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**Title:** High frequency power cable modeling for screen voltage calculation of different cable length with induction motor drive system (VFD)

**Author (s):** N. Shanmugasundaram and S. Thangavel

**Abstract:** This paper discussed on high frequency power cable modeling, simulation and analysis of the cable parameters variation. Also the variation of screen voltage, cable input and output phase voltage is discussed in the new developed power cable model. In this research paper, the input and output cable screen voltage are measured. The phase voltage for the different range of series inductance and shunt capacitance due effects the increasing cable length. The power cable parameters are accurately calculated for the cable connected between Variable Frequency Drive (VFD) and Induction Motor. An improved new high-frequency cable model is developed to represent the behaviors of cables connected between drive (VFD) and the motor terminal. The cable parameters and cable behavior is studied by mathematical functions in frequency domain. For different range of cable length are accounted in the new power cable equivalent circuit are developed and the same has been implemented and the results are presented in MATLAB/SIMULINK.

[Full Text](#)


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**Title:** Optimal placement of TCSC using WIPSO

**Author (s):** K. Kavitha and R. Neela

**Abstract:** Modern power systems are heavily loaded and are being operated in ways not originally envisioned. Flexible AC Transmission System (FACTS) devices play a vital role in improving the static as well as dynamic performance of the power systems. FACTS devices are multi-functional control devices which can be used to effectively control the power distribution and the power transfer capability, to reduce active power losses, to improve stabilities of the power network, to decrease the cost of power production and to fulfil the other control requirements by controlling the power flow in the network. FACTS devices are based on solid-state control and so are capable of control actions at far higher speed. However the location and rating of the FACTS devices play a major role in deciding the extent to which the objective of improving the system performance is achieved in a cost effective manner. In this work an objective function comprising of cost, line loadings and load voltage deviations is proposed to tap maximum benefits out of their installation and the weights assigned to them decide the relative importance. WIPSO (Weight Improved PSO) technique is applied for solving the problem and the effectiveness of the proposed method is tested on IEEE 14, 30 and 57 bus systems using MATLAB. The results of the proposed technique are compared with the results obtained through the application of PSO algorithm for the same objective function.

[Full Text](#)


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**Title:** Computation of elastomers properties using FORTU-FEM CAD system

**Author (s):** Vitaliy Mezhyuev, Sergey Homenyuk and Vladimir Lavrik

**Abstract:** This paper presents developed by authors FORTU-FEM Computer Aided Design (CAD) system, which implements the moment scheme of the Finite Element Method (FEM) for computation of the properties of complex mechanical systems. Examples of application of FORTU-FEM CAD for calculation of the tensional and the deformed states of constructions from elastomers are considered.

[Full Text](#)

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**Title:** Optimized FSI flow simulation using modern up-to-date software systems: A direct comparison between simulated and tunnel results

**Author (s):** Luca Piancastelli, Leonardo Frizziero, Giampiero Donnici, G. Di Giacomo and A. Gattii

**Abstract:** The goal of this study is the analysis of the CFD/FSI simulation accuracy of complex shapes with standard CAD-embedded software packages. In a PLM (Product Lifecycle Management) system, the continuous improvement of CAD-embedded FSI (Fluid System Interaction) software packages has progressively reduced the necessity for highly specialized external partners. These simulation software packages are designed to keep pace with the unavoidable design development. To make FSI and CFD usable for mechanical designers and design engineers from other engineering disciplines, CFD software package have been largely automated. The specialist expertise required to operate traditional CFD software may be negligible. However, the capabilities of CAD-embedded CFD to handle complex geometries and to simulate complex industrial turbulent flows with heat and mass transfer raise question of the accuracy on the results obtainable by a non-specialized designer. In this paper, a paraglider wing from NASA TN D3442 was used as a case study. This wing was modelled inside commercial CAD software and then thoroughly analysed by using the simulation tools with their default settings. The accuracy of results was then evaluated.

[Full Text](#)

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**Title:** ATC enhancement through optimal placement of TCSC using WIPSO technique

**Author (s):** R. Sripriya and R. Neela

**Abstract:** Deregulation of electric power industry aims at creating a competitive market and this brings in new challenges in the technical and non technical aspects. One such problem is congestion management which involves relieving the transmission lines off their overloads, which in other words means enhancing the Available Transfer Capacity of the lines (ATC). In this paper the problem of enhancing the transfer capacity of the transmission lines is addressed by installing TCSC'S through the application of one of the variants of the popular Meta heuristic search technique, Particle Swarm Optimization (PSO) namely Weight Improved Particle Swarm Optimization (WIPSO). The problem is solved by taking into account the variations in wheeling transactions across any two selected buses and the algorithm is used for enhancing the ATC under various load conditions in an emission economic dispatch environment and the results are compared against those obtained using PSO.

[Full Text](#)

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**Title:** Comparison of photovoltaic phenomenon to electronic behaviours of diode, resistance, and capacity

**Author (s):** El Batoul Mabrouki, Moulay Rachid Douiri and Mohamed Cherkaoui

**Abstract:** This paper presents a comparison of the photovoltaic (PV) - photoelectric phenomenon to the following phenomena: diode effect, resistance conceived to respect Ohm's law, and electrical capacity. In order to carry out this analysis, we compared the processes of the electrical behaviour of an amorphous silicon solar cell (a-Si) with those of the conventional electronic components such as: diodes, resistors, and the chemical or ceramic capacitors. This comparison, based on the analysis of the electrical characteristic (Current-Voltage) (I-V) of the PV cell and the electrical or electronic component, is carried out according to field trials. Similarities and differences between the electrical behaviour of the PV cell and that of electrical components were identified. The objective is to better understand the electrical characteristics of a PV cell and subsequently improve, afterwards, the performance modules and solar panels.

[Full Text](#)

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**Title:** Reliable recovery strategy for contention-based forwarding in vehicular ad hoc network streets

**Author (s):** Mojtaba Asgari, Mahamod Ismail and Raed Alsaqour

**Abstract:** Recent research studies prove that contention-based forwarding (CBF) algorithms are preferable in highly-dynamic vehicular environments. CBF algorithms are beaconless, whereas position-based algorithms rely on periodic beacon information to make forwarding decisions. Considering the store-carry-forward paradigm of delay-tolerant networks, which relies on mobility of vehicles to deliver packets when next forwarding vehicle is unreachable, we proposed a new recovery strategy and enhanced the CBF algorithm to tackle the network disconnection problem that frequently occurs in vehicular wireless networks. This enhanced CBF with a store-carry-forward capability is referred to as CBF-SCF algorithm. The algorithm was simulated, and the results indicate that CBF-SCF outperforms normal CBF in terms of packet delivery ratio and routing overhead.

[Full Text](#)

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**Title:** Analysis and selection for motorcycle becak and Microlet Commuterline for travel work of Biringkanaya Tamalanrea to Makassar city

**Author (s):** Ahmad Yauri Yunus, Wihardi Tjaronge, Nur Ali and dan Sakti Adji Adisasmita

**Abstract:** The existence of necessity in work activities will cause a trip which can produce the movement of people, in which it requires alternative modes of transportation. The purpose of this research is to analyze the influence of travel cost, income, ownership of modes and gender to the selection of modes in motorcycle becak and Microlet Commuter line as transportation of modes for work in the district from Biringkanaya to Tamalanrea. This research used questionnaire in which 100 samples for people in six villages in the district from Biringkanaya. Technique used to take sample in the research is purposive proportional random sampling. This research also uses Binary Logistic Regression technique with dichotomous dependent variable, 1 for motorcycle becak and for Microlet Commuterline. Estimation technique by using Binary Logistic Regression conducted to determine the effect of independent variables on the probability of commuters to use motorcycle becak and for Microlet Commuterline. The result of this research shows that the choosing of modes motorcycle becak and for Microlet Commuterline work by people in district of North Biringkanaya is dominated by motorcycle becak users, in which there are 60 respondents, and there are only 40 respondents for Microlet Commuterline. The choosing of motorcycle becak and Microlet Commuterline in district of North Biringkanaya is caused by factor of travel cost, income, ownership of modes and gender influence positive and significance.

[Full Text](#)

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**Title:** DALI master controller unit with a wireless connection and application software

**Author (s):** Mika Maaspuro

**Abstract:** In this study DALI controller device with a wireless connection will be constructed. The device will be used as a platform for studying software solutions to implementing embedded DALI system, the feasibility of DALI, the electrical performance of DALI interface and the wireless connection. The major tasks of this study are developing the embedded software for DALI controller, for the wireless module and the application software for a PC. The hardware for the platform requests technologies of various kind. Evaluation boards and modules will be utilized as far they are available. However at least DALI interface circuitry and DALI power unit must be entirely self-made. The platform and the software will be tested with several light ballasts. The wireless link will be tested in indoor environment. RF propagation tests will show what power levels will be required and how sensitive the RF-link is for the mutual orientation of the antennas. The device is named as a master controller unit because it serves as the main controller and commissioning tool, allowing the user to enter short addresses for the light ballasts, defining groups and scenes and executing other configuration tasks.

[Full Text](#)

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**Title:** Frame rate block selection approach based digital water marking for efficient video authentication using network conditions

**Author (s):** A. Kirthika and A. Senthilkumar

**Abstract:** The modern information technology has provide great impact on information transfer and even if there are many network protocols supports video transfer the problem of information security has not been handled properly. Online video conferencing and live chat are the common applications of modern information technology but the quality of video being transferred or received is based on the frame rate. Also there are many situations where the content of video has to be authenticated before displayed to the user. To perform such authentication there are many approaches has been discussed earlier and suffers with the problem of malformed content display and accuracy. We propose a novel video authentication approach which is performed according to the network conditions. The method encodes the image in a selected block of the video

frame, which will be used to decrypt the image. The water marking is performed on the selected block only and with the identified hidden information the original image could be retrieved. The method also proposes a frame rate selection approach according to the network conditions and the same is used to choose the block where the watermarking could be performed. The proposed approach has produces efficient results in video authentication and data transfer.

[Full Text](#)

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**Title:** 3D digital reconstruction of brain tumor from MRI scans using Delaunay triangulation and patches

**Author (s):** A. Sakthi Bharathi and D. Manimegalai

**Abstract:** In this paper we present two approaches to reconstruct 3D shapes of brain tumors from MRI images. The first approach is reconstruction of 3D images from set of 2D segmented slices of MRI brain by using thresholding and morphological operations; contour plot and patches. The second approach is a better one wherein we reconstruct a tumor by using same segmentation process and altering the 3D reconstruction algorithm that uses sobel operator, boundary extraction, Delaunay triangulation and alpha shapes. The volume to area ratio of the tumor and the distance between points on head and the points on tumor is estimated. Delaunay Triangulation affords distinct advantages, such as: its ability to describe the surface at different levels of resolution, efficiency in storing data, ease of storage and manipulation, easy integration with raster databases, smoother, more natural appearance of derived terrain features. However, we also encounter a few disadvantages such as: in many cases it requires visual inspection and manual control of the network, various grid sizes cannot be used to reflect areas of different complexity of relief.

[Full Text](#)

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**Title:** Efficient privacy preserving authentication for vehicular Ad-Hoc networks

**Author (s):** S. Supriya and B. Bharathi

**Abstract:** Vehicular networks are a fast developing research topic which is useful for the area like traffic efficiency enhancement and safety application. VANET (Vehicular Ad-Hoc Network) is considered as an intelligent transport system where in the vehicles can able to communicate with each other and also with the road side infrastructure. Since the message exchange between two vehicles are ad-hoc in nature and the driver behavior and high mobility of the vehicle, there is a chance of privacy and security problems and also the authentication is an another issue for any secured interactions due to the VANET has a unsecured and untrusted nature. The paper reviews various existing authentication protocols used for efficient privacy preserving authentication in the VANET.

[Full Text](#)

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**Title:** Comparison of PID and fuzzy logic controlled wind generator fed z source based PMSM drive systems

**Author (s):** Jaffar Sadiq Ali and Ramesh G. P.

**Abstract:** This work dealt with comparison of responses of PID and FL controlled ZSI based wind energy conversion systems. A coupled inductor was employed to produce high voltage gain. Open loop and closed loop control systems with PID and FL controllers were designed and simulated using MATLAB. The principle of operation and simulation case studies was presented in detail. The comparison was made in terms of rise time, steady state error and peak over shoot.

[Full Text](#)

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**Title:** An experimental investigation on strength properties of copper slag fibre reinforced concrete

**Author (s):** Binaya Patnaik, Seshadri Sekhar T. and Chandra Sekhar B.

**Abstract:** This paper presents a study of the mechanical properties of copper slag fibre reinforced concrete considering the effect of fibre content (0%, 0.5%, 1%, and 1.5%). Also an attempt has been made to establish the relationship between different mechanical and non-destructive test properties of concrete. Furthermore a mathematical model was proposed to determine different strength properties of copper slag concrete with variation of fibre content in it. The suggested model successfully epitomizes the rise of tensile and flexure strength properties of copper slag concrete with increase in fibre content, however a different pattern has been observed in case of compressive

strength. In the present experimental investigation, concretes of grade M20 and M30 were used with crimped steel fibres having an Aspect Ratio of 60.

