is vital that will affects mineral ore quality, process control, material handling, flowability, and cohesivity. This paper describes experiment of a Random Stratified Sampling Sweeping Microwave method, moisture content measurement technique that lessen interference, annulling or superimposing signal, that are normal errors in moisture measurement using microwave transmission method. The technique is employed for nickel ore running on a belt conveyor exit to the rotary dryer. It showed that high bed depth and high phase stability are essential requirements that must be met for successful microwave moisture measurement analysis of ferronickel ore. Attenuation parameter was the suitable parameter for the experiment, instead of Phase parameter, which is common parameter for the ferronickel application. The experimental results revealed regression of 0.85, standard error of 0.18, and accuracy of 0.7wt%.

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**Title**

Design and Analysis of Bicycle Helmet Moulding Process Development

**Abstract**

The use of material like ABS plastic going through injection moulding arising the health problem and hazard to the operator and the environment. The melting plastic used for injection moulding also may be hazardous to the operator where there might be potentials of getting skin burns from contact with the heated barrel or from splattering hot plastic and gases or vapours. Photochemical oxidation contain in the plastic depleting the ozone layer. The aim of the study is to design an open mould suitable for the hand lay- up technique of the Kenaf fiber with epoxy resin adhesion. The analysis of the mould designed by using CAD is to study its mechanical properties such as plasticity. The analysis shown the critical part of the moulding is at its centre where the deformation happened. The mould will return to its original shape when the force applied was removed due to the maximum value for shear and equivalent elastic strain did not reach 0.4 m/m which will cause silicon rubber material to tear and fail.

**Paper ID 40****Author**

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**Title**

Conceptual Design And Simulation of Rear Pressure Different Air Flow Correction Device Using Computational Fluid Dynamic (CFD)

**Abstract**

Drag reduction is one of the most significant issues within the automotive industry. Pressure drag contributed more than 80% of the total drag and it is highly dependent on vehicle geometry due to boundary layer separation and formation of wake region behind the vehicle. The drag caused by pressure difference at the rear and front of the vehicle is a major issue for all car segments especially bluff body car segments because it contributed largest fuel consumption. Air suction or blown at the rear of the bluff body can alter the flow pattern of the air hence. This resulted in shrinking at the wake region which resulting in an increase of rear pressure and reduces the pressure difference between front and rear of the body. The objective of this study is designing a concept of drag reduction system that can change the pressure distribution and reduce drag coefficient (CD) of bluff body which is represented as Ahmed body model. The design and testing of the airflow correction device were aided by Computer-aided Design (CAD) and computational fluid dynamic (CFD). The concept of the rear air flow correction device altered the flow pattern which changes the pressure distribution and reduces drag coefficient by 4.5352%. Hence, with full of positive expectation, hopefully, this method of reducing drag by using rear suction or blown air flow correction device will be broadly used for bluff body car segments.

**Paper ID 41****Author**

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**Title**

Effect of Pressure on Density, Porosity and Flexural Strength during Cold Isostatic Press of Alumina-YSZ-Chromia Cutting Tool

**Abstract**

This study presented the effect of pressure on the density, porosity and flexural strength when Cold Isostatic Press (CIP) was applied to compact the powders in the form of ceramic cutting tools. Specific composition of Alumina (Al<sub>2</sub>O<sub>3</sub>) wt.90%, Yittria Stabilized Zirconia (YSZ) wt.10%, Chromium Oxide (Cr<sub>2</sub>O<sub>3</sub>) wt.0.6% and Polyethylene glycol (PEG) wt.0.6% were ball milled and compacted using hand press to form green body of ceramic inserts. These compacts were then were further compacted inside CIP with pressures variation of 200MPa, 300MPa, 400 MPa with 30 seconds and 60 seconds pressuring

time. The ceramic composites were then sintered at 1440 °C before being assessed with density, porosity, Rockwell hardness (HRC) and Bending test. The results show that CIP use with 300 Mpa parameters with 60 seconds shows the best mechanical properties with relative density 95.5%, porosity 4.5% and HRC 65.5 hardness. Further assessment of microstructure revealed that the particles size distributed evenly along fracture surface with coarse grain and porosity dominant in the certain area—Cold Isostatic Press (CIP), Density, Porosity and Flexural strength

#### **Paper ID 42**

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##### **Title**

Study of CMOS Ring Oscillator Delay Cell Performance

##### **Abstract**

A common voltage controlled oscillator (VCO) architecture used in the phase locked loop (PLL) is the ring oscillator. This paper presents a review the performance evaluation of different delay cell topologies the implemented in the ring oscillator. The various topologies analyzed includes current starved delay cell, differential delay cell and current follower cell. Performance evaluation include frequency range, frequency stability, phase noise and power consumption had been reviewed and comparison of different topologies has been discussed.

#### **Paper ID 43**

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**Title**

PSO Fine-tuned Model-Free PID Controller with Derivative Filter for Liquid Slosh Suppression

**Abstract**

The disordered behavior of liquid slosh and the complex fluid dynamic motion in the container makes the conventional model-based control approaches complex and challenging to implement in practice. This paper presents investigations into the development of PSO fine-tuned model-free PID controller with derivative filter (PIDN) for liquid slosh control. Two parallel PIDN controllers are developed for both lateral tank position and liquid slosh angle control where 8 PIDN parameters are fine-tuned using particle swarm optimization (PSO) algorithms and Sum Absolute Error (SAE) and Sum Square Error (SSE) are chosen as it fitness functions. With the purpose to confirm the design of control scheme, a liquid slosh model is considered to represent the lateral slosh movement. Supremacy of the proposed approach is shown by comparing the results with manual heuristic tuning method. The performances of the control schemes are accessed in terms of lateral tank tracking capability, level of liquid slosh reduction and time response specifications. Finally, it is seen from the simulation results that the proposed control technique has able to decrease the liquid slosh without explicitly model the liquid slosh behavior.

**Paper ID 44****Author**

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**Title**

Energy conservation potentials of an office buildings in Northern Nigeria: A case study of Katsina secretariat complex

**Abstract**

The importance of energy conservation in our contemporary world cannot be overemphasized, efficient utilization of energy has significant impact in improving economy at all levels of human endeavour. No doubt, adequate and appropriate utilization of energy especially electrical energy boosts up any organizational developmental activities. Recently, research interest has emphasis towards efficient energy utilization and energy conservation as the effective means of reducing energy consumption in buildings thereby reducing its maintenance cost. This paper investigated and analysed the energy consumption characteristics of Katsina state secretariat complex for the period of 3 years (i.e. from 2014 to 2016) based on site surveys and analysis of the energy end users present, using the records of electricity utility bills and Automotive Gas Oil (AGO), being the two energy carriers of the complex. Records have shown that, the secretariat complex average electricity and AGO annual consumptions were found as 1045661.95 kWh and 116650.33 litres of AGO (which is equivalent to 1250491.54 kWh) respectively. The investigation revealed a distinct consumption pattern, indicating peak energy consumption during the hot months of April to August due to significant air conditioning requirements. The result of the investigation of the energy conservation potentials in the secretariat complex have shown that, energy savings of up to 6.5% of the total energy can be achieved by

switching-off all security lights during the day. While turning off the air conditioners in the early morning hours of between 8am to 10am would provide a saving of up to 19% of the total energy. Furthermore, a saving of 16.5% of the total energy can be achieved when the incandescent lamps are replaced with the energy efficient ones. The energy conserving measures (ECMs) followed in this research has shown significant savings in terms of both energy and cost, and if well implemented can give way for a sustainable energy management of similar office buildings in future.

**Paper ID 45**

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**Title**

Evaluation of Fault Location Algorithm in Medium Voltage Distribution Network with Correction Technique

**Abstract**

This paper focused on studying an algorithm of earth fault location in the medium voltage distribution network. In power system network, most of the earth fault occurs is a single line to ground fault. A medium voltage distribution network with an earth fault is modeled in ATP Draw. The generated earth fault is simulated, and the voltage and current signal produced is recorded. The earth fault location algorithm is simulated and tested in MATLAB. The accuracy of the earth fault location algorithm is tested at several locations and fault resistances. A possible correction technique is explained to minimize the error. The results shows an improvement fault location distance estimation with minimum error.

**Paper ID 46**

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**Title**

Design and Development of Portable Vacuum Clamping (Pvac CLAMP) for tool room

**Abstract**

Clamping in tool room usually uses tools and holding devices such as vise to clamp workpieces. However, conventional clamping device such as vise is time consuming, expensive and can not hold thin workpiece. Therefore, this project is to design and develop portable vacuum clamping (Pvac CLAMP) for tool room to overcome those limitations. To design and develop Pvac CLAMP, the machines used in the process are milling machine and drilling machine. After Pvac CLAMP had been developed, two testings were carried on the Pvac CLAMP. The tests are surface roughness testing and clamping time

testing where the Pvac CLAMP's results were compared to conventional vise. The result shows that Pvac CLAMP has better surface roughness and faster clamping time than the vise about 40% reduction.

#### **Paper ID 48**

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##### **Title**

Optimization of boundary layer separation reduction induced by the addition of a dimple grid on top of a bluff body

##### **Abstract**

In recent years, there has been an increasing interest bluff body vehicle aerodynamic. Bluff body vehicle is the vehicle segment category comprising buses, van, multi-purpose vehicle (MPV), small utility vehicle (SUV), truck and lorry. The bulky size of these bluff body experienced a large aerodynamics drag when travelling at high speed. These aerodynamic drag are contributed by large pressure drag at front and boundary layer separation on vehicle wall and wake region at the back of the vehicle. It is becoming increasingly difficult to ignore the effect of boundary layer separation on top of the bluff body towards the aerodynamic drag. Recent developments in the field of vehicle aerodynamic have led to a renewed interest in boundary layer separation phenomena on bluff body. Most studies in boundary layer separation have only been carried out on the wake region at the rear of the bluff body due to shape limitation of the bluff body itself. This research will focus on examine the boundary layer separation on top of bluff body by the adaptation of golf ball dimple grid which will be introduced on top of a generic bluff body in various location. The dimple grid will be further optimize using design of experiment (DOE) approaches. The computational fluid dynamic (CFD) simulation method is one of the more practical ways of validating the bluff body model and this will be further validate using physical wind tunnel experimental. It is possible to hypothesize that the dimple depth, size, grid pattern and location most likely have influential effect to the boundary layer separation. The tendency of a boundary layer to separate primarily depends on the distribution of the adverse or negative edge velocity gradient along the surface, which in turn is directly related to the pressure and its gradient by the differential form of the Bernoulli relation, which is the same as the momentum equation for the outer in-viscid flow. In general, therefore, it seems that drag reduction was possible by the alteration of flow on top of the bluff body. The optimized design shows prominent result as it contribute around 36.5% of drag reduction.

#### **Paper ID 50**

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**Title**

Enhanced performance of 19nm Single Gate MOSFET with High Permittivity Dielectric Material

**Abstract**

In this research, the performance of the 19 nm single gate MOSFET is enhanced through the application of the high permittivity dielectric material. The MOSFET scaling trends necessities in device dimensions can be satisfied through the implementation of the high-k dielectric materials in place of the SiO<sub>2</sub>. Therefore, the 19nm n-channel MOSFET device with different High-K dielectric materials are implemented and its performance improvement has also been analysed. Virtual fabrication is exercised through ATHENA module from Silvaco TCAD tool. Meanwhile, the device characteristic was utilized by using an ATLAS module. The aforementioned materials have also been simulated and compared with the conventional gate oxide SiO<sub>2</sub> for the same structure. At the end, the results have proved that Titanium oxide (TiO<sub>2</sub>) device is the best dielectric material with a combination of metal gate Tungsten Silicides (WSi<sub>2</sub>). The drive current (I<sub>ON</sub>) of this device (WSi<sub>2</sub>/TiO<sub>2</sub>) is 587.6 μA/μm at 0.534 V of threshold voltage (V<sub>TH</sub>) as opposed to the targeted 0.530 V predicted, as well as a relatively low I<sub>OFF</sub> that is obtained at 1.92 pA/μm. This I<sub>ON</sub> value meets the minimum requirement predicted by International Technology Roadmap for Semiconductor (ITRS) 2013 prediction for low performance (LP) technology.