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**Title:** Analysis of Telugu palm leaf characters using multi-level recognition approach

**Author (s):** Panyam Narahari Sastry, T. R. Vijaya Lakshmi, RamaKrishnan Krishnan and N. V. Koteswara Rao

**Abstract:** Palm leaf character recognition is an area which is at the nascent stage of research. Although character recognition is a well-known application of pattern recognition, lot of work is still to be exploited in handwritten character recognition. The recognition accuracy as per the literature survey for handwritten English characters is very low and for Indian languages it is just started. Research has been started for Indian languages like Bangla, Hindi, Telugu, Tamil, Devangari, etc., but still at the starting stage. Palm leaf character recognition is an open area of research and is also very important since these palm leaves contain huge amount of information related to astronomy, astrology, architecture, law, medicine and music. In the present work, an additional feature called depth of indentation at important pixel points like the starting point, curves, joints, loops and end points is considered which is directly proportional to the pressure applied by the scribe on the palm leaf. This depth of indentation is considered in the Z-direction measuring in microns. In the proposed work, multistage recognition approach is used to improve the recognition accuracy up to 92.8%.

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**Title:** Detecting the optic disc boundary and macula region in digital fundus images using bit-plane slicing, edge direction, and wavelet transform techniques

**Author (s):** Bijee Lakshman and R. Radha

**Abstract:** Early diagnosis of vision abnormalities is key focus for medical experts in order to start treatment earlier, in particularly for Diabetic Retinopathy (DR) treatment. In this paper, we have presented a simple, novel algorithm to find the optic disc (OD) and macula in color retinal images which is a fundamental step in DR analysis. The proposed segmentation algorithm involves various image processing techniques such as bit-plane slicing, edge direction detection, HSI color space conversion and block searching using wavelet transformation matrix.

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**Title:** Lung cancer detection using supervised classification with cluster variability on radiographs data

**Author (s):** Noreen Kausar, Brahim Belhaouari Samir and Ramil Kuleev

**Abstract:** Performance enhancement for disease diagnostic systems has been utmost challenging aspect of providing further treatments or proceeds surgeries without any possible delays. In recent times, various data mining techniques are being applied as the ratio of lung cancer is increasing enormously in recent years and require significant developments in its accurate detection at a possible early stage to cure the patients from further suffering. Developing a diagnostic system for lung cancer demands efficiency in processing and classification of X-rays of normal and cancerous cases. In this work, robust computer aided diagnostic system is proposed by utilizing modified clustering based classifiers such as Support Vector Machine (SVM) and k- Nearest Neighbors (k-NN) with optimized processing techniques for feature processing and selection of suitable features to enhance system's performance in terms of accuracy, sensitivity and specificity. Overall, this work has proved to have a maximum detection rate with respect to earlier techniques applied. In future this approach will be implemented for determining the region of interest (ROI) and classifying the severity of cancer cases as mild, moderate or critical.

[Full Text](#)

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**Title:** Study of wear of tools made of pressed and sintered heterogeneous composite powder materials based on HSS with high melting point compounds

**Author (s):** A. S. Vereschaka, M.S. Migranov and A. A. Vereschaka

**Abstract:** The study considers some of the methods to impact the friction conditions in cutting of metals through alloying HSS-based sintered powder tool materials of modern generation. The first method involves the reduction of self-organization level through the reduction of the friction coefficient at operating temperatures by addition of 5% aluminum oxide ( $Al_2O_3$ ). The second method is based on the modern concepts of tribology on the possibility to extend a range of self-organization through stable high-

strength secondary structure appearing on the surface of the tool. This is achieved by addition of 2% BN (hexagonal). The use of both methods makes it possible to significantly increase the tool life, and it is achieved by addition of 20% TiCN.

[Full Text](#)

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**Title:** Cooperative node selection in virtual MIMO based wireless sensor network using maximum a posteriori estimation

**Author (s):** K. Rajeswari and M. A. Bhagyaveni

**Abstract:** A wireless sensor network is a low-cost, low-power network. Because of its multi functionality, it is suitable for wide range of applications. In recent years, the research has focussed interest in to reducing energy consumption in Wireless Sensor Networks. As sensor nodes are battery powered which is very limited resource. Because of the limited energy resource, the life time of network has reduced. In this paper, we proposed a node selection algorithm which prolongs the network lifetime by effectively using advanced physical layer technique such as Virtual MIMO. The cooperative sensor nodes are selected on the basis of prior conditions like residual energy and distance between neighbouring nodes and sink node. Along with the prior conditions, the post conditions such as channel condition, overload and delay for transmission are considered. Based on these conditions, the cooperative nodes are randomly selected. After selecting the cooperative nodes, the maximum a posteriori estimate is applied to select the appropriate nodes before transmission. The simulation results are taken for network lifetime, end to end delay and residual energy. The results show the significant improvement of the proposed algorithm than already existing V-BLAST transmission scheme.

[Full Text](#)

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**Title:** Matlab integration into Java-based expert systems for physical processes modeling

**Author (s):** Dmitry Potapov

**Abstract:** A technique for dynamic Matlab functions integration into Java is proposed; overcoming the constraints imposed by languages involved, such as the need to recompile Java-project, the conversion of m-functions into Matlab scripts, and passing Matlab array as a list of parameters into Java methods.

[Full Text](#)

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**Title:** Crowd density analysis and tracking

**Author (s):** P.V.V. Kishore, M. Nanda Kishore and D. Prudhvi Raj

**Abstract:** Crowd Density Analysis (CDA) aims to compute concentration of crowd in surveillance videos. The central theme of this paper is to estimate the crowd density using crowd feature tracking with optical flow. Features for Accelerated Segment Test (FAST) algorithm extracts local features for each of the surveillance video frame. Optical flow tracks the extracted local features between frames. This process identifies the crowd features in consecutive frames. Kernel density estimator computes the crowd density in each successive frame. Finally individual people are tracked using estimated flows. The drawback of this method is similar to suffered by most of the estimation methods in this class that is reliability. Hence testing with three popular optical flow models is initiated to find the best optical flow. Three methods are Horn-Schunck (HSOF), Lukas-Kanade (LKOF) and Correlation optical flow (COF). Five features extraction methods were tested along with the three optical flow methods. FAST features with horn-schunck estimates crowd density better than the remaining methods. People tracking application with this algorithm gives good tracks compared to other methods.

[Full Text](#)

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**Title:** Analysis of employability skills of undergraduate engineering students in view of employers perspectives

**Author (s):** M. Radhakrishnan and S. Sudha

**Abstract:** The employability issue is most demanded one in this world. In one corner employers are demanding the right skills to meet the ever-changing needs of today's global economy and this has become something of a war city. In the other corner is the learning and skills sector, which is working hard to help develop a better skilled workforce. The Objective of this research was to develop a clearer understanding of the skills employers expect from young people coming into the workforce to hold. Unemployment among 18-24 years old remains a key issue. The researcher wants to come out in this study about the employers' expectations from the young people coming

into the workforce. The researcher has analyzed about the employers demand for a better skilled workforce.

[Full Text](#)

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**Title:** Impact of online stream clustering in bandwidth-constrained mobile video environment

**Author (s):** P.M. Arun Kumar and S. Chandramathi

**Abstract:** Mobile Video Streaming is becoming increasingly popular in today's Multimedia community. Various adaptive streaming techniques have been proposed by multimedia researchers to dynamically vary the video quality according to the available bandwidth. However, the deployment of best video adaptation techniques in real time is highly challenging due to critical QoE (Quality of Experience) requirements in wireless multimedia streaming. Resource constrained wireless multimedia networks demands better perception on the behavior of critical factors such as bandwidth in varying geographic milieu. In this paper, Machine Learning based online stream clustering is adopted to study the bandwidth impact in a streaming environment using 3G wireless video dataset. Massive Online Analysis (MOA) software framework is used to infer the results using algorithms such as CluStream and DenStream. The experimental result shows the effect of stream clustering based on unsupervised study. The measures such as Sum Square Error (SSQ) and Silhouette coefficient are deployed to perform cluster analysis. The results demonstrate the efficiency of CluStream with K means algorithm over density based streaming algorithm. The proposed framework justifies the scope of context aware computing applications in the broader areas of wireless multimedia.

[Full Text](#)

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**Title:** Manufacturing of two step continuous of up-scaled soy-polyurethane

**Author (s):** Flora Elvistia Firdaus

**Abstract:** The tryglyceride of vegetable oils should have at least one of unsaturated fatty acid moiety to be modified with sulfur acid catalyst in peracetic acid co-reagent to be introduced to the desired hydroxyl functional groups in soy-polyol structure. A series of screening reactions have indicated the ratio of acetic/peroxide acid 1:7.25 (mol/mol) with temperature 60<sup>0</sup>C is the best condition for soy-epoxide to up-scale to 10 and 20 folds from initial. A 90 minutes is the best length of reaction for polyol to be synthesized; where the oxirane value and acid value occurred are quite preferable for the proceed reactions. The recommended reactor volume is multiple of 400 mL. There are tendency of increasing the acid number if the volume enlarged 10 times, so it needs repeated neutralizations. New methods are need for the cost efficient.

[Full Text](#)

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**Title:** Design microstrip antenna 900 MHz with customized flower shape patch

**Author (s):** Rudy Yuwono, Oky Prana Wijaya and Aisah

**Abstract:** This research will explain the design of microstrip antenna with 900 MHz frequency that can be applied to all device which worked on these frequency. The design of this antenna begins with theoretical calculations and creating a design based on the results of calculations using CST and then fabricated and be measured using a device GWinstek GSP-827 and IFR Signal Generator 250 kHz-3GHz.

[Full Text](#)

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**Title:** Morphological analyzer for classical tamil text: A rule-based approach

**Author (s):** R.Akilan and E.R.Naganathan

**Abstract:** Morphological Analyzer is the essential and basic tool for building any language processing application. Morphological Analysis is the process of providing grammatical information of a word given its suffix. Morphological Analyzer is a computer program which takes a word as input and produces its grammatical structure as output. A Morphological analyzer will return its root/stem word along with its grammatical information depending upon its word category. Classical Tamil Morphology is very rich and agglutinative language. Morphological analyzer is the tool needed for the following Natural Language Processing Applications like information retrieval, search engine, spell checkers, grammar checker, Machine Translation, dictionary making systems, Information extraction and retrieval, content analysis and Question answering systems. The rule-based approach has successfully been used in developing many natural language processing systems.

[Full Text](#)

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**Title:** Assessing the sustainability of meat transport mode choices in abattoir logistics using the analytic hierarchy process

**Author (s):** Nwakaire C.M. and Keirstead J.

**Abstract:** This paper is an attempt to review the compliance of abattoirs in developing country cities to global sustainability requirements. Some unsustainable abattoir operations in developing country cities, as it relates to logistics and meat transport, have been discussed and their implications were identified. The study disclosed how poor meat quality could be as a result of bad choices in the mode of transportation and distribution of the meat. Four modes were identified, considered and compared in this review and they include; pedestrian carriage, motorcycles, open vans, and refrigerated cooling vans. To ensure that the triple bottom line of sustainable development was met, meat safety/hygiene, reduced transport cost, reduced CO<sub>2</sub> emissions, and reduced stress on labourers were the four major performance indicators used in the assessment of the efficiency of each mode. Using the Analytic Hierarchy Process (AHP), the sustainability of the four modes were assessed systematically and simultaneously. The paper strongly recommends the refrigerated cooling van as the best mode option for meat transport, with benefits up to 40% above each of the other modes.

[Full Text](#)

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**Title:** Estimating dustfall generation affected by wind speed, soil moisture content and land cover

**Author (s):** Arief Sabdo Yuwono, Febri Mulyani, Claudia Risnayanti Munthe, Allen Kurniawan and Budi Mulyanto

**Abstract:** There is a lack of quantitative approach to estimate the amount of natural and anthropogenic dustfall generation during an environmental impact assessment in Indonesia. Dustfall is an obligatory parameter of Indonesian ambient air quality standard. The final objective of the research was to formulate a simple mathematical expression used to estimate the ambient dustfall generation as affected by wind speed, soil moisture content and land cover, during an environmental impact assessment. The experiment was carried out in a laboratory scale tunnel with a land model consisted of soil layer originated from Java Island, Indonesia, i.e. Complex Mediteran Red Yellow Grumusol (RYG) and Regosol (REG). Three speed levels of artificial blowing wind were applied in the tunnel to assess the impact of wind speed on the dustfall generation. Soil moisture content was kept in the range of 35-40%. Paddy plant (15 cm high) was used to serve as land cover to simulate the impact of cover crop on the generated dustfall. Analysis on the resulted dustfall was carried out according to national standard (SNI 13-4703-1998). The revealed experiment result showed that the average generated dustfall over RYG soil type was 14 ton/km<sup>2</sup>.month, whereas for Regosol was 4 ton/km<sup>2</sup>.month. Mathematical expression of the dustfall generation was successfully formulated. It indicated that dustfall generation was strongly affected by wind speed, soil moisture content and land cover. The mathematical expression can be used to estimate the amount of dustfall generation by simply inputting the three affecting parameters (soil moisture content, wind speed and land cover).

[Full Text](#)

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**Title:** Relationship between electrical and mechanical properties of tuff rock on subsurface at the sporting center hasanuddin makassar Indonesia

**Author (s):** Lantu, D.A. Suriamihardja, A.M. Imran and Tri Harianto

**Abstract:** A geophysical survey employing seismic refraction and vertical electrical sounding have carried out at the sport center area of Hasanuddin University South Sulawesi Indonesia, to determine the structural setting and the depth of bedrock at the subsurface using a 12 channel seismograph and Resistivity-meter single-channel Twin Probe Resistivity (G-Sound). The VES has a maximum current electrode separation of 400 m; the result of the survey has enabled the delineation of the bedrock of the area. Data interpretation were using to determine the relationship between electrical and elasticity properties of subsurface in this area. The vertical electrical resistivity has a maximum current electrode of 300 m. The result of the survey has enabled the delineation of the bedrock of the area. The hard rock distinct geo-electrical layer were observed namely volcanic tuff with the resistivity varying from 121m to 735m with depth ranging from 5.36 m to 7.5 m. the seismic refraction thomography show three layer, the layer with velocity about 1000 m/s interpreted as the volcanic tuff situated at the second layer third layer. For both trends, the resistivity ( $\rho$ ) and the time propagation per unit length of p wave obtain that the are relation between electrical properties and the time propagation per unit length. This relation obtained by utilization of porosity parameter. and calculated by least square method.

[Full Text](#)

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**Title:** Effective elastic properties of honeycomb sandwich microstructure: The effect of inclusion arrangement

**Author (s):** K. S. Basaruddin, S. A. Halim, R. Daud, M. J. Aziz Safar, Haftirman and A. S. Abdul Rahman

**Abstract:** This paper presents a homogenization analysis to obtain effective elastic properties of honeycomb sandwich microstructure considering the inclusion defect arrangement. 3D finite element models were developed using voxel-type element with variation of inclusion arrangement where one is regular and three are random arrangement. Aluminium was used as constituent material. Periodic boundary condition was applied to the unit cells in the homogenization analysis. The results suggest that the Young's moduli and Poisson's ratio of honeycomb sandwich microstructure are not sensitive to the inclusion arrangement between regular and random, but quite significant difference was found in shear moduli. Effective elastic properties were found higher for honeycomb with inclusion compared to the case without inclusion except for  $n = 12$ . This work provides a new insight into the arrangement factors in microstructure that contributes to the effective elastic properties.

[Full Text](#)

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**Title:** Transonic flow past symmetrical unswept and swept wings with elliptic nose

**Author (s):** A. N. Ryabinin

**Abstract:** The spatial flow around a wing with symmetrical airfoil is studied. Solutions of Reynolds-averaged Navier-Stokes equations are obtained with Ansys CFX - 13 finite volume solver. A three-dimensional mesh with elongated along the wingspan elements near the wing is used. The dimensions of supersonic regions reduce at the wing tip. Flow past a wing is accompanied by periodic oscillations of lift force. The coalescence of two supersonic regions is detected near the wing tip for swept tapered wings or near wing root for unswept untapered wing. At Mach number that corresponds to coalescence of supersonic regions the average lift is not equal to zero.

[Full Text](#)

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**Title:** Interpretation of pressure tests in uniform-flux fractured vertical wells with threshold pressure gradient in low permeability reservoirs

**Author (s):** Freddy Humberto Escobar, Yu Long Zhao, Maysam Pournik, Qi Guo Liu and Guiber Olaya-Marin

**Abstract:** The level of pressure gradient needed to enable fluid to overcome the viscous forces and start flowing is referred to as the threshold pressure gradient, TPG, or minimum pressure gradient required for fluid flow. While it has been observed that TPG has an important effect on the pseudoradial flow regime of a fractured vertical well, the early linear flow regime caused by the fracture is not impacted by TPG. In this work, *TDS* methodology is implemented for interpretation of pressure tests in uniform-flux fractured vertical wells of low permeability reservoirs affected by TPG. Two governing equations of the TPG effect on pressure response were developed, in addition to two correlations, which were all tested and validated in a synthetic case.

[Full Text](#)

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**Title:** Efficient image sequence compression for capsule endoscopy using IWT

**Author (s):** M. Ferni Ukrit and G.R. Suresh

**Abstract:** In multimedia environment many videos have been introduced which occupies more memory space, especially in the medical field. In this paper, a new low complexity and lossless image compression system for capsule endoscopy (CE) is approached. The compressor consists of a low-cost YCbCr color space converter and variable-length predictive with a combination and unary encoding. All these components have been heavily optimized for low-power and low-cost and lossless in nature. As a result, the entire compression system does not incur any loss of image information. Unlike transform based algorithms, the compressor can be interfaced with commercial image sensors which send pixel data in raster-scan fashion that eliminates the need of having large buffer memory. The results shows increase in PSNR value of 54db the proposed algorithm offers a solution to wireless capsule endoscopy with lossless and yet acceptable level of compression.

[Full Text](#)

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**Title:** Stochastic multiscale modeling of two-phase materials based on first-order perturbation method

**Author (s):** K.S. Basaruddin, R. Daud, Haftirman, A.S. Abdul Rahman, M.J. Aziz Safar and M.H.M. Som

**Abstract:** The homogenization method has been well established in multiscale engineering practise to determine the effective elastic constants of linear elasticity of heterogeneous materials by considering their microstructure. This method was developed to reflect the microscopic structure without looking at details of all of the material points of the body, whenever the mechanical behaviour of the macroscopic body is in question. Nevertheless, in the classical homogenization method, the microscopic characteristics were modelled in deterministic manner. To estimate the expectation and dispersion of macroscopic properties considering uncertainties in microstructure caused by distributing properties of constituent materials, variations in geometry and so on, expensive calculation should be repeated supposedly many times using Monte Carlo simulation. Therefore, this study aims to predict the macroscopic properties of two-phase materials considering uncertainties in microstructure by introducing the stochastic multiscale method. Stochastic finite element method using first-order perturbation-based was combined with homogenization theory to derive the formulation. By assuming the fluctuation arises in microscopic property is distributed in normal distribution, determination of macroscopic properties was formulated in stochastic treatment. Then, the proposed method was established by adding some demonstrative examples that commonly occurred in engineering materials. The numerical results suggest that the uncertainties in microstructure influenced the macroscopic properties of two-phase materials. It indicates the importance of presented stochastic multiscale analysis for microstructure design with considering the microscopic random variations.

[Full Text](#)

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**Title:** Code generation for semantic evolution of embedded systems

**Author (s):** SMT. J. SasiBhanu, A. VinayaBabu and P. Trimurthy

**Abstract:** Monitoring and controlling of the safety and mission critical systems are to be undertaken by through interfacing of the systems with embedded systems. The embedded systems which are monitoring and controlling the mission critical system cannot be shut down for want of making changes to ES software either to fix existing bugs, enhance performance or add fault tolerance and add more functionality due to the reasons that it is quite expensive to shut down and restart either mission or safely critical system. Changes to the ES software, thus has to be carried while the ES system is up and running. The process of making changes while the ES system is up and running is called dynamic semantic evolution. Many methods have been proposed in the literature using which the dynamic evolution can be carried. One of the methods is related to generation of code, which is stored starting from a memory location and creation of a task out of the code stored and make it to run waiting for an event to take place. In literature it has been mentioned that dynamic semantic evolution can be undertaken through a module generation process but the implementation of the same has not been presented. In this paper, an algorithmic and the process of implementation of the same has been presented.

[Full Text](#)

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**Title:** Analysis on telepointer tracking methods for endoscopic images

**Author (s):** Rohana Abdul Karim, Mohd Marzuki Mustafa and Mohd Asyraf Zulkifley

**Abstract:** Recently, the growth of endoscopic surgery for accelerating the operation performance with minimum pain regardless of the distance limitations becomes the crucial agenda for enhancing the health care qualities. Therefore, telemedicine is one of the best alternatives to break the limitation. On top of that, telepointer is a well known supported tool for remote guided used in telemedicine as well as to facilitate the inexperienced physician at the remote place during surgery operation. The function of telepointer is to label the tissues and organs of interest (TOB). However, the non-rigid shape and movement of tissues and organs lead to lost the pointer track. Unfortunately, there are only a few studies has been done on telepointer tracking, especially for endoscopic application. In this paper, we analyzed three methods to keep track the TOB and maintenance the pointer towards the TOB by using feature matching approached as an observation data. Therefore, our aim is to evaluate the most effective method of telepointer tracking. Three techniques have been compared, which are least square method (LMS), Delaunay triangulation with line intersection (DT) and maximum probability keypoints with scale circles intersection (PMAX). Simulation results show that the most effective technique is PMAX with average mean error distance MED lower than six pixels followed by DT and LMS. Hence, the tracking system will allow the physician to track the pointer better especially in noisy environment.

[Full Text](#)

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**Title:** Intelligent system identification for wide area monitor in power system

**Author (s):** A. Nalini, S. Manivannan and E. Sheeba Percis

**Abstract:** In modern Electric Power System the complexity has raised which leads to the complete disaster of the network. Due to this the need for monitoring the Power Network has become an essential feature. Monitoring a Power Network depicts a clear picture of the Voltage, Current, Power angle etc and thereby a corrective action can be taken in advance before the occurrence of any catastrophe of the Power network. The Wide Area Monitoring, Protection and Control (WAMPAC) plays a vital role to maintain the network in equilibrium. The main objective of this paper is to develop an equivalent model of a part of the power system based on PMU measurement. It is the system identification and is an integral part of wide area monitoring and control. The Kundur's two area four machine power system is used to describe the proces. Matlab system identification tool box is used. The non-linear estimation technique based on Hammerstein - Weiner model is utilized.

[Full Text](#)

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**Title:** Fabrication of layer-by-layer electrospun composite membranes based on polylactic acid (PLA) and poly (caprolactone) (PCL)/chitosan for tissue regeneration

**Author (s):** Choi Yee Foong, Lor Huai Chong and Naznin Sultana

**Abstract:** Tissue engineering is an interdisciplinary field that applies the principles of engineering and life sciences towards the tissue development. Scaffolds can provide physical support and carry growth factors to the target cells. In this study, multi-layered composite scaffolds or membranes were fabricated by blending of synthetic polycaprolactone (PCL) and natural Chitosan and poly (lactic acid) PLA layer-by-layer with a multilayer electrospinning method. Scanning Electron Microscopy (SEM), water contact angle measurement (WCA) and water uptake were measured to characterize the multilayered scaffolds. Using optimized solution concentrations and processing parameters, the composite PCL/Chitosan and PLA was successfully fabricated layer-by-layer. It was found that the composite microfibrinous membranes produced were homogenous. No beads were observed in the microfibers of the membranes. They have enhanced wettability and water uptake properties than single layered membranes.

[Full Text](#)

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**Title:** A usability-based framework for electronic government systems development

**Author (s):** Hafizah Yahya and Rozilawati Razali

**Abstract:** In the era of globalization, governments around the world strive to provide the best electronic Government (e-Government) systems to their people. Although the performance of e-Government systems is improving over time, their usability is still unacceptable. One of the reasons of this phenomenon is that most e-Government systems were developed without incorporating usability concerns during the development process. This study was therefore intended to identify the necessary contributing factors that should be considered during development process for ensuring the usability of e-Government systems. Based on the identified factors, the study proposed a usability-based framework for e-Government systems development that comprises three aspects: environment, system development process and product quality attributes. The framework was formulated by combining qualitative data from both theoretical and empirical work. The former involves reviews of previous usability models and standards namely Quality in Use Integrated Measurement (QUIM), Quality of Sustainable e-Government Development (QSeD), Usability Maturity of Open Source-Model (OS-UMM) and International Organization for Standardization (ISO 9241-11). On the other hand, the latter was carried out by interviewing fourteen practitioners who were involved in e-Government systems development. The collected data were analysed by using content analysis. The proposed framework was then validated through reviews by two experienced domain experts. The framework acts as a guideline for government agencies to ensure the usability of e-Government systems that they develop.

[Full Text](#)

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**Title:** Simulation of microwave induced thermo-acoustical imaging technique for cancer detection

**Author (s):** Tony George, Elizabeth Rufus and Zachariah C Alex

**Abstract:** Microwave-induced thermal acoustic imaging (MITAI) is a promising early breast cancer detection technique, in which image construction is based on thermo acoustics signals generated by the illumination of microwave pulses in tissue. In this work we have performed a microwave induced thermal acoustic signal generation simulation study using Comsol Multiphysics. A biological tissue model irradiated with pulsed microwave source from a waveguide is simulated and studied. We have evaluated the deposition of heat in the biological tissue irradiated by electromagnetic fields and the corresponding

pressure variation in tissue due to temperature variations. It is then studied for different power levels to find out the minimum power required to generate the thermo-acoustic signal using 2.45 GHz microwave source.

[Full Text](#)

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**Title:** Amalgamation of continuous time filters by simulated inductor

**Author (s):** D. Susan and S. Jayalalitha

**Abstract:** In the electronics world a good number of the circuits use inductor. But, its implementation at near to the ground frequencies is narrowed due to enormous number of turns required to wound on the coil. This also in turn takes up vast space and makes fabrication difficult. It is not attuned with the most recent Integrated Circuit fabrication technology. Normally the inductors have some losses and its effect is reflected in terms of poor quality factor. Here in this paper a new way of implementing the inductor is discussed. It uses the negative R concept to cancel the positive R to realize an inductor with no loss. Few applications are shown and the response highly coincides with the theory.