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**Title**

Objective Analysis of Muscle Spasticity Level in Rehabilitation Assessment

**Abstract**

In current practice, the assessment of upper limb spasticity is subjectively evaluated based on the experience and perception of therapists. This leads to inconsistency in assessment and could affect the efficacy of rehabilitation process. Thus, the aims of this paper are to study and extract relevant information from the torque and angle signal measured from the muscle of the arm and to select independent features in order to classify the level of spasticity of the muscle based on Modified Ashworth Scale (MAS) assessment tool. Data were collected from twenty five subjects that met the criteria with consent. The data went through pre-processing stage and analyzed before the features extracted. The seven features extracted from the data forming the dataset which later used to train and feed into suitable classifier to classify the level of spasticity. One way ANOVA test was run in order to evaluate the statistical significant differences among the level. Based on the results from the test, four features were selected out from seven. Linear Support Machine (SVM) based classifier accorded the highest performance with 84% accuracy compared to other classifiers.

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**Title**

An Improvement of Plasma Cleaning Time Towards Leadframe Oxidation Performance

**Abstract**

Package delamination causing the tendency to absorb humidity which lead to device failure towards Integrated Circuit (IC) packaging[1]. Most of the screened unit being analyzed and results showed failure due to popcorn effect. Popcorn effect caused by moisture penetration effecting the packaging to expend causing delamination and cracking during high temperature application. In this paper, delamination had been filtered from Scanning Acoustic Microscope (SAM) towards the failure units and once package encapsulation had been done the root cause being identified as leadframe oxidation problem. The leadframe oxidation can be easily observed during wire bonding and oven curing process since it involved with high temperature process which the indication showed leadframe discolouration appearance. The aim of this work is to evaluate plasma parameter to achieve delamination free product by assessing the plasma cleaning time. Additional plasma cleaning before molding process had been identified as a solution towards free leadframe oxidation process which leads to zero delamination issue for package that using Copper leadframe. Higher plasma cleaning time produced significantly lower leadframe oxidation issue however the Unit Per Hour (UPH) will be effected.

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**Title**

Automatic Traffic Light Controller for Emergency Vehicle using Peripheral Interface Controller

**Abstract**

Traffic light plays such important role in traffic management to control the traffic on the road. Situation at traffic light area is getting worse especially in the event of emergency cases. During traffic congestion, it is difficult for emergency vehicle to cross the road which involves many junctions. This situation leads to unsafe conditions which may cause accident to occur. An Automatic Traffic Light Controller for Emergency Vehicle is designed and developed to help emergency vehicle crossing the

road at traffic light junction during emergency situation. This project used Peripheral Interface Controller (PIC) to program a priority based traffic light controller for emergency vehicle. During emergency cases, emergency vehicle like ambulance can trigger the traffic light signal to change from red to green in order to make clearance for its path automatically. Using Radio Frequency (RF) the traffic light operation will turn back to normal when the ambulance finishes crossing the road. Result shows the design is capable to response within the range of 55 meters. This project was successfully designed, implemented and tested.

**Paper ID 60**

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**Title**

Analysis of 4G Mobile Network Coverage in UTeM's Technology Campus

**Abstract**

This paper analyses the coverage performance of 4G cellular services in UTeM's Technology Campus. The performance of the cellular services is presented as the network's coverage profile which was generated based on the received signal strength indicator (RSSI). The area under study is virtually divided into 64 grid points where the average RSSI measurements were captured by using an open source software namely G-Mon. The measured values were mapped into the network coverage profile which represents the signal reception quality at each of the grid points. Also, a statistical analysis was carried out to investigate the correlation of the performance of 4G cellular services in UTeM's Technology Campus with mobile phone brands and service operators. Based on the analysis, it is found that the signal reception in outdoor areas are better than that of indoor areas. Also, the findings show that propagation loss and signal degradation due to the present of obstacles contribute to the 4G services' performance in UTeM's Technology Campus.

**Paper ID 63**

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### **Title**

Investigation of sulfurization time duration process effects on thermally evaporated CZTS absorber layer for photovoltaic application.

### **Abstract**

In this study, Cu<sub>2</sub>ZnSnS<sub>4</sub> (CZTS) thin films were deposited onto Mo coated soda lime glass (SLG) substrates using thermal evaporation deposition method. Stoichiometric CZTS powder (99.95%) is used as the source material. All the deposited samples were then sulfurized at different time from 10 minutes to 50 minutes at 580 °C. The characteristics of the sulphurized films were investigated. Overall, the result showed a potential CZTS's existence although several secondary phases also being detected.

### **Paper ID 64**

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### **Title**

Young Coconut Waste as Greener Desiccant Alternative in Desiccant Dehumidifier

### **Abstract**

Due to tropical climate in Malaysia, humidity control becomes a challenge, hence dehumidifiers are designed to control the relative humidity in order to achieve the optimal thermal comfort. In existing desiccant dehumidifiers, the desiccants used are mostly hazardous to property and people due to its property. Therefore, this research proposes coconut coir as an alternative adsorbent for desiccant dehumidifier with a competitive dehumidifying capability. The performance of the coconut coir is evaluated by the time taken to dehumidify a room with the size of 100 sqft and relative humidity of approximately 72%. The recorded data are then compared to the same sized desiccant filters from silica gel, calcium oxide and calcium sulphate. The result demonstrates that the humidity adsorptivity performance rank is dominated by calcium sulphate, followed by young coconut waste and silica gel and calcium oxide in descending order. This indicates that young coconut waste is a good desiccant and as competitive as other chemical desiccants and therefore qualified to be utilized in a desiccant

dehumidifier. This is showed by its RH Delta value, which is 0.086% and this value is better than calcium oxide's (0.043%) and equal to silica gel. Moreover, formaldehyde emission shows that young coconut waste has the lowest average emission that is 0.058 ppm compared to 0.06 ppm by calcium oxide. This exhibits that young coconut is not only competitive in terms of humidity adsorptivity, but also environment and human health friendly and therefore very attractive to replace chemical desiccant in desiccant dehumidifier.

**Paper ID 65**

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**Title**

Numerical heat transfer analysis in microchannel heat sink with different aspect ratio

**Abstract**

The cooling of electronic devices is essential to guarantee their functional performance and operational lifetime. Due to continued miniaturization and integration of transistors in packaged chips, the heat dissipation rate has surpassed the limits of classical air-cooled heat sinks. This has triggered a lot of research towards alternatives for high heat flux cooling. Liquid cooling with micro heat sinks is one of these candidate solutions. Cold liquid flows through microscopic channels to extract heat from the chip. In this paper, the studied is focused on the effect of aspect ratio in the Microchannel Heat Sink (MCHS) using numerical analysis, and the result obtained is discussed in this paper. The overall result of the present work shows there is a close relationship between both the numerical and analytical data.

**Paper ID 66**

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**Title**

Development of a Portable Community Video Surveillance System

**Abstract**

In 2016, crime rate has been evidently increasing particularly in Kuala Lumpur areas, including reports on house break-ins, car thefts, motorcycle thefts and robbery. One way of deterring such cases is by installing CCTV monitoring system in premises such as houses or shops, but this usually requires expensive equipment and installation fees. In this paper a cheaper alternative of a portable community video surveillance system running on Raspberry Pi 3 utilizing OpenCV is presented. The system will detect motion based on image subtraction algorithm and immediately inform users when intruders are detected by sending a live video feed to a Telegram group chat, as well as sound the buzzer alarm on the Raspberry Pi. Additionally, any Telegram group members can request images and recorded videos from the system at any time by sending a get request in Telegram which will be handled by Telegram Bot. This system uses the Pi NoIR camera module as the image acquisition device equipped with a 36 LED infrared illuminator for night vision capability. In addition to the Python language, OpenCV, a computer vision simulation from Intel is also used for image processing tasks. The performance analysis of the completed system is also presented.

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**Title**

Waste Paper Plastering Mortars Machine Development

**Abstract**

This paper present waste paper plastering mortars machine development. This waster paper plastering mortar is manual machine system. The main ingredient to make mortar is cement, sand, water and waste paper. These machines have two separate tanks, which is first tank is to produce a pulp and second tank is to mix up the entire ingredient. The objectives of this research are to design a Waste paper plastering machine, to develop a functional prototype of Waste Paper Plastering Machine and also to test the machine by compare the best method by with machine and without machine to make plastering mortar. The testing has been done between preparation and procedure how to make plastering mortar with machine and without machine. This machine can be used in every household. This can save environment and reduce pollution

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**Title**

Smart Soap Making Machine Development For Home Appliances

**Abstract**

This paper present the Smart Soap Making Machine Development for Home Appliances. This Smart Soap Making Machine is semi-automatic machine system. The main ingredients to make soap are by using used cooking oil, warm water, NaOH pallets and fragrance. It will be mixed together in this Smart Soap Making Machine by using the mixer mechanism. This machine is small in size and easy to store in every kitchen in the house. The objectives of this research are to design a Smart Soap Making Machine, to develop a functional prototype of Smart Soap Making Machine and also to test the machine by compare the best method by semi-automatic vs manual to make soap in term of time and quality of the soap being produced. The testing have been done between preparation and procedure how to make soap manual vs semi-auto. This machine can be used in every kitchen of household and can make these soap as an alternative detergent to wash floor, car and drain. This can save environment and reduce pollution. This smart soap making machine is very special and practical because the design is suitable for home user and not for mass production.

**Paper ID 67**

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**Title**

Design for Manufacturability (DFM) of 3D Printed Parts Fabricated using Open Source 3D Printer

**Abstract**

Fused deposition modeling (FDM) is one of the well-known additive manufacturing (AM) techniques to fabricate the part using layer-by-layer concept. Recently, an open source 3D printer is become widely available used by 3D printer user because of its affordability and portability. In this study, the performance of an open source 3D printer was evaluated based on the dimensional accuracy of the printed parts. The test model was fabricated using two types of printer, which is low cost 3D printer, Prusa and mid-end 3D printer, Cubepro. Then, the dimension of every test structure was measured using Rexscan 3D laser scanner and was compared.

**Paper ID 68**

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**Title**

A Hybrid Method of Least Square Support Vector Machine and Bacterial Foraging Optimization Algorithm for Medium Term Electricity Price Forecasting

**Abstract**

Predicting electricity price has now become an important task for planning and maintenance of power system. In medium term forecast, electricity price can be predicted for several weeks ahead up to a year or few months ahead. It is useful for resources reallocation where the market players have to manage the price risk on the expected market scenario. However, researches on medium term price forecast have also exhibit low forecast accuracy. This is due to the limited historical data for training and testing purposes. Therefore, an optimization technique of Bacterial Foraging Optimization Algorithm (BFOA) for Least Square Support Vector Machine (LSSVM) was developed in this study to provide an accurate electricity price forecast with optimized LSSVM parameters and input features. So far, no literature has been found on feature and parameter selections using the LSSVM-BFOA method for medium term price prediction. The model was examined on the Ontario power market; which is reported as among the most volatile market worldwide. Monthly average of Hourly Ontario Electricity Price (HOEP) for the past 12 months and month index are selected as the input features. The developed LSSVM-BFOA shows higher forecast accuracy with lower complexity than the existing models.

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**Title**

Spectrogram Based Window Selection for the Detection of Voltage Variation

**Abstract**

This paper presents the application of spectrogram with K-nearest neighbours (KNN) and Support Vector Machine (SVM) for window selection and voltage variation classification. The voltage variation signals such as voltage sag, swell and interruption are simulated in Matlab and analyzed in spectrogram with different windows which are 256, 512 and 1024. The variations analyzed by spectrogram are displayed in time-frequency representation (TFR) and voltage per unit (PU) graphs. The parameters are calculated from the TFR obtained and be used as input for KNN and SVM classifiers. The signals obtained are then added with noise (0SNR and 20SNR) and used in classification. The tested data contains voltage variation signals obtained using the mathematical models simulated in Matlab and the signals added with noise. Classification accuracy of each window by each classifier is obtained and compared along with the TFR and voltage PU graphs to select the best window to be used to analyze the voltage variation signals in spectrogram. The results showed window 1024 is more suitable to be used.

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**Title**

Non-conformance Time as the Component of Time Loss Measures in Assembly Processes

**Abstract**

Hidden Time Loss (HTL) occurs along the production processes that have a significant effect on productivity. Overall Equipment Efficiency (OEE) is the most popular performance measurement tool used in the production line. Equipment performance is one of the measure components of OEE that caters HTL. However, OEE doesn't really fit in measuring operation performance of assembly process especially the semi-auto assembly and the manual assembly process. There would be the amount of HTL have occurred along the semi-auto assembly and manual assembly processes that become critical when to involve high product variety at the same production line. Thus, the purpose of this paper is to introduce the Non-conformance Time (NCT) as one of the component of Hidden Time Loss Measures (HTLM) in assembly processes. The structure of NCT is developed through a thorough literature study on manufacturing operations and its performance measures. The NCT structure is validated by using case study at two automotive manufacturing companies. The results show that the NCT is one of the components of HTLM in semi-auto and manual assembly processes.

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**Title**

Design of bloomed flower patterned solar panel

**Abstract**

As one of tourist attraction in Malaysia, Malacca River is required to provide good and clean environment. With the increasing of number of population, waste and trash flow through Malacca river stream also considered increased. A River Trash Collector System (RTCS) has been designed and developed in order to control waste and trash pollution in several area along Malacca River. The RTCS is utilized several alternative power source such as solar, wind and water. Therefore this project is subjected to design a solar panel which able to blend in with the surrounding as power source and produce 24 Volt DC electric for the RTCS. A bloomed flower like solar panel was chosen from four concept design by concept scoring method. Five criteria was determined and the final concept chosen from model with highest score. The model then fabricated into a prototype by using 3D printer. Sixteen solar panels with size of 42.25 cm<sup>2</sup> were attached onto the panel. Electrical output from single cell, as well as output from solar cell in series and in parallel connection were examined. The temperature of the solar panel also measured to see the effect of temperature to electrical output. The solar panel successfully designed and prototype of the panel was produced output voltage of ~24 VDC at maximum. The temperature has little effect to voltage output but insignificant effect to current was found. Moreover, increasing of ambient relative humidity affects the decrement of electric energy output of the solar panel.

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**Title**

Buckling experiments of axially compressed circular cylinder with imperfect length

**Abstract**

Buckling experiment on the effect of imperfect length on the buckling load of axially compressed circular cylinder is presented in this paper. Seven cylindrical specimens with different wave number (i.e., 0, 0, 4, 8, 10, 12 and 12) were manufactured using advanced manufacturing process. Specimens were cut from 1 mm mild steel plate using waterjet machining and weld using Metal inert gas welding. During the cutting process sinusoidal waves were introduced. The magnitude of the waves is assumed

to be a fraction of the axial length of the cylindrical shell structure. The ratio of axial imperfection-to-axial length of the cylinder ( $2A/L$ ) was taken to be 0.1. Repeatability of experimental buckling load for two nominally identical pairs with no waves (perfect) and 12 waves (imperfect) was good. The error within each pair were: 3% and 4%. Furthermore, experimental results indicate that the imperfect length in the form of sinusoidal waves strongly affect the load carrying capacity of circular cylinder [(58.62 kN; 60.47 kN) for perfect cylinders; (32.38 kN) for cylinder with 4 waves; (20.23 kN) for cylinder with 8 waves; (28.59 kN) for cylinder with 10 waves and (30.48 kN; 31.79 kN) for cylinders with 12 waves]. Also, it was revealed that the buckling load of the cylinder reduces as the axial imperfection amplitude of the cylinder increases.

#### **Paper ID 74**

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##### **Title**

Significant Improvement on Shrinkage Effect of Vacuum Casting Process Parameters using Taguchi Method

##### **Abstract**

This paper investigates the optimization of vacuum casting process by using Taguchi method. Vacuum casting process is a one of the method in Rapid Tooling Technology. The parts produced by vacuum casting process has its accuracy varies with the changes of the process parameters of the machine such as resin temperature, vacuum pressure time, mould temperature and some others. In order to optimize 3 parameters which are resin temperature, mould temperature and vacuum pressure time, the L'9 orthogonal array was used. From the results, it shows that the optimum parameters that may improve the shrinkage effect are resin temperature (30 °C), mould temperature (60 °C) and vacuum pressure time (5 min.). The shrinkage values between default and optimum parameter are 0.159mm and 0.336mm respectively. Thus, the improvement on shrinkage effect was 52.4 percent. The study demonstrates that the better dimensional accuracy of vacuum casting process can be optimized using Taguchi method.

#### **Paper ID 75**

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**Title**

Development of Wireless Remote Bar Spinner Combat Robot

**Abstract**

In this present era, combat robot competition became one of the famous technical competition among school and university. Combat robot usually builds with a powerful weapon, which can immobilize or disable opponent's robot and win the match. In this project, a wireless remote vertical axis bar spinner combat robot is designed and developed for the 3rd Malaysia Combat Robot Competition at National Science Centre (PSN). Furthermore, the evaluation of the robot is done in a combat environment. The robot is controlled by using radio control (RC) and the robot is supplied by a highly discharge 22.2V Lithium Polymer (LiPo) chemical battery. The robot is developed with DC brush motor and a thick metal bar in vertical axis as the weapon. The robot has designed successfully and fulfilled the requirement for a combat competition environment.

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**Title**

Microstructural Analysis on the Effect of Welding Current on Tungsten Carbide Hardfacing

**Abstract**

Tungsten carbide (WC) hardfacing coating technique is widely used to improve the performance of carbon steel blade exposed to acidic and abrasive conditions during production. This paper deals with the influence of welding current on the microstructure and carbide distribution of WC. WC hardfacing was deposited onto carbon steel by shielded metal arc welding (SMAW). Coating microstructure, elemental composition, volume fraction and hardness are analysed in detail. The effects of different welding current (150 A and 200 A) on WC hardfacing coating microstructure and hardness value are characterized by scanning electron microscope (SEM) and micro-Vickers hardness tester respectively. The larger carbide growth in overall coating region and growth of smaller carbide in non-carbide region are mainly dictated by high current (200 A). Higher percentage of WC volume fraction is noted for high current. It is found that increased number of large carbides and uniformly distributed smaller carbide in WC hardfacing deposit increased the hardness value of the coating.

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**Title**

Effect Of Acetone Vapor On Mechanical Properties Of Fused Deposition Modeling Printed Part

**Abstract**

Additive manufacturing (AM) has the benefit being capable to create very complex geometries, which could be impossible with traditional methods or fabricated at a high cost. For material cost properties, the cost of AM parts is mostly related to the size of the product. The project used polymer-based material specifically acrylonitrile butadiene styrene (ABS). However, the FDM technique suffers from poor surface roughness, restricting its application on some areas requiring high surface integrity. Therefore, a post processing is required to improve the surface roughness of the FDM printed part. In this study, an acetone vapor post process employed to improve the surface roughness of the part but the scope of the study will focus on the effect of mechanical properties of the printed part. Mechanical anisotropy behaviour of the specimen investigated via tensile test, flexure test and surface finish. The results of an implementation of acetone vapor as post processing of FDM printed part are compared to the original printed part in terms of its mechanical properties.

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**Title**

Improvement of Chatter Stability in Milling Machining using Neoprene Rubber Sheet as Damping Element

**Abstract**

Vibration cannot be avoided while performing any machining process, especially in milling operation. Nevertheless, the vibration could be diminished by developing the vibration damper. In this study, the application of neoprene rubber sheet was tested on the workpiece in order to reduce the damping of tool holder. As the neoprene rubber sheet can control the noise, it is possible to reduce the vibration of tool holder. Therefore, in this project, table dynamometer was used to capture the cutting force and amplitude. These two parameters can be made as the references to determine the rate of vibration of cutting tool while performing the milling machining. The data and graph of force and amplitude had been captured for each of machining operation. The final results showed that the application of neoprene rubber sheet can diminish the values of maximum force and maximum amplitude. When the force and amplitude values is low, it means that the vibration generated while machining process also low. Hence, it was proven that neoprene rubber sheet brought a significant contribution to the reduction of vibration and damping of tool holder while performing the milling machining.

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**Title**

Extraction of Cause-Effect-Concept Pair Series from Web Documents

**Abstract**

This research aims to extract a cause-effect-concept pair series of consequent event occurrences in health information of hospital web-boards. The extracted cause-effect-concept pair series representing a disease causation pathway benefits for the automatic diagnosis and solving system. Where each causative/effect event concept is expressed by an elementary discourse unit (EDU which is a simple sentence). The research has three problems; how to determine causative/effect concept EDUs from the documents containing some EDU occurrences with both causative concepts and effect concepts, how to determine the cause-effect relation between two adjacent EDUs having the discourse cue ambiguity, and how to extract cause-effect-concept pair series mingled with either a stimulation relation EDU or other non-cause-effect relation EDUs from the documents. Therefore, we apply annotated NWordCo pairs with causative-effect concepts to represent EDU pairs with causative -effect concept where the NWordCo size solved by Naïve Bayes. We also apply Naïve Bayes to solve NWordCo-concept pairs having the cause-effect relation from the adjacent EDU pairs. We then propose using cue words and the collected NWordCo-concept pairs with the cause-effect relation to extract the cause-effect-concept pair series. The research results provide the high precision of the cause-effect-concept pair series determination from the documents.

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**Title**

Classification of Myoelectric Signal using Spectrogram Based Window Selection

**Abstract**

This paper presents a study of the classification of myoelectric signal using spectrogram with different window size. The electromyography (EMG) signals of 40 hand movements are collected from 10 subjects through NinaPro database. By employing spectrogram, the EMG signals are represented in time-frequency representation. Ten features are extracted from spectrogram for performance evaluation. In this study, two classifiers namely support vector machine (SVM) and linear discriminate analysis (LDA) are used to evaluate the performance of spectrogram features in the classification of EMG signals. To determine the best window size in spectrogram, three different Hanning window sizes are examined. Our results indicate that by applying spectrogram with optimize window size and LDA, the highest mean classification accuracy of 91.29% is obtained.