[Full Text](#)

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**Title:** Development of smart pic-based electronic equipment for managing and monitoring energy production of photovoltaic plant with wireless transmission unit

**Author (s):** Paolo Visconti, Rossella Ria and Giorgio Cavallera

**Abstract:** Aim of this paper is to present a PIC-based low-cost monitoring system for domestic PV plant, able to detect environmental and electrical parameters for controlling energy production and its proper functioning. Thereby the designed equipment can guarantee, by sending alarm signal to a data/receiving viewing device, quick detection in case of system's malfunction or productivity's drops. In fact realized system is able to transmit by wireless ZigBee module, the PIC processed data about PV plant's status and productivity to a remote device, touch screen display or PC, for viewing the information to the user.

[Full Text](#)

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**Title:** The effect of mesh network on ECG data transmission by XBEE toward the data error rate

**Author (s):** Sugondo Hadiyoso, Ratna Mayasari and Achmad Rizal

**Abstract:** Wireless Sensor Node technology based on XBee radio can support peer-to-peer network topology, cluster tree and mesh. Implementation of network topology must be adjusted to the needs. The study conducted a comparative between peer to peer topology and mesh toward the behavior of the data transmitted by electrocardiogram signal data acquisition device. The purpose is to determine the performance of XBee in real time application. After 4 scenario tests obtained, error happened when two or more nodes are connected to the coordinator with the numbers of average error for 1000 data is 0.4 - 2.7. The other facts, error happened randomly and not linear with the number of sensor nodes.

[Full Text](#)

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**Title:** Creation of a new class of nanocomposite coatings of the increased crack resistance and hardness on the basis of innovative beam technologies

**Author (s):** Grigoriev Sergey N.

**Abstract:** Article is dedicated to development of the scientific and technological principles allowing by means of innovative beam and plasma technologies to receive a new class of heterogeneous nanocomposite coatings having the increased cyclic crack resistance and hardness on the conductive and dielectric complex-shaped products. On the basis of the received results the source of metal atoms and beams of high-energy molecules with a rectangular target was developed and new installation for coating deposition is made.

[Full Text](#)

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**Title:** Research and classification of surface and internal defects of ceramic cutting tool

**Author (s):** Volosova Marina A.

**Abstract:** System approach to studying of causes of infringement of operational characteristics tool ceramic materials on the basis of complex researches and systematization of their volume and superficial defects is presented in article. The main directions of improvement of tool ceramics are allocated.

[Full Text](#)

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**Title:** CFD simulation using wood (Cengal and Meranti) to improve cooling effect for Malaysia green building

**Author (s):** Mazlan Mohamed, Mohd Hazim Mohamad Amini, Muhammad Azwadi Sulaiman, Mohamad Bashree Abu Bakar, Mohamad Najmi Masri, Nor Hakimin Abdullah, Nik Alnur Auli Nik Yusuf, Mohammad Khairul Azhar Abdul Razab and Zairi Ismael Rizman

**Abstract:** In this study, heat transfer investigation is done in order to improve the cooling effect for green building without damaging the environment. This proposal is provoked by the desire to reduce the temperature for the green building and to sustain the environment and natural resources. The building industry is also a large consumer of non-renewable materials, and this trend has increased dramatically over the past century. To this end, we have been addressing sustainability concerns related to building construction materials through much research approach. It applied to building elements where we can collectively influence design, materials, construction, energy consumption and disposal. Comparison of temperature profiles of the material in the traditional wood house and green building model by using the constant temperature heat source and linearly varying temperature of the heat source for unsteady state is done. Also, the time for temperature to become steady is compared. The problem will be solved by using the software package FLUENT-GAMBIT. The parameters under analysis focused on changing the influence of exterior walls in the energy consumption for cooling the building.

[Full Text](#)

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**Title:** Computational analysis of air intake system for internal combustion engine in presence of acoustic resonator

**Author (s):** Mohd Nasir Kassim, Moumen Idres, Muhammad Iqbal Ahmad and Zairi Ismael Rizman

**Abstract:** Volumetric efficiency is one of the important parameters which affect the performance of four-stroke engines. This study examines the effect of resonators on the volumetric efficiency over a wide range of engine speed. An intake system with and without resonator are simulated by using GT-POWER software. Intake systems with three configurations of resonators with various resonator volumes are represented in terms of volumetric efficiency. The three intake system configurations are in-series, side-branch and double resonator. The results obtained are compared with an intake system without resonator. An intake system with resonator gives a significant improvement of volumetric efficiency at medium and high speed compared to the intake system without resonator. Volumetric efficiency showed an increment when the volume of the resonator increased. Overall, simulations indicate that the presence of the resonator in the intake system affects the volumetric efficiency of the engine especially for single cylinder engines.

[Full Text](#)

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**Title:** Dye adsorbent by pineapple activated carbon:  $H_3PO_4$  and NaOH activation

**Author (s):** Nagendran Selvanathan and Noor Syuhadah Subki

**Abstract:** Dye has become an indispensable tool for a variety of industries. More than 100000 types of dyes were produced exceeding 150 metric tons per year. They are used extensively in many industries which make the research on the color production more important. Despite that, dye can cause major environmental problems due to its toxicity and carcinogenic properties. So, it is important for the dyes to be treated before being disposed into the environment. In this study, activated carbon derived from chemical pineapple wastes namely pineapple crown, core and peel which prepared by different activation by using phosphoric acid ( $H_3PO_4$ ) and sodium hydroxide (NaOH) were utilized to adsorb methylene blue and malachite green dyes. The results indicated that the activated carbon derived from pineapple crown shows maximum adsorption of methylene blue (99.48%) and malachite green (98.94%). This research was also used to determine the appropriate activation method between acid ( $H_3PO_4$ ) and base activation (NaOH) by comparing the percentage of adsorption by both activation methods. Results obtained shows that the acid activated carbon serves as the best activated carbon with highest adsorption value of 99.48%. This study shows a benefit of transforming agriculture waste to value added product and also helps to solve over the abundance pineapple waste problem.

[Full Text](#)

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**Title:** Effect of cooling rate in variant selection during bainite transformation in heat affected zone of CR-MO steel

**Author (s):** Sarizam Mamat and Yu-ichi Komizo

**Abstract:** The effect of the cooling rate on the variant selection mechanism during bainite transformation was investigated in 2Cr-1Mo steel. The specimen was heat treated to 1350°C and held for 60s before being cooled to room temperature with various cooling rates. The usage of high temperature laser scanning confocal microscopy (LSCM) to heat and cool the specimen under controllable conditions enabled the bainite transformation to be observed in a real time. The heat treated sample was then analyzed by using electron backscattered diffraction (EBSD) method. As a result, increasing the cooling rate was discovered to refine the bainite block size. In the higher cooling rates, high angle variants were formed prominently.

[Full Text](#)

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**Title:** Effect of welding heat input on microstructure and mechanical properties at coarse grain heat affected zone of abs grade a steel

**Author (s):** Wan Shaiful Hasrizam Wan Muda, Nurul Syahida Mohd Nasir, Sarizam Mamat and Saifulnizan Jamian

**Abstract:** The fabrication and construction of structures used in the offshore and marine industries are made according to the international code and standard requirements to ensure the quality and to extend the life span. Proper material selection needs to be carried out to achieve proper function and to reduce the cost. The American Bureau of Shipping (ABS) Grade A steel is one of the huge materials used in the marine industries. The study has been carried out to scrutinize the effect of welding heat input to the distribution of microstructure formation and its mechanical properties at coarse grain heat affected zone (CGHAZ) of the ABS Grade A steel. Three heat input combinations which designated as low heat (0.99 kJ/mm), medium heat (1.22 kJ/mm) and high heat (2.25 kJ/mm) have been used to the weld specimen by using flux cored arc welding (FCAW) process. The microstructure formation at CGHAZ was consisting of grain boundary ferrite (GBF), Widmanstatten ferrite (WF) and pearlite (P). Significant grain coarsening was observed at the CGHAZ of all the joints, and it was found that the extent of grain coarsening at CGHAZ has also increased along with the heat input. The results of the mechanical investigation indicated that the joints made by using low heat input exhibit higher hardness and impact toughness value than those welded with medium and high heat input. It can be concluded that higher heat input can cause the expansion towards the microstructure's grain size, but will lead to lower hardness and affect the toughness value.

[Full Text](#)

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**Title:** Environment for agent-based model in mobile database transaction: a review

**Author (s):** SuhailaMohd Zain, Sharmilla Sulong, Noor Muzlinda Mat Hashim and Zairi Ismael Rizman

**Abstract:** This paper described the concepts of mobile environment that are vastly used and discussed in the database transaction application. In order to understand the management of databases in a mobile environment, special terms and concepts need to be clarified. This includes of the setting for elements involved and how they are organized. Many technologies are applied to deliver the accessibility of data needed in the mobile database transaction. Features identified in transaction management of mobile database came from the characteristic of the network structure in mobile topology, database operation nature and also limited resources. In this review, we try to cater disconnection issue for planned and unplanned disconnection of mobile database transaction in Mobile Ad-Hoc Network (MANET) architecture. The study also involved various types of database in two types of architectures which are general environment and MANET.

[Full Text](#)

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**Title:** Evaluation of BTEX concentration and indoor air quality perceptions in platforms and train

**Author (s):** Siti Hajar Ya'acob, Nor Syazwani Saidin, Nor Sayzwani Sukri and Mazrura Sahani

**Abstract:** Benzene, toluene, ethylbenzene and xylene (BTEX) are compounds that are harmful to health and it exists in the public transportation environment including the railway transportation. This study was conducted to determine the concentration of BTEX in the train and the platform of a railway service provider. Air sampling was conducted to compare the concentrations of BTEX in the train and platform by using activated charcoal sorbent tubes for one hour at Sentul-Klang route during peak hours. Analysis

of air samples was done by using Gas Chromatography-Flame Ionization Detector (GC-FID). In addition, questionnaires were distributed to 254 respondents by cluster sampling on weekdays to examine passengers' perception on the indoor air quality (IAQ) of trains and platforms. The results indicated that 70.5% of passengers are aged 21-30 years, 11.8% aged 31-40 years, 10.6% aged 51 years and over, 5.5% aged 41-50 years and 1.6% aged 20 years and less. Majority of the passengers perceived the density of passengers on trains as dense (63.0%) and platform as less dense (49.2%). Passengers mostly feel that ventilation (57.9%), wind quality (66.9%) and IAQ (57.9%) are acceptable in the train. In the platform, passengers mostly choose an acceptable answer to the perception of ventilation (64.6%), air quality (63.0%) and IAQ (70.5%). There were no significant differences in comparison of IAQ in the train and platform by passengers' age range ( $p > 0.05$ ). There is a significant correlation between IAQ and passenger density, ventilation, odor and air quality in the train ( $p < 0.01$ ). However, a significant correlation was only found between IAQ and ventilation and air quality in the platform ( $p < 0.01$ ) and no significant correlation was found between IAQ and the passenger density on the platform ( $p > 0.01$ ). Although the overall passengers' perception of IAQ in the train and platform are acceptable, improvement is required especially regarding to indoor air quality services so that a better indoor environment can be achieved.

[Full Text](#)

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**Title:** Isotherm and thermodynamic study of paracetamol removal in aqueous solution by activated carbon

**Author (s):** Norzila Mohd, Muhammad Fadhil Aiman Ery Sudirman and Sarifah Fauziah Syed Draman

**Abstract:** Paracetamol is a pain reliever and fever reducing drug used widely in Malaysia. Since paracetamol is a pharmaceutical product it is not biodegradable, hence it will not decompose easily. This will pose an environmental and health problem as the residue will seep into wastewater and groundwater supply and eventually in drinking water. An experiment was set up to investigate the performance of activated carbon and modified cellulose for adsorption of paracetamol from aqueous solution by batch method. The effect of pH and temperature was chosen as a parameter in this experiment. The removal percentage was increased at higher temperature and decreased at a basic solution for both adsorbent. Then, the data were fitted to Langmuir, Freundlich and Temkin adsorption isotherm. It was found out that the effect of pH adsorption equilibrium data was fitted well with the Langmuir model with an  $R^2$  of 0.9522. Adsorption of thermodynamic was carried out by using the data from effect of temperature and was found out that the  $\Delta G$  at all temperatures was negative,  $\Delta H$  and  $\Delta S$  was positive. Therefore, the process was spontaneous and favorable at high temperature.

[Full Text](#)

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**Title:** Material properties characterization of coir cardboard

**Author (s):** Abdul Rahim Bahari, Mohamad Salmi Mohd Fudzi, Nurul 'Uyun Ahmad and Haizuan Abd Rahman

**Abstract:** Material property is an important element to be considered during the design and engineering application of cardboard to avoid any failure. This study involves the development method for producing the cardboard by using natural waste which is a combination of coir fiber and recycled box. Experimental procedures have been conducted to analyze the mechanical properties and chemical properties of the cardboard. The two parameters in producing cardboard are time soaking coir fiber in sodium hydroxide and the ratio mixing between two materials. For mechanical property, the impulsive excitation test has been performed by tapping a specimen elastically by using an impactor. This experiment is to obtain dynamic Young's modulus property of the cardboard based on its fundamental longitudinal resonant frequency of vibration. In chemical analysis property, it was performed by using the Fourier transform infrared spectroscopy (FTIR), a technique to obtain an infrared spectrum of absorption, emission, photoconductivity or Raman scattering of a solid specimen. The experimental results show that a higher ratio of coir fiber and longer time treated with sodium hydroxide produces higher dynamic Young's modulus property of cardboard.