**Paper ID 55****Author**

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**Title**

The Characterization of PEFB Reinforced Box Waste Coated Superhydrophobic Coating for Shoe Pad Applications

**Abstract**

The study present mechanical properties of the palm empty fruit bunches (PEFB) reinforced with box waste for shoe pad application. The main objective of this study is to determine the optimum composition of PEFB reinforced with box waste for shoe pad application. The use of PEFB and box waste in this study is to replace the synthetic materials in shoe pad application. Furthermore, the environmental problems can be reduced by using waste PEFB become a value-added product instead of biomass waste. The preparation of sample involved grinding process of PEFB fiber and box waste, blending process of different percentage of PEFB in 20%, 40%, 60% and 80% with 50% of box waste, followed by mixing process with epoxy and hardener, and finally coated with superhydrophobic coating with spray gun technique. Epoxy resin and hardener are used as binder to provide bonding between fiber matrix of PEFB and box waste to be applied on shoe pad application. The sample was conducted in mechanical and physical tests. The tensile strength test showed 40% PEFB reinforced with 50% box waste with maximum load of 181.36N and percentage strain of 16.70%. The composition of 80% PEFB showed the highest bursting pressure to 13.62kgf and abrasion resistance had the lower mass loss of 0.28g. The higher percentage of PEFB which is 80% produced the lower density of 1.06g/cm<sup>3</sup> and higher porosity up to 0.44%. In term of water droplet test, the lower percentage of PEFB in 20% produce the water contact angle up to 100° with coated superhydrophobic while 63° for uncoated surface. It is also revealed that 40% of PEFB reinforced with 50% box waste produced the most optimum composition for shoe pad application.

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**Title**

Development On Orthotics Insole For Flat Feet Focusing On Sport Usage Evaluated By Electromyography

**Abstract**

Running is a method of terrestrial locomotion allowing humans to move rapidly on foot, which related to the movement of lower limb. But for flat feet, running or walking for a long period will give them a high-risk associate with a foot pain. In order to reduce the foot pain, an arch orthotics insole is advised to be wore by the flat feet. This paper provides an extensive study on orthotics insole focusing on sport usage for flat feet. For this silicon rubber Orthotics Insole is designed with sufficient arch support, sufficient thickness, metatarsal pad, heel pad, heel cup and ergonomics dimension specification. The objectives of this research are to design and improve the efficiency of orthotics insole for flat feet focusing on sport usage. Both new orthotics insole and existing insole will be evaluated by using electromyography (EMG) that will record the electrical potential which generated by muscle cells. The output of time domain feature and frequency domain feature for both insole will be analyzed and

compared. This Orthotics Sport Insole ideal to be used by flat feet especially during their sport activity specifically running in order to reduce muscle pain to prevent injuries.

**Paper ID 88**

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**Title**

Development of River Trash Collector System

**Abstract**

Protecting environment from various sources of pollution is imperative to ensure the sustainability of the earth. Water pollution has also become one of the significant issues due to increasing water-related activities such as transportation, fisheries, entertainment and many others. It threatens the well-being and prosperity of human and nature as well as the quality of water in the surrounding. This project of River Trash Collector System (RTCS) is to develop a system that can remove floating trash, oil, fuel, and detergents from the water to resolve water pollution problem so that would not threaten Malacca River the as one of the main tourist attraction to Malacca and it is marine life. The threats faced by marine life and surrounding particularly in the Malacca River may appear to be overpowering. The design is based on Solidwork design platform and using Rapid Prototyping to fabricate prototype scale model of a physical part or assembly using three-dimensional computer-aided design (CAD) system. At the end of this research, a fully functional trash collector is expected to be operating along the shoreline of Malacca River to clean up debris. This developed RTCS will further benefit especially for Malacca River in resolving the water pollution issues.

**Paper ID 90**

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**Title**

Mechanical Properties of Rice Husk Ash (RHA) Brick as Partial Replacement of Clay

**Abstract**

Clay has been used as main material in fabrication of bricks however the use of waste materials in brick manufacturing has been introduced for conservation of dwindling clay resources, as well as preventing environmental and ecological damages caused by quarrying and depletion of raw materials. Bricks that available in some regions have poor quality, low compressive strength, higher water absorption and uneven surfaces Therefore in this study, rice husk ash has been utilized for the preparation of bricks in partial replacement of clay. The specimens were cast with different replacement levels of clay varying as 0%, 5%, 10%, 15%, and 20% with rice husk ash. The specimens were tested for water absorption and compressive strength accordingly to Malaysian Standard EN 1008:2010 for 2 hours. Experimental shows that excessive addition of rice husk ash has higher water absorption and low compressive strength as rice husk ash percentage increases rice husk ash characteristics predominate. The bonding between the clay particle and the rice husk ash particles is weak. By adding 10% of rice husk ash by weight is the best brick properties which 6.80 MPa of compressive strength and 16.30% of water absorption. The water absorption of RHA brick developed did not exceed 20% hence promoted to be partial replacement of clay.

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**Title**

Experiment Study using Parallel Plate Sensor for Detect Conductive Material

**Abstract**

Gold is the yellow precious metals that used in many application likes medicine, electronics, jewelry, investment, and others. Thus, gold has become one of the commodities which has high demand in the global market. Due to that, to guarantee the purity and to protect the retailer and consumer from fraud, the gold assay is very important in the industry. There are many techniques had been implementing for verified gold. The technique must consider a few factors such as non-destructive, inexpensive, precise, simple and widely accepted by the jewelry industry. Electrical capacitance tomography (ECT) is most mature non-destructive technique among various tomography. Advantages of ECT technique are its non-radioactive, non-intrusive, high imaging speed and low cost. This paper introduces an ECT using the square sensor. The aim of his paper is to present a new method for verified conductive materials (gold and non-gold) using parallel plate sensor which adopted from the ECT system.

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**Title**

Robotic Rover with controller & vision system

**Abstract**

Rover is a robotic system which integrated simple system that implemented electrical and mechanical components together. In this study, we used mechanical components consist of robotic arm, joint and mechanical gripper, backbone chassis and continues track while electrical components include servo motor, servo controller, transmitter and receiver for vision system and wireless controller via USB host as its control system. The purpose of this project is for monitoring and safety purposes. In addition, the main goal of this project is to make a simple robotic rover that are easy to build and manufacture as well as cost-effective to add more functionality on this rover, it is equipped with robotic arm and real-time view camera integration. This rover is equipped with first person view (FPV) camera, an integrated camera on the rover can give a clear visibility and direction to the rover pilot. The live feed can be viewed on the monitor inside the command station box. It can be used to assist safety authorities to collect information & insights, work lift to collect and remove load and to make search and rescue operation. As for the result, we had tested the mobility system of the rover at terrain surfaces and analyses the capabilities of the chassis during lifting load.

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**Title**

Model Predictive Direct Current Control (MPDCC) for Grid Connected Application

**Abstract**

This paper deals with the design and simulation of Dual active bridge multilevel inverter based Model predictive direct current control for grid connected application. To achieve multilevel output voltage waveforms, the second inverter will be supply with half of the dc-link voltage. Model predictive direct current control used to control the grid current component in order to achieve minimum grid current error. Modulation is unnecessary in this system because the switching pattern is produce by the possible switching that determined by the proposed MPDCC. The voltage vector which minimizes the cost function will be selected and applied to track the reference current. The performance of the proposed MPDCC is observe and implement by MATLAB/Simulink Software.

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**Title**

Design and Implementation of Smart Farming System for Fig using Connected-Agronomics

**Abstract**

Abstract—This paper proposes a design and implementation approach of smart farming system using connected-agronomics technique for fig farm application. Nowadays, fig plants having a rapid growth in the current market demand due to its rich in natural health benefiting nutrients, antioxidants and vitamins where some farming systems have been used in maintaining fig plant's environmental resources to grow without fail. Smart farming is a system applied to provide user with real time information and plan for desired plant such as time intervals for watering systems. There are two major problems on maintaining the fig fruit quality; watering system fail during emergency blackout and a contagious disease known as leaf rust due to external environments. The system implements two microcontrollers, the Arduino Uno & Raspberry Pi along with smartphone Android application. The system performance is evaluated based on the requirement specification, irrigation soil, surrounding temperature and moisture. It is found that all data collected by the sensors are within the optimal range of values, which are 1500  $\mu\text{S}/\text{cm}$  to 1599  $\mu\text{S}/\text{cm}$  for the EC reading of the fertilizer while 6.0 to 6.5 for the pH value of the soil. This prototype of smart farming was well developed and can be applied to the fig plantation environment. Index Terms—Fig, Smart Farming, Agronomics, Microcontroller

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**Title**

INITIAL STUDY OF GREEN SUPPLIER PRACTICES AND GREEN SUPPLY CHAIN MANAGEMENT WITH WORK SYSTEM PERFORMANCE

**Abstract**

This paper aims to explore the level of green supplier, manufacturing performance, environmental actions and customer activities in implementing green supply chain initiatives. Besides, the relationship between environmental actions and customer activities towards manufacturing performance also been investigated. For this purposes, the data was collected using questionnaire-based survey among Malaysian manufacturing firms. Using the factor analysis, the data was analyzed. From the results, it is showing that the manufacturing performance through the implementation of green supply chain management has a positive relationship to environmental action and customer activities.

**Paper ID 98**

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**Title**

EXPLORING THE IMPACT OF SUPPLIER DEVELOPMENT PRACTICES ON MANUFACTURING RESPONSIVENESS IN MALAYSIA

**Abstract**

Responsiveness in manufacturing has become a crucial source of competitive advantage in a modern manufacturing environment. The collaborative relationship with a supplier is important in formulating the responsive supply chain. Therefore, this study is carried out to explore the extent of green supplier development (GSD) practices in influencing the manufacturing responsiveness (MR), particularly in Malaysian manufacturing firms. Data collected through questionnaire survey from 71 ISO 14001 certified manufacturing firms. The results reveal that the development of suppliers has a positive and meaningful impact on MR. However, not all GSD practices correlate equally to the MR practices. This finding can be used as a guideline for the manufacturing industry, particularly in Malaysia to understand better and deeper valuable information on the impact of GSD practices towards manufacturing responsiveness as well as strengthening the GSD practices to further enhance a responsiveness level in manufacturing.

**Paper ID 94**

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**Title**

Drilling of Nickel-Titanium (NiTi) Alloys under Minimum Quantity Nano-lubricants with Coated Carbide Tools

**Abstract**

Nickel-titanium (NiTi) alloys are considered as hard alloys which cannot be machined easily. This is due to the exquisite features that the NiTi alloys have been endowed with that includes the high strength, high ductility and excellent work hardening. As a result, these properties are likely to contribute towards rapid tool wear and high cutting forces during machining processes. This incurs a poor cutting tool efficiency with unacceptable workpiece quality. A proper selection of cutting tool parameters (cutting tool material, geometry, and tool coating) with a range of machining parameters (cutting speed and feed rate) are inevitable for efficient cutting process of the alloys. In this paper, the performance of NiTi alloys during drilling process has been evaluated in terms of the wear growth on the cutting edge of the TiAlN coated carbide drills. The generated thrust forces and the surface finish of drilled holes under the minimum quantity nano-lubrication (MQL) were also considered as another machining performance criteria.

**Paper ID 87**

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**Title**

Surface modification of the Ti6Al4V alloys via Electrical Discharge Coatings

**Abstract**

Long-term implantation of titanium-based alloy, Ti6Al4V can be harmful in human bodies due to the release of aluminium and vanadium elements. Thus, a biocompatible barrier coating can be applied towards corrosion and wear resistance of the implant. In this research, the surface of biomedical grade of Ti6Al4V was coated with a thin film of biomaterial ceramic by the electrical discharge coatings (EDC) using a pure graphite electrode. Pulse duration, pulse interval and polarity were varied in order to investigate the formation of recast layer thickness (RLT) on the surface of titanium alloys. RLT was measured from cross sectioned samples using a high magnification optical microscopy. From the statistical analyses of variance, the response was significantly influenced by the pulse interval, followed with electrode polarity. Additionally, the interaction of polarity to pulse duration and pulse interval also significantly affect towards the RLT.

**Paper ID 100**

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**Title**

PID-based Temperature Control Device for Electric Kettle

**Abstract**

A normal electric kettle usually is intended to boil water until boiling point and cannot be controlled. Most of the kettle does not provide the temperature display for user to track the current temperature reading. Thus, this project is inspired from the shortcoming of most kettles that are sold at the market. By using Arduino microcontroller, a device is developed to control water temperature inside electric kettle. To provide automated temperature control, PID controller is chosen since it can provide precise water temperature control with less fluctuation. The device is also equipped with the display of the current water temperature and desired temperature. The device is tested to an electric kettle and the performance of PID controller in controlling water temperature is compared to on-off controller. An analysis is performed based on the amount of fluctuation with respect to desired temperature to verify the efficacy of the designed circuit and controller. It is found that the developed device and PID controller are capable to control the water temperature inside kettle based on the desired temperature set by user with less amount of fluctuation.

### **Paper ID 103**

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#### **Title**

TDS and pH Analysis for Water Quality Monitoring in Water Hydraulics Food Processor

#### **Abstract**

This study proposes a low-cost water hydraulics food processor for a traditional cookies production. The hygienic, safe and low maintenance cost characteristics of water should provide interesting viewpoints due to concern over issues in hydraulic fluid contamination, flammability, disposal, and costly maintenance. The objective of this project is to introduce the design and the working principle of the water hydraulics-driven food processor, and to determine production process performances and capabilities. In this paper, results of the corrosion monitoring of the test bed is presented. PLC is used in the testing of the machine, by creating an automatic movement of the cylinders. The Total Dissolved Solids (TDS) and pH analysis of the water hydraulics quality used in the process is discussed.

### **Paper ID 104**

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#### **Title**

Construction of Driving Seat Frame and 2-DOF Motion Simulator

#### **Abstract**

Driving simulators are increasingly being used as a didactic tool in car racing games because it offers virtual driving experience to users. However, existing driving simulators are found in market at high cost. This project proposes the design and development of a low cost 2-DOF driving motion simulator with the interface from SimTools. The driving simulator comprises a steering wheel, a pedal and simulator software. When the steering wheel is turned in the racing simulator Live for Speed, it controls the angle of the driver's seat upraising. The input data from the steering wheel is derived using SimTools, which extracts the motion data from the racing simulator. Potentiometer is used as the feedback sensor that manipulates the data from SimTools to control the angle of the dc motor driver rotation. The motion is created using the rotation of two dc motors that actuate the car seat frame. Moto Monster motor driver which supports 30A of current is used to control both of the dc motors using Arduino microcontroller. The angle control of the driver's seat is proportional to the input data from steering wheel. This project contributes the basic idea on building a low cost motion simulator.

#### **Paper ID 105**

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#### **Title**

Pressure Analysis of Remotely Operated Water Hydraulics Actuator (ROWHA)

#### **Abstract**

This study proposes a development of remotely operated water hydraulic actuator (ROWHA) for industrial application. The safe, hygienic and low maintenance cost characteristics of water should provide interesting viewpoints due to concern over issues in hydraulic fluid disposal, flammability, and costly maintenance. An experiment is conducted on the remotely operated water hydraulic actuator by moving variable load up to 5 kg. The result of the remote operation of extension and retraction of the load is presented. A PS2 wireless controller is use to act as remote control for this system. Experimental result of ROWHA show same pattern of result where pressure during extension is lower than retraction

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**Title**

Automated Segmentation and Classification Technique for Brain Stroke

**Abstract**

Diffusion-Weighted Imaging (DWI) plays an important role in the diagnosis of brain stroke by providing detailed information regarding the soft tissue contrast in the brain organ. Conventionally, the differential diagnosis of brain stroke lesions is performed manually by professional neuroradiologists during a highly subjective and time-consuming process. This study proposes a segmentation and classification technique to detect brain stroke lesions based on diffusion-weighted imaging (DWI). The type of stroke lesions consist of acute ischemic, sub-acute ischemic, chronic ischemic and acute hemorrhage. For segmentation, fuzzy c-Means (FCM) and active contour is proposed to segment the lesion's region. FCM is implemented with active contour to separate the cerebral spinal fluid (CSF) with the hypointense lesion. Pre-processing is applied to the DWI for image normalization, background removal and image enhancement. The algorithm performance has been evaluated using Jaccard Index, Dice Coefficient (DC) and both false positive rate (FPR) and false negative rate (FNR). The average results for the Jaccard index, DC, FPR and FNR are 0.55, 0.68, 0.23 and 0.23, respectively. First statistical order method is applied to the segmentation result to obtain the features for the classifier input. For classification technique, Bagged Tree Classifier is proposed to classify the type of stroke. The accuracy results for the classification is 90.8%. Based on the results, the proposed technique has potential to segment and classify brain stroke lesion from DWI images.

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**Title**

Prospective Study of Power Generation from Natural Resources Using Hybrid System for Remote Area

**Abstract**

Living in the 21st century, electricity has become a need in every society level. However, numbers of the remote area, especially in third world countries still facing difficulty to reach a grid-connected electricity due to various reasons. As such, this paper presents a prospective study of generating an electrical energy that is converted by utilizing natural resources from the sky. It is realized by

implementing a hybrid solar-rainwater harvesting system. Combination of solar cells and pico-hydro implemented in the work has given a great yield reaching average 921 milliwatts of energy produced by the natural resources.

**Paper ID 101**

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**Title**

HectorSLAM 2D Mapping For Simultaneous Localization and Mapping (SLAM)

**Abstract**

This paper presents an application of LiDAR sensor for 2D mapping construction in an unknown environments and capability to localize its own location based on landmark detected. Previously, there are various research actively conducted by others researchers for SLAM application. In general, it can be categorized based on three different type of sensor measurement and technique such as Vision based SLAM, RGB-D based SLAM and also Laser based SLAM. The main focus in this project is to present an experiment result conducted of a Simultaneous Localization and Mapping (SLAM) application based on laser sensor which is LiDAR in term of capability of mapping construction and localization it self. LiDAR sensor is put on the vehicle that will operate in real-world environments and computational processing done by using Robotic Operating System (ROS). This project is tested and verified in a curtain room with several parameter by using Robot Operating System (ROS). SLAM was implemented to provide localization estimates in environments, where there are static landmarks that are only rarely recognized by the vehicle or robot. This project also consider the features that enter and leave the environment as temporary landmarks that can be used in combination with the rarely seen static landmarks. As conclusion, performance of SLAM by using LiDAR sensor can be apply for several robotic system such as flight control, obstacle avoidance, navigation and other function in the future application.

**Paper ID 112**

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### **Title**

Multiple View Image Registration of 3D Object Pose Estimation Using Outer Box Method

### **Abstract**

This paper present Stereo view image registration of pose estimation relation on 3D CAD model object and Projection Real Image model (PRI) by using Outer Box Method. There are few stage for the system development of 3D pose estimation which were 1) image acquisition, 2) pre-processing, 3) processing and 4) camera calibration. In the image acquisition stage contained of CAD model image acquisition and Projection Real Image (PRI) model acquisition. While in the image pre-processing stage that is consist of 1) image rescale, 2) image segmentation and 3) image registration. In image segmentation, hypotenuse outer box object segmentation method was study and applied. The object was represented by area with edge information. The techniques or method used in pre-processing stage is template matching method. The 3D pose estimation identification using template matching method showed a good results. The tested object were using the action camera. There are 37 images CAD model for the pose estimation identification. Stereo image registration through center hypotenuse length of outer box method was implemented. The similarity on both CAD stereo image registration and real object stereo image registration resulted in range 70% to 77%.

### **Paper ID 110**

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### **Title**

Weighting the Material Requirements of NFRC filament for FDM by Using Fuzzy AHP with Extent Analysis Approach

### **Abstract**

In this paper, Fuzzy Analytic Hierarchy Process (FAHP) method with extent analysis was applied in the weighting of material requirements of natural fiber reinforced composite (NFRC) filament for fused deposition modelling (FDM). The selection of material requirements was conducted based on physical properties, chemical properties and mechanical properties of selected natural fiber. From literature review, nine (9) material requirements was identified as the alternatives to achieves the objectives. Fuzzy AHP is used to establish fuzzy comparison matrices for each alternatives and extent analysis is used to satisfies the goal. The results showed that Young's modulus is the important material requirements for NFRC filament used in FDM. The selection of material requirements is important to ensure higher degree of confidence for utilization of NFRC filament for FDM.

**Paper ID 113****Author**

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**Title**

"BrilliantReflect": Smart Mirror for Smart Life

**Abstract**

In this globalization era, smart mirror have been one of the invention to represent futuristic interconnected physical object with several applications. Smart mirror is innovating appliance that incorporates with contextual information which offered the interactive user interface on the surface of a mirror with the use of Raspberry Pi 3. To create this smart mirror the methodology that includes analysis about smart mirror, designing the hardware and software, developing the prototype, implementation and lastly the evaluation phases needs to be take care of. The presentation performed on the mirror will be information such as weather, time and date, holiday calendar, to-do list by mobile synchronization, current traffic of selected area, news feed and compliment as a motivation. Furthermore, our framework also introduces music presentation that use for alarm purpose. In a nutshell, this mirror what we called "Brilliant Reflect" will be convenient to use as it provides various features to the user.

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**Title**

Automated Medical Surgical Trolley

**Abstract**

Operating theatre is a place in a hospital where surgical operations are conducted on patients by surgeons. In the operating theater, the surgical equipment is placed on stainless steel table or on surgical instrument tray. However, during the operation accidents can occur where the surgical tools placed near to the surgeon could be accidentally be hit by them during the surgical operation. This may cause the surgical tools to fall on the floor which may lead to injuries. Hence, this paper presents a smart trolley for surgeons to grab operating tools easily. The proposed system is implemented for automatic trolley movement using Arduino Uno R3. The invention provides an automatic medical surgical trolley which comprises automatic guidance, a wireless controller, an obstacle avoiding detection device, a touch screen controller via the smart phone, an IP camera, a trolley, an integrated power supply and a processor. The trolley with stainless steel shelves is ideal for use in clinical environments and operation theatres. Medical equipment is loaded in the trolley, the wireless remote drives the trolley to move forwards and backwards. Automatic visual guidance is achieved via an IP camera attached to the trolley and a touch screen controller via a smart phone. A large amount of space and a large number of materials are saved, the workload of medical workers will be greatly relieved, and the working efficiency will be improved.

#### **Paper ID 62**

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#### **Title**

Development of Portable Automatic Number Plate Recognition (ANPR) System on Raspberry Pi

#### **Abstract**

ANPR system has performed well in automating access control and security such as identifying stolen cars in real time by installing it to police patrol cars, and detecting vehicles that are overspeeding on highways. However, this technology is still relatively expensive; in November 2014, the Royal Malaysian Police (PDRM) purchased and installed 20 units of ANPR systems in their patrol vehicles costing nearly RM 30 million. In this paper a cheaper alternative of a portable ANPR system running on a Raspberry Pi with OpenCV library is presented. Once the camera captures an image, image desaturation, filtering, segmentation and character recognition is all done on the Raspberry Pi before the extracted number plate is displayed on the LCD and saved to a database. The main challenges in a portable application include crucial need of an efficient code and reduced computational complexity while offering improved flexibility. The performance analysis of the completed system is also presented.

#### **Paper ID 115**

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**Title**

Intelligent Fire Detection and Alert System Using LabVIEW

**Abstract**

Fire detection systems are designed to discover fires and allow the safe evacuation of occupants as well as protecting the safety of emergency response personnel. This paper describes the design and development of a fire detection and alert system. Temperature and flame sensors are used to indicate the occurrence of fire. This work consists of two parts, which are transmitter and receiver, both using ZigBee wireless technology. Arduino Uno is used as the microcontroller at the transmitter part to control the sensor nodes and give alert when over temperature and flame are detected. At the transmitter, the collected data from the sensors are transmitted by an XBee module operated as router node. At the receiver side, an XBee coordinator module which is attached to a computer using USB to serial communication captured the data for further processing. In addition, an interactive and user friendly Graphical User Interface (GUI) is developed. LabVIEW software is used to design the GUI which displays and analyze the possibility of fire happening. The system can display the fire location and provides early warning to allow occupants escape the building safely.