[Full Text](#)

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**Title:** Partial characterization of collagen sheet from *Lutjanus campechanus* scale

**Author (s):** Sopiah Ambong @ Khalid, Mohd Shahrul Nizam Salleh, Azmi Mahmood and Amirah Adniruddin

**Abstract:** The purpose of this study is to prepare fish scale collagen sheet from red snapper (*Lutjanus campechanus*) scales and to study its characterization. Fish scale waste became by-product from the fish processing industry, and utilization of these by-products to produce valuable collagen can give benefit to the entire world. From this study, collagen sheets were successfully prepared from fish *Lutjanus campechanus* scale

waste. The fish scales obtained from local markets in Terengganu were washed thoroughly and dried. The scales were then being treated with different concentration of HCl, pulverized and paste into sheets. The effect of concentration of HCl on the fish scales, the effect of thickness to collagen sheet tensile strength and the component inside collagen sheet were determined. The effect of concentration of HCl shows that, 2.8 M is the best concentration to prepare fish scale collagen sheet. The tensile strength has no correlation with the thickness of collagen sheet, and the tensile strength which is in average of 29 MPa is enough to use the sheet as a wound dressing material. The components inside the collagen sheet show the same component as the previous study, which is the high characteristic of collagen. From the Thin Layer Chromatography (TLC) TLC analysis shows that fish scale collagen contains the abundance of Leucine amino acid. From this study, *Lutjanus campechanus* fish scale waste was successfully made into sheets. T and 3he components inside the fish scale collagen sheet also can be normally observed in bovine and porcine collagen, which conclude that fish collagen can be an alternative to mammalian collagen.

[Full Text](#)

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**Title:** Performance and carbon efficiency analysis of biomass via stratified Gasifier

**Author (s):** Muhammad Iqbal Ahmad, Zainal Alimuddin Zainal Alauddin, Shahril Nizam Mohamed Soid, Mazlan Mohamed, Zairi Ismael Rizman, Mohd Sukhairi Mat Rasat, Mohammad Khairul Azhar Abdul Razab and Mohd Hazim Mohd Amini

**Abstract:** Recent concerns on environment, fuel price and scarcity of its supply have promoted interest in the development of renewable sources as a replacement. This paper aims to show the gasifier experimental finding based on performance and process efficiency. Wood chip was fed in stratified downdraft gasifier with air as gasifying agent. The biomass feeding rate varied from 3 to 4.5 kg/hr with an output of various high heating values (HHV) of producer gas. The study provides a clearer picture of the result obtained from the equivalence ratio (ER) which improvise the gas composition, HHV and carbon conversion efficiency.

[Full Text](#)

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**Title:** Preparation and characterization of alkyl-thiols monolayer on glass substrates by microcontact printing

**Author (s):** Nor Hakim Abdullah, Wan Azelee Wan Abu Bakar, Rifaqat Hussain, Mohd Bakri Bakar, Mazlan Mohamed, Mohammad Khairul Azhar Abdul Razab and Jan H. van Esch

**Abstract:** Surface modification is a fascinating method to tailor the surface of material properties such as hydrophilicity, roughness, surface charge and many more. The modification is not only limited to solid materials, but could be possibly extended to particular liquid surfaces. In this paper, surface modification of glass slides with self-assembled monolayers (SAMs) of (3-Mercaptopropyl) trimethoxysilane (MPTMS) was conducted by using a simple method of microcontact printing. Characterizations of the self-assembled monolayer were realized by 3 techniques; (1) Atomic Force Microscopy (AFM) to determine the height of self-assembled monolayer and obtain the topography image, (2) X-ray Photoelectron Spectroscopy (XPS) to further confirm the thiol groups were grafted on the surface and (3) Confocal Fluorescence Microscopy (CFM) to visualize the reaction between thiol terminal groups and fluorescent probe. From the experiment conducted, the result showed that the MPTMS was successfully stamped on glass substrates. AFM scanning images displayed the  $0.8 \pm 0.2$  nm height of MPTMS, which matching the size of the MPTS molecules ( $0.7 \pm 0.05$  nm). XPS spectra indicated the appearance of the doublet structure in the  $S_{2p}$  region ( $S_{2p_{3/2}}$  and  $S_{2p_{1/2}}$  levels of the S energy levels) with two peaks in binding energy of 162.8 and 163.8 eV respectively. CFM imaging indicated the fluorescent patterns on glass substrates.

[Full Text](#)

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**Title:** Removal of paracetamol from aqueous solution by dried cellulose and activated carbon

**Author (s):** Sarifah Fauziah Syed Draman, Izzati Auni Batra'azman and Norzila Mohd

**Abstract:** Paracetamol is favorable medicine which used by human. But if it is taken beyond the optimum limit, it can put that particular person be in danger. It also can cause effect to aquatic life if it is excessive in the aqueous solution. Therefore, it is important to remove paracetamol from aqueous solution to avoid any effect whether to the humans or even to the non-humans. The aim of this study is to compare the efficiency for removing paracetamol by using activated carbon and dried cellulose. The removal of paracetamol from the aqueous solution was investigated by using effect contact time and initial concentration. The treatment that was used in this experiment was adsorption batch method and the result was analyzed by using ultraviolet (UV) Visible Spectrophotometer. The percentage removal of paracetamol from aqueous solution by activated carbon is 94.5%, while dried cellulose is 58.1% with effect of the initial concentration. As for effect of contact time, the result of activated carbon is 98.6%; meanwhile dried cellulose is also 68.6%. The adsorption isotherm that was analyzed in

this study is Langmuir model. It has indicated that percentage removal of paracetamol by using activated carbon is obeying the model, whereas unmodified dried cellulose does not.

[Full Text](#)

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**Title:** Three phase induction motor inverter application for motion control using crusher machine

**Author (s):** Mohd Rusmi Abdul Ghani, Nadiyahatul Akmar Abdul Latif and Zairi Ismael Rizman

**Abstract:** The aim of this research is to familiar with the operation and use of the Toshiba VFFS1 inverter. It is used to reduce motor starting current and also to improve on the quality of the motion executed motor-driven equipment. Various methods exist to reduce the high starting currents of three phase induction motors. A low starting current not only reduces stresses on the power utility, but also decreases stresses on the motor and the driven equipment. As designed, inverters can reduce the starting current especially by programming the motion to follow a trapezoidal or s-curve profile. A trapezoidal motion profile reduces jerky motion, while the s-curve profile totally eliminates it. The challenge in motion control is on how to achieve precise motion with minimum jerk and overshoot in position as well as velocity. There are four methods that can be used to connect the inverter to a motor namely control panel by using a controller computer, remote terminal box or a Programmable Logic Controller (PLC). A number of induction motors were tried with the inverter to observe their response to the different motion profiles which programmed into the inverter. The results are reported and discussed later.

[Full Text](#)

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**Title:** Effects of diesel displacement on the emissions characteristics of a diesel derivative dual fuel engine

**Author (s):** Wan Nurdiyana W.M., Jennifer V. and Daniel O.

**Abstract:** In this research a John Deere 6068H diesel engine is converted to dual fuel operation. The engine is a Tier II, 6 cylinders, 6.8 liter, 4-stroke compression ignition engine with a compression ratio of 17:1 and a power rating of 168 kW at 2200 rpm. A natural gas fuel system is installed to deliver fuel upstream of the turbocharger compressor. The engine operates at 1800 rpm through five different load points in diesel and dual fuel operating modes. The natural gas substitution values tested are representative of standard dual fuel tuning, with a maximum diesel displacement of 70%. Emissions were collected according to the appropriate ASTM, EPA, and ISO standards. Through the experimental investigations, it is shown that dual fuel engines are capable of reducing nitrogen oxides (NO<sub>x</sub>) and particulate matters (PM) emissions. However, dual fuel engines emitted excessive total hydrocarbons (THC) and carbon monoxides (CO) especially at low and intermediate loads. In order to formulate an optimized substitution scheme that would reduce these emissions in dual fuel engines, a natural gas substitution sweep as a result of diesel displacement was conducted at each load. Results showed a reduction in CO and THC emissions with optimized substitution scheme when compared with dual fuel baseline emission. Therefore, it is suggested that dual fuel would be turned off until intermediate loads were reached. Subsequent target diesel displacements were determined by selecting the highest diesel displacement observed during the natural gas substitution sweeps which maintained engine stability.

[Full Text](#)

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**Title:** Explaining model for supervisor's behavior on safety action based on their perceptions

**Author (s):** Thu Anh Nguyen, Phong Thanh Nguyen and Vachara Peansupap

**Abstract:** Supervisors play a significant role in controlling safety in construction projects. They provide good advice on safety practices and check the condition of equipment. The carelessness of supervisors may cause several accidents. Therefore, accident prevention is required the encouragement of supervisor to have good behavior on safety action. Although several research studies mention the importance of supervisor behaviors, few research studies are focused on factors influencing supervisor's behavior on safety action. This research aims to develop a model to explain the relationships between factors influencing and supervisor's behavior on safety action based on their perception. The questionnaire is developed from literature related to factors influencing safety behavior and issues represented supervisors' behavior on safety. The survey is performed within two months March and April 2010 in Vietnam. From the survey, 800 questionnaires are distributed to supervisors who are currently working at 39 construction sites and one Cultivate Professional Supervisor course in Hochiminh city, one of the most developing cities in Vietnam. Finally, 434 respondents are collected and 403 data are used for factor analysis, only 214 respondents are used to adopt structural equation modeling (SEM). Factors analysis technique is applied to group twenty-five variables into six main factors that are organizational and managerial influence, project

characteristics and work assignment, superiors' pressure and workers influence, safety knowledge and learning, working motivation and supervisor habits. Results from SEM indicated the significant influence of project characteristics, superior pressure and safety knowledge on supervisor intentional behavior. This intentional behavior combined with organizational influence were positive impacts on supervisor behavior.

[Full Text](#)

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**Title:** An intricate stringent chunking (ISC) de-duplication for space optimization in private cloud storage backup

**Author (s):** M. Shyamala Devi, Yella Sravya and Mounika Yarasi

**Abstract:** Cloud Computing has evolved as a service as well as deployment model over the decade in catering data storage and data access technology. Many private data owners prefer utilizing cloud storage service model due to flexibility in maintaining infrastructure, cost and ability to access data over internet. The cost of cloud utilization is determined by the amount of data stored on the cloud environment. It is imperative that optimization of cloud storage for effective data usage enables saving cost, space and effective data utilization. Recent advancements have established digital data in storage medium are redundant and data compression is effective in eliminating data redundancy. Deduplication techniques have been devised to identify and eliminate identical data in cloud. As private cloud storage has limited hardware resources and infrastructure, it is essential to optimally utilize the storage space to be able to hold maximum data. In this paper, we discuss the limitations of the existing de-duplication methods and propose a new scheme for Data De-Duplication. The proposed method of Intricate Stringent Chunking (ISC) De-duplication which is the enhanced File level de-duplication provides dynamic space optimization in private cloud storage backup as well as increases the throughput and enhances the efficiency of deduplication.

[Full Text](#)

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**Title:** An improvement of voltage quality in low voltage distribution system using dynamic voltage restorer

**Author (s):** Abba L. Bukar, DalilaM. Said, Babangida Modu, Abubakar Musa, Abubakar K. Aliyu, Abdu Isah, Ibrahim Tijjani and Jamilu G. Ringim

**Abstract:** With the increase use of semiconductor devices (switched mode power supply) and ICT (information communication technology) equipment in homes, offices and the industry's power quality (PQ) are gaining significant interest to both the electric utility and the industry. The absence of power quality causes enormous economic losses all over the world; it is estimated that these problems cost commerce and industry about 100 billion Euros per annum in the European Union. This paper is, therefore, aimed at mitigating power quality problems such as voltage sag, voltage swell, voltage unbalance and harmonic at low voltage distribution system, using a dynamic voltage restorer (DVR). Implementations of DVR have been proposed at both a medium and low voltage levels to protect sensitive loads from power quality problems. The proposed system is designed using Matlab/Simulink Sim Power System tool box. The simulation results verified the capability of the proposed DVR system in mitigating the power quality problems in a low-voltage distribution system.

[Full Text](#)

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**Title:** Hall effects on MHD flow past an infinite vertical plate in the presence of rotating fluid of variable temperature and mass diffusion with first order chemical reaction

**Author (s):** R. Muthucumaraswamy and L. Jeyanthi

**Abstract:** Combined study of Hall current and rotation on MHD flow past an accelerated infinite vertical plate in the presence of rotating fluid of variable temperature and mass diffusion with first order chemical reaction has been analyzed. The effects of Hall parameter, Hartmann number, an imposed rotation parameter, thermal Grashof number and mass Grashof number on axial and transverse velocity profiles are presented graphically. It is found that when  $\Omega = M^2 m / (1 + m^2)$ , the transverse velocity component vanishes and axial velocity attains a maximum value.

[Full Text](#)

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**Title:** Placement of dg and capacitor for loss reduction and reliability improvement in radial distribution systems using BFA

**Author (s):** E.R. Biju and M. Anitha

**Abstract:** This paper presents a methodology for determining the optimal location and capacity of Distributed generator (DG) and capacitor in the radial distribution system in view of loss reduction and improvement in voltage profile and reliability. The overall objective function includes reliability index, power loss reduction, DG and capacitor investment cost and voltage deviation index. Customer and energy based indices i.e. SAIFI, SAIDI, CAIDI, AENS, and ASAI have been optimized by using the optimum values of failure rate. In this paper, the most recent Bacterial foraging algorithm (BFA) is used to find optimal location of single DG and capacitor in radial distribution systems. To evaluate the effectiveness of the proposed algorithm in finding best solutions, simulations are carried out with and without DG and capacitor installation on 10 bus and standard IEEE 33 bus radial distribution system. The obtained results are compared with binary particle swarm optimization algorithm (BPSO) for validation.

[Full Text](#)

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**Title:** Area contraction effect on shock tube performance, numerical and experimental study

**Author (s):** A. M. Mohsen, M. Z. Yusoff and A. Al-Falahi

**Abstract:** The paper presents numerical and experimental study on the effect of area contraction in shock tube facility. The shock tube is the main component of short duration test facility at The Universiti Tenaga Nasional (UNITEN), Malaysia. In the shock tube, a small area contraction in form of a removable bush was facilitated adjacent to the diaphragm section. The flow process was simulated using a two-dimensional time-accurate Navier-Stokes solver. The solver uses second order accurate cell-vertex finite volume spatial discretization and fourth orders accurate Runge-Kutta temporal integration. In this study, the solver was programmed based on the dimensions and configuration of UNITEN's shock tube facility. The numerical results were validated with experimental data from the ground based test facility. Numerical pressure histories were found to be in accordance with the experimental data. For further investigations, simulations were conducted for different operating conditions. The results showed that shock tube performance in term of producing shock wave and steady gas flow is highly influenced by area contraction in the diaphragm section. The shock wave strength and speed decreased by 18% and 8% respectively.

[Full Text](#)

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**Title:** Cloud office using homomorphic encryption

**Author (s):** Umamaheswari. E

**Abstract:** The cloud computing has become the most promising innovation in computing world as it is an attractive solution to store and process the confidential data. Lately many users pool their data and application in cloud as it provides global access, confidentiality, provides lot of storage space and is easy to use. But the development of cloud computing is obstructed by many cloud security problem. The problem of data security in cloud computing is to be solved by using homomorphic encryption algorithm for an office management application which will manage the leave and salary details of the employee. The homomorphic encryption allows the user to store and manipulate their data in cloud confidential from the third party server. Re-encryption technique is used to prevent the system from chosen cipher text attack.

[Full Text](#)

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**Title:** Enhance implementation of FPGA based laser missile frequency jamming system using spatial parallelism

**Author (s):** Muataz Hameed Salih, Omar Faez Yousif, Mays Q. Seddeq and Hiba M. Isam

**Abstract:** System performance, power consumption and cost are considered the key factor and criterion for the success or failure of any system. Increasing the system performance is a relative issue since that it can be done via multiple mechanism and approaches. In this paper, applying of spatial parallelism mechanism over the Field Programmable Gate Array (FPGA) platform is proposed to achieve this goal. The spatial parallelism can provide the ability for duplicating the tasks which can be processed via specific modules. System signals ranging from 1Hz to 200 MHz is covered. To avoid the limitation of the master clock of the Nios II Embedded Evaluation Kit (NEEK) board, Phase Locked Loop (PLL) is utilized to enable system from covering wide spectrum of signals. Laser missile frequency jamming system has the ability to process multiple frequencies per time. The multiple signals processing capability is handling the situation where multiple aircraft fighters are attacking a single target or even multiple targets. FPGA platform is used to be the implementation environment for this system which resulted in enriching proposed system with core features such as the low cost as well as decreasing the system complexity since the concurrent structure is used within this system. In this paper, a description of the system modules, the modules functionalities, the results obtained from each module, and the final results which have been shown on the touch

screen of NEEK board. The results obtained in this research paper are accurate because of using PLL (200MHz) and the signal tolerance is equal to 5ns.

[Full Text](#)

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**Title:** Marine vessel recognition by acoustic signature

**Author (s):** N. Leal, E. Leal, G. Sanchez

**Abstract:** Automatic recognition of an acoustic signature in underwater environments is an important and active field with multiple applications, one of which is vessel recognition. When a vessel moves through the sea, its engine and the cavitation generated by its propellers produce an acoustic wave of unique characteristics that allow for its individual identification. The problem of identification involves several variables, such as ambient noise, biological noise, and even noise produced by its own machinery, which means that the signal produced, is complex to treat. This paper presents a method based on Fourier transform and digital signal processing to extract a set of features allowing for automatic ship classification (by type). Computational intelligence techniques such as Artificial Neural Networks (ANNs) and Support Vector Machines (SVMs) are used for the classification stage. Results showed that the vessel recognition system has accuracy close to 92%.

[Full Text](#)

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**Title:** Successful factors on e-government security social-technical aspect

**Author (s):** Rabia Ihmouda, Najwa Hayaati Mohd Alwi and Ismail Abdullah

**Abstract:** This study explored and identified success social-technical factors related to the information security effectiveness in organizations. It explored these factors based on literature view, and documents, the study based on the Socio-Technical approach (STA) and the Security by Consensus (SBC) model. Quantitative analysis of the organizations' employees' experiences were analyzed and discussed to validate the questionnaire. The aim of this paper is to propose conceptual framework for understanding, clarification and investigation of the socio-technical factors involved in improving e-government security effectiveness in developing countries.

[Full Text](#)

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**Title:** Detection of endogenous electromagnetic field of the human body

**Author (s):** Siti Zura A. Jalil, Hasnain Abdullah and Mohd Nasir Taib

**Abstract:** Studies have shown that human body emits their own signal radiation, which emit their frequency radiations into space surround the body. In this paper, an investigation of body radiation wave detector is performed to measure the frequency of human radiation wave. At first, the performance of body radiation wave detector is calibrated by considering two parameters; measurement distance and antenna length. The appropriate distance and length used for measurement is concluded and the accuracy for detection is determined. It is found that the detector has less than 1% of vagueness and its measurement characteristic is validated using a spectrum analyzer. Then, the human radiation wave of endogenous electromagnetic fields is examined on seven points of the human body which the results shows that each point has their own frequency that correspond to the unique attribute of human being.

[Full Text](#)

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**Title:** Local search particle swarm optimization algorithm channel estimation based on mc-cdma system

**Author (s):** Ali Kareem Nahar and Kamarul H. Bin Gazali

**Abstract:** Channel estimation is an exact significant technique to work around the influence of channel fading's which jamming pilot symbols and produced Bit Error Rate (BER) degradation. That the market for wireless communications infrastructure matures and operators wireless technology complexity. In this paper, archive new channel estimate schema named Local Search Particle Swarm Optimization (LS-PSO) in the Multi Carrier Code Division Multiple Access (MC-CDMA) system suggested that was based on a combination of classic particle swarm optimization and genetic local search algorithms. The proposed channel estimator tested under channel fast fading for different situations. In addition, the transmitter and receiver design emphasis on the 16, 32 and 64-Quadrature Amplitude Modulation (QAM) system and gold code with length 8. Simulation results, in MATLAB, show that the proposed LS-PSO for MC-CDMA system could provide a better BER performance and flexible manner.

[Full Text](#)

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**Title:** Industrial birch-bark alcohol-based extraction**Author (s):** Sergey Ivanovich Tretyakov, Elena Nikolaevna Koptelova, Natalia Alekseevna Kutakova and Nikolai Ivanovich Bogdanovich**Abstract:** In work are considered algorithms of calculation of intra diffusive kinetics of process of extraction of the birch bark differing in difficult capillary and porous anisotropic structure. Possibility of calculation of process of extraction of the extractive substances (ES) and betulin from birch bark at constant values of coefficient of internal diffusion is experimentally confirmed, dependencies of coefficients of internal diffusion on the birch bark sizes are established. The effective new way of allocation of betulin from birch bark with the use of microwave field allowing reducing at 10-15 times process duration in comparison with traditional methods of extraction is developed. Influence of key parameters on microwave extraction process is studied: type of solvent, concentration of ethyl alcohol, power consumption, the intensity of hashing and liquid module of the process. The empirical equation for the mathematical description of process is received and optimum values of parameters of allocation of betulin are defined: concentration of ethyl alcohol of 86%, duration of process is 6-7 min., liquid the module 1:20, power consumption of 16 kW· h/kg birch bark or 67 kW.h/kg betulin.[Full Text](#)

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**Title:** Laboratory analysis of capillary flow in roller-compacted concrete and the effects of water-cement ratio, resistance, freezing and thawing of concrete on it**Author (s):** Mostafa yousefi rad and Mehdi Mahmoudi**Abstract:** Concrete as one of the most consumed building materials has been used nearly two centuries in the construction industry. The final properties of the concrete is a function of the components of its mix design and also an accurate estimate of behavioral characteristics and design of concrete optimized mix designs is one of the most important things in concrete projects that has much more importance in RCC concrete. That is why; transfer and capillary flow in RCC concrete and the impact of water-cement ratio, resistance, freezing and thawing of concrete have been analyzed in this research. The results of the these tests indicate a decrease in cement content of 330 to 400 kg/m<sup>3</sup> in the blend will cause a small increase in compressive strength, reduced water absorption and capillary water absorption in the mix. Also, reducing the cement content of 250 to 330 kg/m<sup>3</sup> will result in reduced compressive strength and increased capillary water absorption. The overall result is that optimized cement content in this research is 330 kg/m<sup>3</sup> that improves the quality of concrete as well reduces construction costs due to low consumption of cement. The lowest capillary absorption was for content 250 and water-cement ratio of 4.0 and the highest capillary absorption for content 400 and water-cement ratio of 5/0. At the time of concrete curing the rolling resistance cycle was increased that this strength is due to capillary absorption in comparison with the concrete cured in 7 days.[Full Text](#)

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**Title:** Calculation of heat transfer in case of freon condensation in plate condenser channels**Author (s):** Rinat Nyavmyanovich Taktashev, Tatyana Sergeevna Ivanova, Fedor Andreyevich Yerokhin**Abstract:** The article deals with the process of R407C refrigerant vapor condensation in brazed plate condensers of vapor compression refrigerating machines, operating as part of small-scale generation objects performing centralized autonomous refrigeration supply of the group of consumers. The research is conducted with respect to different types of corrugated plates with V-shaped profile, the angle of expansion  $f$  of which equals to 60° and 120° on the assumption that condensation occurs on the entire surface of the plate. As a result of the undertaken studies semi-empirical calculation characteristics for the calculation of heat transfer in the process of R407C refrigerant vapor condensation were received.[Full Text](#)

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**Title:** Organization aspects of the ground objects monitoring by unmanned aerial vehicles in the variable observation environment**Author (s):** Nikolai Vladimirovich Kim and Nikolay Evgenievich Bodunkov**Abstract:** The work is devoted to the monitoring of ground vehicles by unmanned aerial vehicles (UAV) through the use of on-Board vision systems. The problems related to uncertain variable conditions of observation over the objects of interest (OI) that reduce the monitoring effectiveness are examined. It is shown that the change of observation conditions leads to changes in the visible features of OI and change of their

descriptions. The article describes the approach enabling to create descriptions, adaptive to the change of observation conditions. This approach uses interpolation for current conditions according to previously determined reference descriptions, based on the neuro-fuzzy systems. It is shown, that the efficiency of search objects detection on the road depends in a significant extent on the accuracy of descriptions of the respective underlying surfaces and objects in various observation conditions. The presented results of studies confirm the effectiveness of the proposed approach.

[Full Text](#)

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**Title:** Selection of concept and determination of the main parameters for manipulator of dual-arm manipulator system of planetary rover

**Author (s):** Aleksandr Borisovich Fedorushkov, Dmitrii Nikolaevich Kuzmenko and Evgenii Alexeevich Lazarev

**Abstract:** The article analyzes foreign dual-arm manipulator systems created for space application. The analysis of human anthropometric characteristics is performed and new manipulator system concept is developed based on this analysis. A kinematic structure is developed and technical specifications for manipulator system drives are calculated.

[Full Text](#)

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**Title:** The reliability model of a distributed data storage in case of explicit and latent disk faults

**Author (s):** Lyudmila Ivanichkina and Andrew Naporada.

**Abstract:** This work examines the approach to the estimation of the data storage reliability that accounts for both explicit disk faults and latent bit errors as well as procedures to detect them. A new analytical math model of the failure and recovery events in the distributed data storage is proposed to calculate reliability. The model describes dynamics of the data loss and recovery based on Markov chains corresponding to the different schemes of redundant encoding. Advantages of the developed model as compared to classical models for traditional RAIDs are covered. Influence of latent HDD errors is considered, while other bit faults occurring in the other hardware components of the machine are omitted. Reliability is estimated according to new analytical formulas for calculation of the mean time to failure, at which data loss exceeds the recoverability threshold defined by the redundant encoding parameters. New analytical dependencies between the storage average lifetime until the data loss and the mean time for complete verification of the storage data are given.