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**Title**

Experimental Dataset to Develop a Parametric Model Based of DC Geared Motor in Feeder Machine

**Abstract**

This paper presents the application of a System Identification based on Particle Swarm Optimization (PSO) technique to develop parametric model of experimental dataset of DC geared motor in feeder

machine. The experiment was conducted to measure the input (voltage) and output (voltage) data. The actual data is used to be optimized using PSO algorithm. The parameter emphasized is time, mean square error (mse) and average time. One of the best models has been chosen based on the optimum parameters.

**Paper ID 82**

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**Title**

EVALUATION OF NOISE LEVEL IN WOMAN TRAIN CABIN AT KTM KOMUTER BERHAD

**Abstract**

Noise is identified as a bad ergonomic factor for human being. It affects hearing problem, annoying, intrusion, and psychological and other unhealthy environment. The aim of this study is to evaluate the actual value of noise measurement in KTM (Keretapi Tanah Melayu) Komuter Berhad based on operating hours; morning and afternoon. A concept to reduce noise level during train operation was proposed after that. Three sitting or standing points were measured using Sound Level Meter (TECPEL), at the same time the number of passengers had to be counted. The trip took exactly two hours which covered 18 stations. The results showed that the maximum value of noise reading was 82.2 dBA, occurred when standing at the gangway. This project may help the passenger who has noise problem or phobia to select a standing or sitting point while using KTM Komuter Berhad train.

**Paper ID 117**

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**Title**

Modelling Rail Accident and Incident Causes by Using Zero-Inflated Poisson Approach

**Abstract**

The development of Railway industry has been growing rapidly until today, which make it as one of the popular choice of transportation mode to travel from one place to another and it becoming more complex. Thus, the complexity of rail network required high level of safety features to prevent any unwanted incident. Therefore, this study proposed a proper procedure on modelling accident need to be conducted by using Poisson model. The most contributory factor which influenced the accident can be identified by using root cause analysis. "Ishikawa diagram" is a popular tool to identify problem occurring from the root where it begins. The data were taken from several sources which is secondary

data where the data period is starting from 1999 to 2014. Analysis from Ishikawa shows there are ten main factors involved to influences an accident. Those factors are “train driver mistake”, “other’s human mistake”, “weather influence”, “track problem”, “train problem”, “signaling error”, “maintenance error”, “communication error”, “procedure error”, and “others”. Then, before completing the prediction model formula, some of hypothesis needs to be tested to know which model among regression model is suitable and give a better prediction result by carrying out Dispersion test and Vuong test. In some country, they may have different system of rail and geography, thus it should have different possibilities to influence accident and incident. However, this method and procedure are available to use for them to identify and predict the most influencing factor that contributes to the accident occurrences.

#### **Paper ID 91**

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##### **Title**

Development of Energy Harvesting from Burning Process for Community Need via IoT Based System

##### **Abstract**

In this project was proposed to recreate a new harvesting technique using biomass energy such as twigs, leaves, wood, paper and charcoal emitted from the burning and simultaneously harvest the energy from this heat energy that is released. In addition this product promises a lot in terms of its application whereby it serve the community need during disaster especially during flood or power outages whereby electricity is a necessity for well-being of population around the world. In addition not only providing electricity during disaster this invention can charge your electronic gadgets during outdoor activities such as camping and the plus point here is by eliminating to carry gas fuel along during outdoor activities. Practically, this method could potentially reduce or slows down the risk of global warming if implemented in large scale and also produces free electric power that can be extremely beneficial in third world countries. In addition this product can be emerge as new method to harvest energy as the cost of the module used in this product to produce the energy is cheap than the existing harvesting method such as solar panel or water turbine. Based on the type of material used charcoal was selected as the best material in terms of all the variable especially power. Therefore, we want to propose this product which would be simple, implemented during disaster, power outage or outdoor activities, cost effective which would very much benefit the community on a long term basis.

#### **Paper ID 129**

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**Title**

Analysis of Light Bulb Temperature Control for Egg Incubator Design

**Abstract**

This paper explained the analysis and findings of using light bulb as a thermal source for an incubator system. In the experiment, a temperature sensor that measures the inside temperature of an incubator used as a feedback signal for the closed loop temperature control system. To run the experiments, number of light bulb(s) and its type is determined. Apart from that, there are three control modes to be proposed, Mode 1-3. The results show that for the chosen incubator size, three-fixture IL-type light bulb controlled with Mode 3 control gave the best temperature control performance. The proposed system gave shorter time to reach the setpoint and to return to setpoint after overshoot.

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**Title**

Composite Optimization of Automotive Carbon Fiber Strut Bar Using Hyperworks Optistruct

**Abstract**

Front strut bar is an automotive part commonly used for McPherson suspension system to minimize load on the strut tower by tying both left and right strut with a single bar. By distributing the force acting on a single strut to both strut tower, the strut bar reduces the chassis flex which improves ride and handling especially during cornering. Therefore, strut bar should be stiffer but lighter at the same time to reduce vehicle weight towards fuel efficiency and lower carbon emission. This research attempts to design a lightweight carbon fiber reinforced polymer strut bar in order to replace conventional steel strut bar with equivalent stiffness. For validation, a steel strut bar model is analyzed by conducting experimental modal analysis to determine their natural frequencies and the corresponding mode shapes. These results were compared to simulation results. Later, the dynamic behavior of CFRP and the corresponding mode shapes were analyzed and correlated with static loading test results. Findings in the static loading and dynamic analysis will be used as input in designing a carbon fiber strut bar to further optimizes using composite optimization method in Hyperworks Optistruct software until desired characteristics are obtained. Combination of different ply orientation and stack sequence results in the design of an optimized carbon fiber strut bar achieved a reduction in weight, higher natural frequency while improving or preserving the static and dynamic performances.

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**Title**

Development of Crack on Composite Detection Sensor Using Magnetic Induction Concept

**Abstract**

A crack detection is very important to control the quality of the composite itself that been widely used in industry. The objectives of the current study are to develop a sensor that able to detect crack on composite, make an inspection quality of the composite and distinguish between cracks and not crack on composite material. This project focuses on designing and implementing the system to detect crack on composite material using magnetic induction concept. The miniature of composite detection sensor using magnetic induction concept is designed using Comsol Multiphysics Software to see the current induced from the system. The current value from the sensor is measured based on magnetic induction concept. The induced current produced from the sensor shows the condition of the composite. The signal produced will be amplified by amplifier before sending to RC filter for rejecting the unwanted signal of the fringe effect and to get the clean DC output from AC input signal. The output from the signal will be converted from the analog to digital signal using analog digital converter then using Bluetooth Electronic as interface application via the Arduino module circuit. The Bluetooth Electronic software is used as interface to display the condition of composite materials.

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**Title**

Development of Foreign Material in Food Detection Sensor Using Resistance Concept

**Abstract**

Electrical Resistance Sensor for detect the foreign material in food detection sensor is constructed and presented in this work. This project focuses on how to design and implement the system to detect and distinguish between food and foreign material using resistance concept. The electrode plate of Electrical Resistance Sensor (ERS) is designed using COMSOL Multiphysics Software to see the electric field and contour of the electric potential of the system. The resistance value from the sensor is measured based on AC Circuit concept. The alternating current from the sensor flows to the charge detector circuit providing the voltage corresponding to the resistance between the electrode pair. The voltage from the charge detector circuit has been amplified by amplifier circuit to obtained DC output from AC input signal. The voltage form circuit has been converted from the analog to digital signal using Bluetooth Electronics Application via Arduino Uno through HC-05 Bluetooth module. The

Bluetooth Electronics Application is used as graphical user interface (GUI) to display the condition of the material tested including food and foreign material to smartphone.

**Paper ID 132**

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**Title**

Tchebichef Image Watermarking along the Edge using YCoCg-R color space for Copyright Protection

**Abstract**

Easy creation and manipulation of digital images present the potential danger of counterfeiting and forgery. Watermarking technique which embeds a watermark into the images can be used to overcome these problems and to provide ownership and copyright protection. Digital image watermarking should meet requirements, e.g. maintain image quality, difficult to remove the watermark, quality of watermark extraction, and applicable. This research proposes Tchebichef watermarking along the edge based on YCoCg-R color space. The embedding region is selected by considering the human visual characteristics entropy. The selected blocks with the the human visual characteristics entropy are transformed by Tchebichef moments. The locations of  $C(0,1)$ ,  $C(1,0)$ ,  $C(0,2)$  and  $C(2,0)$  of the matrix moment are randomly embedded for each watermark bit. The proposed watermarking scheme can achieve a trade-off between invisibility and resistance of the watermark. The quantitative experimental results produce the imperceptibility by SSIM value around 0.98. The watermark recovery has greater resistance after several types of attack than other schemes.

**Paper ID 135**

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**Title**

A Preliminary Assessment of Physical Properties of Sediment at Sembrong Reservoir

**Abstract**

Reservoir is one of the main sources of water supply and provides functions to hydroelectric power, domestic use, agriculture, flood protection and recreation. However, there is a pollution problem in the reservoir, one of the physical pollution found in the reservoir is usually sediment, and the problems related to sediment caused by pollution are increasing. This is because the sediment trapping ability of organic materials, minerals and other particles build up in the reservoir and affect water quality and

quantity of sediment itself. Therefore, this research is initiated to characterize the sediment which could be used as control in future research in the treatment of contaminated sediment. The objective of this study was to determine distribution of physical properties of sediment based on Sembrong Reservoir sediment. In this experiment, sediment sampling will be collected using gravity corer at different points in the reservoir area. In addition, the physical properties of sediment is investigated by conducted experiments include particle size distribution, bulk density test, moisture content, loss of ignition and scanning electron microscope (SEM). The result of this experiment may be describing the impact of sedimentation to the water quality and environment. Index Terms—Bulk density, particle size distribution, moisture content, sedimentation

#### **Paper ID 136**

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##### **Title**

Electrical Production Cost of Young Coconut Waste Pellet by Using Mini Pellet Mill – A Feasibility Study

##### **Abstract**

Abstract— Biomass from plants, which have lignocellulosic structure have low bulk density of 30 kg/m<sup>3</sup>, is suitable to be pelletized to increase its specific density (gravity) for easy and inexpensive handling and storage. A new biomass waste material has evolved in interest due to abundant young coconut waste produced from famous young coconut drink and shake business in Melaka, Malaysia. The young coconut pelletization feasibility needs to be verified by firstly assessing its electrical production cost. Therefore, this paper aims to measure the electrical production cost for process involved in young coconut pelletization and analyze its competitiveness against other biomass material from other countries. This is executed by assessing the electrical production cost of three main process in pelletization; crushing, drying and pelleting. The equipments used are coconut crusher, lab-scaled industrial oven and mini pellet mill. The result demonstrates a significantly high electrical production cost, which is MYR141,430/tonne, while other material's production cost only amounts to couple of Malaysian hundreds. Processes' efficiency need to be massively improved by using drum drying method and by adding blender after crusher to increase the desired grain size to avoid raw material wastage. Electrical tariff must also be switched from commercial to industrial tariff.