[Full Text](#)

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**Title:** An experimental investigation on the effect of surface roughness on the performance of Magnus wind turbine

**Author (s):** O. F. Marzuki, A. S. Mohd Rafie, F. I. Romli and K. A. Ahmad

**Abstract:** Wind turbine that used airfoil-shaped blades cannot harvest wind energy at low speed wind condition efficiently. A wind turbine that used Magnus effect is proposed to overcome the wind speed problem. Magnus wind turbine (MWT) performance can be further enhanced by using sanded surface on the rotating cylinder blades but the surface roughness effect on MWT are not yet fully explored. Experimental approach by wind tunnel is conducted in order to understand the effect of surface roughness. Blades rotation speed and wind speed are the controlled variables. Meanwhile, torque, torque coefficient and tip speed ratio are the measured variables. The experiment shows that sanded surface roughness can significantly increase the MWT performance up to four times based on torque production in comparison with the smooth surface. In conclusion, the results proved that surface roughness can be used to improve MWT.

[Full Text](#)

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**Title:** Engine optimization by using variable valve timing system at low engine revolution

**Author (s):** Ainul Aniyah Sabaruddin, Surjatin Wiriadidjaja, Azmin Shakrine Mohd Rafie, Fairuz I. Romli and Harijono Djojodihardjo

**Abstract:** Engine optimization is one of the most cost-effective methods in reducing emissions and fuel consumption. In the theory, the maximum overlap would be needed between the intake valves and the exhaust valves opening whenever a common internal-combustion engine is running at high revolution per minute (RPM). At lower RPM, however, as the engine is run at lighter load, maximum overlaps may be useful as a means to lessen the fuel consumptions and emissions. The timing of air intake and exhaust valves are usually determined by the shapes and the phase angles of the camshaft. To optimize the air breathing, an engine would require different valve timings at different speeds. As the revolution speed increases, the duration of the intake and exhaust valves opening would

decrease, thus less amount of fresh air may enter the combustion chambers, while complete exhaust gas cannot exit the combustion chamber in time. Therefore, varying the intake timing of an engine could help to produce more power and, if applied to smaller and lighter engine, it could result in a lower fuel consumption as well. This particular investigation has been conducted through simulations and complemented by experimental works. It has been realized in this study that optimization of an engine together with implementation of variable valve timing was able to generate similar power with an increase in volumetric efficiency, while it is obtained with a slightly lower fuel consumption. As reported by many researchers, the variable valve timing method has been indeed proven to deliver better fuel economy, less emissions, but higher torque under any operating condition.

[Full Text](#)

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**Title:** Application of TiO<sub>2</sub> nanostructure using hydrothermal method for waste water treatment

**Author (s):** Noor Sakinah Khalid, Indah Fitriani Hamidi, Noor Kamalia Abd Hamed, Fatin Izyani Mohd Fazli, Chin Phong Soon and Mohd Khairul Ahmad

**Abstract:** Titanium dioxide (TiO<sub>2</sub>) can be used as a photo-degradation material. TiO<sub>2</sub> nanostructured has been successfully fabricated by hydrothermal method. The objective of this study is to optimize the TiO<sub>2</sub> nanostructures for waste water treatment. Titania Degusa P25 and sodium hydroxide (NaOH) were treated hydrothermally with different concentrations of NaOH i.e. 1, 5 and 10 M. The morphology of the samples were characterized using FESEM and XRD for structural analysis. All the samples were observed to have clumps of nanowires based on the FESEM images. XRD analysis showed that the samples produced were anatase phase. Later, the TiO<sub>2</sub> nanostructures were applied to waste water treatment.

[Full Text](#)

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**Title:** Analysis of techniques for ANFIS rule-base minimization and accuracy maximization

**Author (s):** Kashif Hussain and Mohd. Najib Mohd. Salleh

**Abstract:** Despite of acquiring popularity among researchers, the implementations of ANFIS-based models face problems when the number of rules surge dramatically and increase the network complexity, which consequently adds computational cost. Essentially, not all the rules in ANFIS knowledge-base are the potential ones. They contain those rules which have either minor or no contribution to overall decision. Thus, removing such rules will not only reduce complexity of the network, but also cut computational cost. Thus, there are various rule-base optimization techniques, proposed in literature, which are presented in motivation to simultaneously obtain rule-base minimization and accuracy maximization. This paper analyzes some of those approaches and important issues related to achieving both the contradictory objectives simultaneously. In this paper, Hyperplane Clustering, Subtractive Clustering, and the approach based on selecting and pruning rules are analyzed in terms of optimizing ANFIS rule-base. The optimized rule-base is observed in connection with providing high accuracy. The results and analysis, presented in this paper, suggest that the clustering approaches are proficient in minimizing ANFIS rule-base with maximum accuracy. Although, other approaches, like putting threshold on rules' firing strength, can also be improved using metaheuristic algorithms.

[Full Text](#)

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**Title:** Voice enabled device switching for physically challenged and emergency alerts through SMS

**Author (s):** S. Ghojavand Beltijeh, H. Singh and M. Iwan Solihin

**Abstract:** The project develops device switching via voice commands. Therefore, the focus is on device switching and controlling GSM modem to send SMS in case of emergency, all controlled by voice commands. To be specific, there are three main objectives in this project. First of all, to design and construct a voice enabled device switching system to assist physically challenged and elderly people. Secondly, to control the electrical devices like light, fan, etc. with the help of voice recognition system. Finally, to provide a communication mechanism between the user and the predefined number through SMS messages via GSM modem in case of emergencies. The method used during the development of the system involves use of Visual Basic 6.0 (V.B.6.0) and Microsoft Speech API to detect commands, RS232 serial port to receive and transmit data from a computer, and PIC16F877A to control relays. As a result, there are four sets of coding involved, i.e C coding, V.B.6.0 coding to create GUI, coding for GSM and HTML in V.B. 6.0. Although many systems have been developed that use voice recognition such as voice enabled wheelchairs, voice enabled home loads and many more, they do not provide monitoring ability. In this project the user has the ability to monitor the loads and security system through HTML from anywhere, using any device, as long as they are connected to the same network, which will be explained in more details.

[Full Text](#)

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**Title:** Modelling and simulation of an inverted pendulum system: comparison between experiment and cad physical model

**Author (s):** J.S. Sham, M.I. Solihin, F. Heltha and Muzaiyanah H.

**Abstract:** SimMechanics can be used for modelling of mechanical systems of any degree of freedom in MATLAB/Simulink environment. Mechanical systems have physical properties that use physical modelling blocks in SimMechanics that relates to geometric and kinematic. By using this toolbox, it saves the time and effort to derive the equations of motion. SimMechanics provides a visualization and animation of mechanical systems with 3D geometry graphical shown. SimMechanics is able to interact with SolidWorks via external features. This paper describes the development of physical modeling of an inverted pendulum (IP) via SimMechanics. The swing up and stabilizing controller for the IP using Linear Quadratic Regulator (LQR) is also discussed.

[Full Text](#)

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**Title:** Design and implementation of a gas identification system on Zynq soc platform

**Author (s):** Amine Ait Si Ali, Abbes Amira, Faycal Bensaali, Mohieddine Benammar, Muhammad Ali Akbar, Muhammad Hassan and Amine Bermak

**Abstract:** The Zynq-7000 based platforms are increasingly being used in different applications including image and signal processing. The Zynq system on chip (SoC) architecture combines a processing system based on a dual core ARM Cortex processor with a programmable logic (PL) based on a Xilinx 7 series field programmable gate arrays (FPGAs). Using the Zynq platform, real-time hardware acceleration can be performed on the programmable logic and controlled by a software running on the ARM-based processing system (PS). In this paper, a design and implementation of a gas identification system on the Zynq platform which shows promising results is presented. The gas identification system is based on a 16-Array SnO<sub>2</sub> gas sensor, principal component analysis (PCA) for dimensionality reduction and decision tree (DT) for classification. The main part of the system that will be executed on the PL for hardware acceleration takes the form of an IP developed in C and synthesized using Vivado High Level Synthesis for the conversion from C to register transfer level, a hardware design for the entire system that allows the execution of the IP on the PL and the remaining parts of the identification system on the PS is developed in Vivado using IP Integrator. The communication between the processing system and programmable logic is performed using advanced extensible interface protocol (AXI). A software application is developed and executed on the ARM processor to control the hardware acceleration on the programmable logic of the previously designed IP core and the board is programmed using Software Development Kit. The maximum accuracy achieved by the system to classify three types of gases CO, C<sub>2</sub>H<sub>6</sub>O and H<sub>2</sub> is 96.66%.

[Full Text](#)

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**Title:** Comparison analysis between fuzzy and fuzzified-pid methods on gun-barrel motion control

**Author (s):** Muhammad Aziz Muslim, Desyderius Minggu, Jeki Saputra and Rini Nur Hasanah

**Abstract:** Cannon guns of 57mm-caliber are some of the main weapons owned by the air defense artillery divisions of Indonesian army. However, some of them still have to be operated manually to provide the direction course of the projectile following the target to be fired. This article presents the comparison of two possible control methods being implementable on the anti-aircraft cannonry system. The first one is the use of fuzzy-logic control method, whereas the second one is the integration of the fuzzy-logic algorithm into the commonly known proportional-integral-derivative control method. The control is aimed to direct the gun barrel toward the desired direction, in terms of both the azimuth and elevation angles based on the target position. The results show fuzzified-PID control method excels the fuzzy-logic control method in terms of steady-state error performance and settling-time performance in general.

[Full Text](#)

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**Title:** Mechanical reinforcement of conductive graphite/ biopolymer thin film composite

**Author (s):** Nur Munirah Abdullah, M.F.L Abdullah and Anika Zafiah M. Rus

**Abstract:** Mechanical properties such as tensile strength, elastic modulus and elongation at break of graphite/ biopolymer composites with different particulate fractions of graphite (5 wt.%, 10 wt.%, 15 wt.%, 20 wt.%, 25 wt.%, 30 wt.% by weight percent in the composites ) were investigated. The composites showed improved elastic modulus and tensile strength with increased treated graphite weight loading by ~300% and ~200%

respectively at the percolation threshold, compared with those of its neat counterpart. Meanwhile, the functional group tends to decrease in the composites with increasing filler content in which contributes to the stiffness of the composites as the elongation at break of composites decline. The results implies that the mechanical properties of the composites mainly depend on dispersion condition of the treated graphite filler, crystallite structure and strong interfacial bonding between treated graphite in the biopolymer matrix.

[Full Text](#)

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**Title:** Virtual reality game controlled with user's head and body movement detection using smartphone sensors

**Author (s):** Herman Tolle, Aryo Pinandito, Eriq Muhammad Adams J. and Kohei Arai

**Abstract:** This paper proposes methods for detecting user's body and head movement using accelerometer and gyroscope to control the natural visualization of the 3D game object in smartphone platforms. A virtual reality (VR) game has implemented on smartphone to demonstrate the new controlling system. The user can control the visualization of the 3D VR displayed in a new head-mounted displayed (HMD) like Google Cardboard by moving user's head, walking and rotating. The pattern of real-time data gathering from the accelerometer and gyroscope inside a smartphone is recognized to determine user's movement for controlling the visualization of VR game object. Our method success to implement on a virtual reality labyrinth game while the user had to find the way on the labyrinth game by walking, rotating and moving the head to control the game visualization.

[Full Text](#)

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**Title:** Numerical investigation for cooperative multi blimp system

**Author (s):** Herdawatie Abdul Kadir , Mohd Helmy Abdul Wahab, M. R. Arshad and Husaini A.B

**Abstract:** This paper presents the numerical investigation on multi blimp motion using three dimensional computational fluid dynamic (CFD) approach. The cooperative flight configuration is important to reduce energy and improve the communication reliability within the group. Therefore, we examined the influence of drag and pressure force of cooperative configurations shape in several formations: vee, echelon, line and column. The use of different velocity is also presented to study the effect on a cooperative navigation process. The outcome of this analysis provides the optimal configuration for multi blimp operation. Based on the numerical results, the vee formation should be considered as the best cooperative configuration with low drag effect of drag coefficient and lift coefficient which offered good data overlapping.

[Full Text](#)

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**Title:** Graphical user interface controlled via brainwave signals for paraplegic rehabilitation

**Author (s):** K. A. A. Rahman, B. S. K. K. Ibrahim, M. S. Huq, N.H.M.Nasir, M.K.I.Ahmad and F. Sherwani

**Abstract:** This article presents a practical method for recorded raw brainwave signals in three different ways. The motivation for this experiment is to get the right and persistent raw brainwave signal for the future development of GUI controlled via brainwave signals. This step was very basic but very important step in that development. Motivation behind the work also include gaining the ability to examine the behavior of raw brainwave signals. To archive the objectives, the raw brainwave signals is recorded via two different platforms of GUI; MATLAB and NeuroSky Application. NeuroSky Mindwave Mobile device is used to capture the brain signals. The raw brain wave signals taken via MATLAB are found to be similar/ verified with other brainwave signals taken via others platform.