#### **Paper ID 137**

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**Title**

Image Watermarking based on Integer Wavelet Transform-Singular Value Decomposition and Variance Pixels

**Abstract**

With the era of rapid technology in multimedia, the copyright protection is very important to preserve an ownership from multimedia distribution. This paper proposes an image watermarking scheme based on integer wavelet transform and singular value decomposition. Embedding watermark locations are determined by using variance pixels. Selected blocks with the lowest variance values are transformed by Integer Wavelet Transform (IWT) and the LL sub-band of 8×8 transform domain is computed using singular value decomposition. The orthogonal U matrix component of U<sub>3,1</sub> and U<sub>4,1</sub> are modified using certain rules with considering watermark bits and an optimal threshold. This research reveals the optimal threshold value based on the trade-off between robustness and imperceptibility of watermarked image. The binary watermark is scrambled by Arnold transform before embedding watermark. In order to measure the watermarking performance, the proposed scheme is tested under various attacks. The experimental result indicates that our scheme achieves higher robustness than other scheme under different types of attack.

**Paper ID 138**

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**Title**

Development of Mobile Robot for Measuring Distance using Optical Quadrature Encoder.

**Abstract**

This paper describes the design and development of a measuring tool using a mobile robot. At present, contractors are measuring distances using measuring tape which has few limitations. This includes using of another manpower or a marking flag. The Robot Measuring System is designed to measure distances at multiple conditions such as smooth and rough surface. An optical quadrature encoder is used as a sensor to measure the distances while a program is installed in Arduino Uno for reading and data collection. Graphical User Interface (GUI) was created using Android software so that the movement of the robot can be controlled using a smartphone within a Bluetooth range. An experiment was conducted to test the reliability in terms of accuracy and precision. The best accuracy and precision were obtained when the robot speed is at 90 cm/s on the plain tiles, 80 cm/s on the tar road and 90 cm/s on the grass surface. The robot speed needs to be adjusted accordingly.

**Paper ID 140**

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**Title**

Stability and Roll Effect of the Straight Truck Suspension System

**Abstract**

Safety and stability control especially those involving rollover motion are important features of heavy vehicles. Therefore, this study concentrates to identify the stability and roll effect on front and rear straight truck suspension system. The straight truck roll motion is modeled in Matlab-Simulink software and validated using TruckSim software. The behavior of the straight truck is identified by contravenes in terms of road bumps to generate the roll motion together with the truck body and wheel movements. The simulation results demonstrate that the rear suspension system is effectively more stable compared to the front suspension system based on the lower root mean square (RMS) value and shorter settling time.

**Paper ID 142****Author**

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**Title**

MINIMUM THRESHOLD FOR ZERO CROSSING DETECTION OF THE FIRST RETURN STROKE IN NEGATIVE CLOUD-TO-GROUND LIGHTNING FLASHES IN SOUTHERN PENINSULAR OF MALAYSIA

**Abstract**

This paper aims to investigate the minimum threshold for zero crossing detection of the first return stroke in negative cloud-to-ground lightning flashes in southern peninsular of Malaysia. The uncertainty for a minimum threshold to be set into a programmed software for an automatic zero crossing detection motivated the author to overcome the problem. The software was built-in MATLAB. The development of the software considered the important parameter of lightning strike from the preliminary breakdown stages until the first return strokes. A single station measurement was setup in Ayer Keroh, Malacca. 41 samples of duration of the zero crossing time were recorded by using Lecoy HDO4024 with 5 MS/s. The results showed that the minimum threshold for zero crossing detection was 40 $\mu$ s with 82.9% accuracy. In conclusion, the minimum threshold of zero crossing detection of the first return stroke in negative cloud-to-ground was determined.

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**Title**

Optimization of multi factors for injection-moulded micro gear via numerical simulation integrated with the Taguchi method and Principal Component Analysis

**Abstract**

Many factors need to be considered in producing micro gear by means of injection moulding process including material selection, part and mould design as well as processing parameters. Inappropriate combination of these factors can cause numerous production problems such as occurring of defects, long lead time, much scrap and high production cost. Therefore, the aim of this study is to evaluate the effects of different material for micro gear, gate types, size of gear as well as processing parameters on the multi quality characteristics of the micro gear. The simulation was conducted by integration of Taguchi L27 orthogonal array and principal component analysis. The result of main effect analysis exhibited that the optimal combination of factors that resulted in minimum sink index, volumetric shrinkage and deflection was A3B3C2D3E1F1G1H1I3. Meanwhile, from the ANOVA, gate type was found out to be the most significant factor in minimizing the multi quality characteristic of the simulated micro gear. The findings of this study should be benefited to the gear industry particularly in improving the quality of micro gear where the use of micro gear in microsystem is accelerating nowadays.

**Paper ID 147**

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**Title**

Analysis Antenna By Simulation Using Kapton for Smart System Application

**Abstract**

This paper is to analysis Kapton material to apply in antenna design for telecommunication system. This material used to design radio and microwave frequency antenna with flexible material and persist with different dielectric . This analysis will be combination two materials between copper (FR4) and Kapton substrate. Due to the Kapton characteristic related to temperature, the dielectric will be changed when the temperature changed. The result show that the bandwidth of the antenna will be change up to 10 MHz with additional of Kapton. The gain of the antenna is decreased to 1.19 dB when the dielectric value is increased. The analysis used Computer Simulation Technology (CST) software to get the performance result.

**Paper ID 148**

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**Title**

A Case Study of Malaysian Pedestrian Walking Speed at Shopping Malls in Kuala Lumpur, Malaysia

**Abstract**

Rate of pedestrian walking speeds are influenced by some factors such as gender, age and location. Numerous research had been conducted to deepen the understanding of pedestrian walking speed because it is one of the keys in understanding the pedestrian walking behaviour. This case of study was conducted at two shopping malls in Kuala Lumpur with two main objectives i) one was to determine the average walking speed of pedestrian by considering the factors of age and gender; and ii) to compare the average walking speed that considered age as the factor of comparison between the pedestrian walking speed at shopping malls, bus terminal and crosswalk. Demographic factors of pedestrian walking speed in this study are on the basis of gender (male and female) and 7 groups of age categories consist of children, adult men and women, senior adult men and women, over 70 and disabled person. A camcorder was used to obtain the data of experiment by making video recording of the movement of people that were walking and roaming around at the main atriums of the shopping malls for 30 minutes. Hence, data analysis was completed by using a software named Human Behaviour Simulator (HBS) for analysing the data that were extracted from the video. The result of this study was male pedestrian walked faster than female with the average walking speed of 0.93m/s and 0.81m/s respectively. Furthermore, people in shopping malls walked slower compared to pedestrian who were walking at crosswalk.

**Paper ID 149**

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**Title**

Denosing Small Signals Using Moving Average Method in Arduino

**Abstract**

High-quality biomedical research work such as electroencephalograms (EEG) requires very important high-quality signals from the human body. Usually, the EEG signal that is acquired from the scalp of the brain is a small signal ( $\mu\text{V}$ ) and low-frequency signal, along with external noise accumulation on it which are from the spontaneous activity of the human brain.. The averaging method, is frequently engaged in waveform measurements in order to reduce the additive noise and at the same time, retaining significant parts of the noisy instances. Moving average is also used as a lowpass filter. The averaging and moving average technique on small signals are demonstrated using MATLAB and Arduino. The correlation between the two methods are shown to demonstrate the effectiveness of the two methods. These two techniques will be applied in a real-time acquisition of EEG signals.

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**Title**

Development of Power Generator Using Thermal Source from a Car

**Abstract**

Wasted energy is created in our surroundings, including in a car's operating system. This paper presents the development of a power generator system using thermal source from a car. Energy cannot be created or destroyed but it can be transferred or changed into other forms. Therefore, an idea of reusing the thermal and generate electric to supply car devices was conceived. A power generator system is created to reuse the thermal sources. The power generator system uses a thermoelectric generator to convert heat energy from a car to electrical energy when a difference in temperature occurs. The conversion process is achieved by using a Peltier module. With the small amount of voltage produced from the process, a DC-DC boost converter is used to boost the voltage from the converted voltage. The result for output voltage is 5 V and it useful to supply back for car's devices or charge small electronic devices.

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**Title**

DISCOVERING THE CLASSIFICATION OF MANUFACTURING COMPLEXITY FROM MALAYSIAN INDUSTRY PERSPECTIVE

**Abstract**

Nowadays, manufacturing complexity (MC) is considered as a major challenge in manufacturing industry. MC covers a very wide area in manufacturing practices either within firm's control or out of control, either directly or indirectly with manufacturing routines. As the technology and globalization getting better, the challenges borne by MC are also getting tougher. This scenario experienced by worldwide manufacturing firms including Malaysian manufacturing industry. In order to face this challenges, it is essential to manage MC accordingly. Although some researchers expressed MC negatively, it is believed that managing MC in correct manners will be beneficial to manufacturing firms. The first step towards managing MC accordingly is knowing MC itself in every angle. Generally, MC is divided into two division which are internal MC (IM) and external MC (EM). Initially, both division have several elements which the numbers are 30 and 22 elements for IM and EM respectively. A set of questionnaire survey consisting of these elements has been distributed to representative of manufacturing firms across Malaysia to gather the information and through factorial analysis using Statistical software (SPSS), these elements are classified into smaller number of classification to facilitate towards the better MC management. The classifications for IM are human management, production design, productivity, job floor management and conflicts while for EM are local culture, trend changes, volume variety and globalization. These classifications will support industrialist especially in Malaysia towards better MC management to grow a better outcome in manufacturing industry.

**Paper ID 154**

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**Title**

A Design of License Plate Recognition System Using Convolutional Neural Network

**Abstract**

This paper proposes an improved Convolutional Neural Network (CNN) algorithm approach for license plate recognition system. The main contribution of this work is on the methodology to determine the best model for four-layered CNN architecture that has been used as the recognition method. This is achieved by validating the best parameters of the enhanced Stochastic Diagonal Levenberg Marquardt (SDLM) learning algorithm and network size of CNN. Several preprocessing algorithms such as Sobel operator edge detection, morphological operation and connected component analysis have been used to localize the license plate, isolate and segment the characters respectively before feeding the input to CNN. It is found that the proposed model is superior when subjected to multi-scaling and variations of input patterns. As a result, the license plate preprocessing stage achieved 74.7% accuracy and CNN recognition stage achieved 94.6% accuracy.

**Paper ID 146****Author**

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**Title**

Single Feed Square Aperture Circular Polarized Antenna

**Abstract**

In recent years, circular polarized antennas become more important in wireless communication systems because of the ability of radiating circular polarized wave. In this paper, the design of single-fed square-aperture antenna with and without reflector towards the circular polarized antenna performance is presented. The antenna made of square ground plane, square-aperture and a probing strip feed by using microstrip transmission line. The design has achieved a target axial ratio, which is less than 3 dB at frequency range of 4 GHz to 6.5 GHz. When a square ground plane reflector is integrated on the CP antenna for the unidirectional pattern, the presented antenna enhanced gain about 8 dB.

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**Title**

Assessment on The Impact of Distributed Generation (Renewable Energy) Penetration to The National Grid Protection System Performances using ERACS Software

**Abstract**

This paper is an assessment on the impact of distributed generation penetration to the national grid protection system performance based on a model simulated using software named ERACS. In recent years, the need and demand of using renewable energy as power source has increased greatly. This demand then led to the integration of distributed generation on the grid. Distributed generation has a lot of advantages. It can acts as emergency supply, offering high quality power as well as reducing the carbon emission. However, it also has advantages that cause major concern, with protection being a major concern. Two model are used to simulate different scenario, focusing on protection blinding impact to the overcurrent relay used that is Inverse Definite Time Relay using ERACS. The result of the simulation are then studied in order to determine the relay performance during normal condition and when injected with renewable energy.

**Paper ID 155**

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**Title**

EFFECT OF DISTANCE BETWEEN NATURAL THREAD ON FLAME SPREAD BEHAVIOUR OF KENAF AND POLYESTER FABRIC

**Abstract**

The understanding of fabric flammability is important in fire safety engineering. It noted that natural thread has different flame spread characteristic than synthetic thread. This different characteristic may influences on flame behaviour of combine fabric. In this research, the combine fabric was made 50 % of kenaf and 50 % of polyester with the different distances and angles. Two type of distance is chosen in this experiment, one is 0 mm for kenaf / 20 mm for polyester and another distance is 20 mm kenaf / 20 mm polyester. Thread angle is measured between kenaf thread and horizontal line. In this research,  $\theta = 0^\circ$ ,  $45^\circ$ , and  $90^\circ$  are chosen. The fabric is suited from the top of edge and the flame will be in downward direction. The flame spread behaviour is recorded by camera to analyzes the data. It seen that the distance and angle are affected on the flame spread behaviour of combine fabric.

**Paper ID 158**

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**Title**

A Comparative Study of Different Blood Vessel Detection on Retinal Images

**Abstract**

Detection of blood vessel plays an important stage in different medical areas, such as ophthalmology, oncology, neurosurgery, and laryngology. The significance of the vessel analysis was helped by the continuous overview in clinical studies of new medical technologies intended for improving the visualization of vessels. In this paper, several local segmentation techniques which include such as Vascular Tree Extraction, Tyler L. Coye and Line tracking, Kirsch's Template and Fuzzy C Mean methods were studied. The main objective is to determine the best approaches in order to detect the blood vessel on the degraded retinal input image (DRIVE dataset). A few Image Quality Assessment (IQA) was obtained to prove the effectiveness of each detection methods. Overall, the result of sensitivity highest came from Kirsch Templates (96.928), while specificity from Fuzzy C means (77.573). However, in term of accuracy average, the Line Tracking method is more successful compared to the other methods.

**Paper ID 160**

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**Title**

Study on Mist Nozzle Spray Characteristics for Cooling Application

**Abstract**

Evaporative cooling mist spray is a cost effective solution for many cooling application. The suitable misting spray nozzle play a major role in order to provide the suitable spraying condition in regards to the application. One of the most widely use mist spray application is in cooling the outdoor open area to lower the temperature for a more comfortable thermal comfort surrounding. This study was carried out to characterized the spray formation, size of droplet, velocity of the droplet and the angle of the spray formation from a commercial mist spray nozzle namely 1/8 SF-CE SM nozzle with 1 mm and 2 mm diameter hole. Water was supplied with different pressure of 1, 2 and 4 bar. High speed camera and still digital camera using short burst of flash were used to produce the video and image for analysis. The results show that changes in water pressure effect the spray angle, droplet speed the droplet size of the mist spray

**Paper ID 161**

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**Title**

Modification and Design PID Controller of Vapour Refrigerator System

**Abstract**

Designing a temperature control system of vapour refrigerator is a real challenge where the dynamic and steady state of the system need to be diagnosed properly through the behaviour of the system. This research focused on development of temperature control of the refrigerator for biomedical storage purposes. In any hospital, the refrigerator is the key component for storage of vaccines, serums, reagents, hormones etc. Thus, the specific refrigerator is need to keep the blood samples at maximum cooling point. This project is to design and develop the constant temperature control by modifying the control system of vapour refrigerator. A commercial mini bar refrigerator is modified to produce high technology refrigeration system. In order to control the temperature, the input current to the system need to be controlled until it reached to a desired temperature of this project which is 4°C. A mathematical model is developed based on time response characteristics of the system. Four types of controller are design to analyze the best performance for the refrigerator application. A second order model is found to adequately represent the system as it gives best fit with better properties than the first order model with error between measured data and simulation data is 0.44. Validation procedures show that the derived model is indeed a good enough representation of refrigerator system. In the end of the project completion, PD controller show the best performance for the system with steady state error 0.022.

**Paper ID 163****Author**

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**Title**

Classification of Partial Discharge Detection Technique in High Voltage Power Component

**Abstract**

In this study, a review on categorized of partial discharge (PD) were prepared. The PD detection is important due to monitor and diagnosis the insulation health on high voltage (HV) power component. PD at high voltage transformer occurs due to the unscheduled maintenance, aging of equipment, breakdown of insulation, gas bubbles in insulation liquid, manufacturing error etc. In order to maintain constant and high as possible transformer performance it is essential to control, detect and measure the PD phenomena. There are many methods developed through time grouped in four groups based point of observation: optical, chemical, acoustic and electrical. Importance of PD detection is monitoring of health and conditions of high voltages transformers, together with prediction of insulation life, replacement time and early indication of outages for reliable operation of the equipment. Without detection and locating problems in transformer, PD frequency and occurrence increase by the time, leading to failure of transformer, causing equipment damage, fire and loss of revenue because of unscheduled outage. However, the different type of sensors have their advantages and disadvantages.

**Paper ID 168**

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**Title**

DEVELOPMENT OF INVERTER BY USING DC-DC BOOST CONVERTER

**Abstract**

This paper proposes an alternative topology of an inverter to the existing topologies available in the market. A prototype is intended with the purpose of investigate the possibility of designing an inverter using two Boost Converters. This project initialized with a series of simulations using Matlab in order to determine the feasibility of the proposed topology. The next step is the design and development of the proposed prototype where suitable electronics components is chosen based on simulation result. A PIC microcontroller is used to control the proposed prototype where a control scheme is created based on the programming in microcontroller. Then the performance of the proposed prototype will be verified to be optimum by several practical testing using different values of capacitor, inductor and duty cycle. Lastly, data and analysis will be presented in a proper mannered way. In the end, this project intends to produce stepped-up square wave output voltage waveform by proper controlling of two Boost Converters.

**Paper ID 170****Author**

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**Title**

Graphene Magnetite Polymeric Nanocomposites (GMPN)-Array Sensor for Human Brain Tumor Detection Using Specific Absorption Rate (SAR) Technique

**Abstract**

Graphene Magnetic Polymeric Nanocomposites-Array sensor is successfully detecting human brain tumor based on Specific Absorption Rate technique. The sensor consists of graphene as the radiating

element and Polydimethylsiloxane Ferrite as the substrate in order to realize ultra-wide band radiation (2.5 GHz-12.2 GHz) with high energy (2.5dB-6.7dB) in microwave frequency ranges. Amount of energy absorbed by the human brain indicated the present of tumor. Human brain with tumor absorbed more energy and recorded higher SAR value (2.56 W/kg) compared with human brain without tumor (1.07 W/kg).

**Paper ID 170**

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**Title**

Geological Effect on GPR System Due to Soil Properties in Malaysia

**Abstract**

This paper present the measurement of dielectric properties of soil in Malaysia in three differences condition which are normal condition (ambience), heated (up to 50 OC) and wet condition (10 % water content). Eight (8) samples of soil have been collected in the local region and was measured in the frequency range from 0.5 GHz to 3.5 GHz for Ground Penetrating Radar (GPR) applications. The measurement of the dielectric properties has been conducted using Agilent high temperature probe (Model) integrated with Performance Network Analyzer (PNA E8362B). The uncertainties in measurement process, especially dealing with measurement data have been considered in order to eliminate the probability of error during the measurement. The measured result for permittivity and loss factor of the measured samples are tabulated in graphs and the analysis of the measured data are discussed in this paper.

**Paper ID 172**

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**Title**

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eliminate the probability of error during the measurement. The measured result for permittivity and loss factor of the measured samples are tabulated in graphs and the analysis of the measured data are discussed in this paper.

**Paper ID 173**

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**Title**

Study of 5.8 GHz band-stop frequency selective surface (FSS)

**Abstract**

This paper presents the study of 5.8 GHz frequency selective surface (FSS) acts as a band stop to eliminate unwanted radiation signal at 5.8GHz. The FSS was designed using computer simulation technology (CST) Microwave Studio software. The paper shows the comparison of square loop, octagon loop and hexagon loop of Band stop FSS (BSFSS) performance at 5.8 GHz. Besides, the BSFSS design using four different type of dielectric substrate such as FR-4, TLY-5, Roger RT5870 and Roger RT5880 were compared. The results obviously show that the Rogers RY5880 has the attenuation -44.72 dB. The fabricated FSS were measured by using free space technique with two horn antennas connected to performance network analyzer (PNA). The measured and simulated results were compared. The results show that the square loop FSS structure have the better attenuation -26.76 dB (simulated) and -38.05 dB (measured) at 5.8 GHz.

**Paper ID 175**

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**Title**

Green Roof Performance under Malaysia Tropical Climates: A Review

**Abstract**

Green technology initiatives are increasing as efforts to ensure environmental sustainability within the construction industry. The concept of the green roof is relatively new in countries like Malaysia, being part of the efforts to minimize the green-house gas emissions and reduce the occurrence of flooding due to the runoff from concrete urban surfaces. Experimental approaches to the assessment of the viability of the green roof within tropical climates allow for the determination of the applicability of this concept within the design storm or in the face of an actual storm. This paper evaluates the performance of the roof within Malaysia, reporting 44% reduction in storm water runoff and reduction in interior temperatures from the presence of the roof. However, shortcomings in the design and data make it difficult to generalize this outcome in the overall context of tropical climates.

**Paper ID 176**

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**Title**

Effect of Ground Granulated Blast Slag (GGBS) to the Bonding Strength of Geopolymer Mortar as Repairing Material

**Abstract**

The bonding strength of geopolymer mortar is very important for binding the old concrete with the latest concrete when act as repair material. The present study is aim to determine the best ratio between GGBS and fly ash in order to find the optimum bond strength under ambient temperature. There are five different ratios of GGBS to fly ash that had been tested in this research which are GGBS: FA= 10:90, 20:80, 30:70, 40:60, and 50:50. The different mixture of GGBS and fly ash is added with the alkaline solution (12M of sodium hydroxide and sodium silicate) and sand which have been mixed then rapped cured under ambient temperature. Once the mixing is done completely, pour the mixture into the metal mold and attach with the OPC concrete substrate. The bonding strength of this research were tested by using slant shear test in 7 days, 28 days and 60 days of curing. From the result tested, GGBS: FA= 30:70 could concluded as the best ratio for presenting the optimum bonding strength in this research since the bond strength for GGBS: FA=30:70 had obtain optimum strength under long curing time (9 MPa in 28 days cured and 10.6 MPa in 60 days cured). The maximum compressive strength of 46.4 MPa was observed at geopolymer mortar with GGBS: FA = 30:70. There are many factors affecting the bond strength of geopolymer which are slow setting time of fly ash and GGBS, curing temperature, size of GGBS and also the mixture proportion. The present study had concluded that GGBS: FA= 30:70 in geopolymer mortar are the best for presenting the bond strength.

**Paper ID 177**

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**Title**

## Application of Natural Fiber for Short Term Stabilization of Marine Clay Slope

### **Abstract**

Existence of marine clay leading to further investigate on the properties and also the method of stabilization. The aims of this study is to investigate the shear strength parameter marine clay slope stabilized with kenaf fibers. The laboratory testing has been conducted to determine the marine clay and stabilized marine clay properties and its characteristic by using soil classification of particle size distribution, specific gravity, Atterberg limit and unconfined compression test. The result show that shear strength for marine clay reinforced kenaf fiber is increase by increasing the percentage mixing of kenaf fiber into marine clay. The result of slope stability is also increased when mixing kenaf fiber with marine clay sample at 5% and 10% which show safety factor higher than 1.2 as required for most of temporary slope construction

### **Paper ID 178**

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### **Title**

NATURAL VENTILATION FOR ENERGY EFFICIENT OFFICE BUILDINGS: A COMPARATIVE ANALYSIS ON THREE BUILDINGS IN KUALA LUMPUR

### **Abstract**

The aim of this study was to identify and analyse the criteria of natural ventilation in the selected office buildings. The analysis had been made based on the architectural and passive design component provided in MS 1525:2007 for the office building. This case study is important in helping to understand the relationship between natural ventilation, energy efficiency and cost effectiveness.