[Full Text](#)

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**Title:** Investigation of ka-band satellite communication propagation in equatorial regions

**Author (s):** S.L. Jong, H.Y. Lam, J. Din and M. D'Amico

**Abstract:** Future satellite communication (SatCom) systems operating at high frequencies (Ka-band and above) are expected to suffer from deep signal fades due to rain, particularly in tropical/equatorial regions. Accurate satellite propagation channel modeling requires the knowledge of radio channel characteristics with respect to the peculiarities of tropical precipitation. The European Space Agency (ESA) has recently funded a Ka-band propagation measurement campaign over Peninsular Malaysia that exploits the Syracuse-3A satellite (beacon frequency 20.245 GHz). The main objective of this campaign is to collect actual propagation Ka-band signal measurements in a heavy rain

region with the aim of assessing and improving currently available statistical models of rain fade dynamic as well as evaluating the performance of site diversity and time diversity techniques. Some results relative to first- (i.e. cumulative distribution function of attenuation) and second-order (i.e. fade duration and fade slope) statistics of rain attenuation are reported based on the basis of the simulation using weather radar data, the prediction of the Stratiform convective- Synthetic Storm Technique (SC-SST) model, ITU-R recommendation and comparison of measured statistics from the literature. The discrepancy among the predicted results implies that it is important to validate the accuracy of current radio channel prediction models using actual experimental data. The experimental results of this campaign will eventually be submitted to the International Telecommunication Union-Radiocommunication Sector (ITU-R) for the benefit of the scientific community, specifically in heavy rain regions.

[Full Text](#)

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**Title:** Wireless industry emission: electromagnetic field monitoring and analysis

**Author (s):** Ching Yee Yong, Tharek Abd Rahman and Kim Mey Chew

**Abstract:** This study is prepared by the Wireless Communication Centre (WCC) Universiti Teknologi Malaysia (UTM) as collaboration with the Malaysian Communication and Multimedia Commission (MCMC) from Northern, Central and Southern regions to study the non-ionizing radiation (NIR) emission to public. This study aims to investigate the EMF pattern and its bio-effect to human kind. The installations of mobile base stations among residential areas have raised widespread concerns about the possibility on radio frequency (RF) exposure to human being. The rapid growth of mobile telecommunication technologies which subscription estimated about 9.3 billion by 2019 will affect each person in the world. The proposed study aims to evaluate the communication science, radio frequency technologies and recommend some solutions to fill any gaps in knowledge of electromagnetic field (EMF). In addition, five EMF area monitoring systems will be placed nearby mobile base stations to record the radiating sources in real time for a year period. The methodology frame work covers the investigation of emission from FM radio, analogue TV broadcasting, WiMAX, 2G, 3G and 4G mobile base stations 24 hours every day. This study has given the opportunity to identify the most sensitive systems of human body. Biological reaction of human body are obligatory taken into account, when assessing the risk of EMF effects to body tissues to develop standards of the electromagnetic safety.

[Full Text](#)

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**Title:** Study of the effect of air-gap on array microstrip antenna performances for mobile satellite communications

**Author (s):** Muhammad Fauzan Edy Purnomo, Sholeh Hadi Pramono Mauludi Ariesto Pamungkas and Taufik

**Abstract:** This paper presents the design and performance analysis of stack-patch and pentagonal microstrip array antenna models based on simulation and measurement results. Both antennas use air-gap for enhancing bandwidth, gain, axial ratio and circular polarization. The paper first discusses stack-patch microstrip array antenna where the results at  $EI=48^\circ$  agree well with the calculated results of 5 dBic gain. Results also show that the 3-dB axial ratio beamwidth of the whole azimuth ranges about more than  $120^\circ$  for each beam coverage in the conical-cut direction satisfy for mobile satellite communications. Secondly, the paper examines the pentagonal microstrip array antenna model whose results demonstrate that the bandwidth of impedance, axial ratio, and gain at the resonant frequency of 2.4925 GHz are good mainly about 15.67 %, 4.11 % and 52.16 %, respectively. The results further yield the value of S-parameter, axial ratio and gain at 2.4925 GHz to be better about -15.03 dB, 0.06 dB and 8.74 dBic, respectively. Furthermore, performance characteristic especially bandwidth of axial ratio of both antennas mainly caused by a new shape of pentagonal antenna using air-gap and good selection of a feed position are satisfied.

[Full Text](#)

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**Title:** Investigation of threshold voltage and transconductance variations in PMOS

**Author (s):** Siti Hajar Marni Hasbulah and Rahmat Sanudin

**Abstract:** Scaling process of MOSFET has yielded great benefit in term of processor technology evolution. However, it is worth to note that the scaling process also affects the electrical parameters as well. It is expected that as MOSFET gradually scaled into the submicron regime, the variation of electrical parameters due to scaling becomes more apparent. The study is carried out through simulation work of 45 nm p-type MOSFET (PMOS) using a commercial device simulator. This tool is used as a medium to observe changes in threshold voltage (VTH) and transconductance (gm). Changes of both parameters are investigated against three factors; oxide thickness (tox), doping concentration of dopant in substrate and doping energy. Observation in simulation results suggest that

increment in both tox and doping energy increases VTH and reduces gm. In contrast, increment in doping concentration of dopant improves gm and trims VTH. Analysis of results deduces that the variations of both VTH and gm against those three factors are related to number of free carriers during device operation.

[Full Text](#)

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**Title:** A novel adaptive time gap based congestion control for vehicular ad hoc network

**Author (s):** Suzi Iryanti Fadilah and Azizul Rahman

**Abstract:** Despite the growing rates of vehicles on the roads and transported goods, transportation and traffic should become safer, cleaner and more efficient. Thus to ensure reliable and safe communication architecture within VANET, we propose in this context a cooperative and fully distributed congestion control approach, dedicated to operate within vehicular networks, integrated within the 802.11p underway standard, and based on time gap model. We present in this paper a cooperative and fully distributed congestion control approach, based on time gap, to adaptively control the PSM generation rate. Using the measured time gap of the neighbor vehicles in the same lane, the periodic safety message (PSM) generation rate is controlled in order to reduce the congestion, keeping the safety of the vehicles intact.

[Full Text](#)

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**Title:** Analysis of five-phase induction motor with dynamic load

**Author (s):** Kasrul Abdul Karim, Nor Azizah Mohd Yusoff, Auzani Jidin, Fazlli Patkar, R.N. Firdaus, M.L.Mohd Jamil

**Abstract:** The three-phase induction motor with squirrel-cage rotor is the workhorses of industry because of their low cost, rugged construction, low price, and easy to maintain, which employs a clever scheme of electromechanical energy conversion. On top of that, the interest on electric motor with higher number of phases are kept increasing due to certain advantages such as higher torque density and less torque pulsation. In this project, five-phase induction motor is introduced and its performance as compared to three-phase induction motor will be discussed. This five-phase induction motor may replace conventional three-phase induction motor where higher torque density application is required.

[Full Text](#)

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**Title:** Audio transmission using visible light communication (VLC)

**Author (s):** M.I. Ma'ruf, M.B. Othman and Sholeh H.P.

**Abstract:** Limited radio frequency spectrum (or bandwidth) is one of the major issues in wireless communication. Visible light communication (VLC) should be considered as the medium for wireless transmission because it has few advantages over other standard wireless transmissions. The advantages of VLC are low power consumption and can avoid interference occurs. The visible light spectrum have 10,000 times larger than the entire radio frequency spectrum which ranges from 428 THz to 750 THz. In this paper the performance of visible light communication have been tested on the variation of distance between transmitter and receiver. Besides that the influence of the additional amplifier at the transmitter and receiver on the VLC system has also been characterized. Based on the results and analysis the implementation of the amplifier circuit at the transmitter and receiver helps to improve the signal quality of the audio signal in the VLC system. However the amplifier also increased the noise in this system. Moreover, the distance between transmitter and receiver can influence the system performance too. The longer the distance means that the signal strength and voltage which has been received by the receiver decreased and cause the data loss in the system. As a conclusion this audio transmission in the VLC system have been successfully demonstrated. However the maximum of distance between transmitter and receiver is limited to 20 cm. We believe this VLC technology has many potential to be explore and implemented in the next generation in-home network and transportation network.

[Full Text](#)

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**Title:** Arrhythmia detection based on Hermite polynomial expansion and multilayer perceptron on System-On-Chip implementation

**Author (s):** Amin Hashim, Rabia Bakhteri and Yuan Wen Hau

**Abstract:** As the number of health issues caused by heart problems is on the rise worldwide, the need for an efficient and portable device for detecting heart arrhythmia is needed. This work proposes a Premature Ventricular Contraction detection system, which is one of the most common arrhythmia, based on Hermite Polynomial Expansion and Artificial

Neural Network Algorithm. The algorithm is implemented as a System-On-Chip on Altera DE2-115 FPGA board to form a portable, lightweight and cost effective biomedical embedded system to serve for arrhythmia screening and monitoring purposes. The complete Premature Ventricular Contraction classification computation includes pre-processing, segmentation, morphological information extraction based on Hermite Polynomial Expansion and classification based on artificial Neural Network algorithm. The MIT-BIH Database containing 48 patients' ECG records was used for training and testing purposes and Multilayer Perceptron training is performed using back propagation algorithm. Results show that the algorithm can detect the PVC arrhythmia for 48 different patients with 92.1% accuracy.

[Full Text](#)

**Title:** The effect of working memory load on prefrontal cortex activation: An optical topography study

**Author (s):** Ahmad Fadzil M. Hani, Ying Xing Feng, Tong Boon Tang and Masashi Kiguchi

**Abstract:** Working memory (WM) is a theoretical concept that represents the system responsible for cognitive brain functions such as language, planning and problem solving. Studies have suggested that negative mood states impair the WM system, which can be reflected through changes in WM task performance and in activation of specific parts of the brain such as the prefrontal cortex (PFC). In this study, the relationship between working memory load and the PFC activation is investigated without biasing of mood using an optical topography (OT) system. Three levels of N-back tasks were carried out on 14 healthy male university students. It is found that the OT modality as a less-constrained neuro imaging tool can effectively measure the haemodynamic changes at PFC, confirming a significant increase of PFC activation is associated with increase of WM load from 0-back to 1-back task.

[Full Text](#)

**Title:** Routing optimization for last mile mobile of hybrid optical/wireless access network

**Author (s):** M.A. Wong, M. Elshaikh, Nadiatulhuda Zulkifli, S.M. Idrus, S.J.Elias and Arnidza Ramli

**Abstract:** Last mile mobile hybrid wireless-optical access network is obtained increasing attention among internet users and industry plus is gauging momentum as bandwidth-effective, flexible, and cost-effective solutions for providing connectivity to anywhere internet users in anywhere areas. In this work, we address the issue of resource utilization efficiency designing the cooperate multiple layers framework of deploy over passive optical network. Namely, we consider the case where the coverage of a mobile wireless segment which features multi-hop wireless link, multiplexing scheme and operated either according to the IEEE 802.11 standard is extended by an additional Ethernet-based Passive Optical Network (EPON). We propose a design of experiment simulation model which optimizes the overall last mile mobile hybrid wireless-optical access networks transmission in terms of system network performance, while accounting for the specific traffic requirements of the anywhere internet users, and the specific features of the technological components. The data packet delivery ratio (PDR), average end-to-end delay, total energy consumption and network throughput are evaluated as the performance metrics by OMNeT++ simulation. Conditions for best fit performance are determined through optimization, generalizing existing work by opting taguchi scheme for choosing the best fit parameters for determines the optimal and efficient last mile mobile hybrid wireless-optical access networks. Simulation studies indicate the optimized framework of last mile mobile of hybrid optical wireless access network that proposed here is performing better such as 2-6% energy reduction as compared to the non-optimized of the first work in joint cooperation layers of last mile mobile HOWAN framework.

[Full Text](#)

**Title:** The study of green biomass coated hollow microwave absorbing material

**Author (s):** Hasnain Abdullah Idris, Mohd Nasir Taib, Fatimah Zaharah Ali, Najwa Rawaida Ahmad, Asmalia Zanal, Azwati Azmin, Mohd Hussaini Abbas, Rohaiza Baharudin and Norhayati Mohamad Noor

**Abstract:** In recent years, absorbing material has received great attention for various applications in electromagnetic wave, communications, radar, satellite systems, and anechoic chambers for the usage of both civil and military fields. This paper investigates the effectiveness of coconut shell-based microwave absorbing material. The absorber was prepared using elephant board with coated absorbent. Absorbent performance is predicted using the Computer Simulation Technology (CST) Microwave Studio simulation software. Wave frequency of 8GHz to 12 GHz has been chosen for the simulation and performance measurement of the absorbent. The reflectivity performances of the developed absorber are compared with the existing commercial absorbers in term of their absorption characteristics. Results obtained from this study have excellently shown

that the absorption of the hollow shape can absorb the microwaves and thus, the introduced absorbing material can be used as microwave absorber.

[Full Text](#)

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**Title:** The correlation between total electron content variations and solar activity

**Author (s):** S. Z. M. Hamzah and M. J. Homam

**Abstract:** Due to the irregularities and dispersive medium of ionosphere, the total electron content (TEC) varies caused by a several factors such as local time (LT), latitude, longitude, season, geomagnetic conditions, solar cycle and activity, and so on. This investigation focused on the correlation between TEC variation and solar activity at an equatorial and polar station. This paper investigated the TEC variation at recent solar cycle 24. 2008 indicates solar minimum period while 2013 indicates solar maximum period. This paper covered analysis on hourly mean TEC value at the equatorial station, Libreville, Gabon (0.354°N, 9.672°E) and the polar station, Ny-Alesund, Norway (78.929°N, 11.865°E). By using the GPS-TEC analysis application software, the TEC value was extracted from Receiver Independent Exchange (RINEX) observation files. The TEC values increases during solar maximum because of higher solar activities. Additionally, geographic latitude also affects TEC variation, as solar radiation hits directly to the Earth's atmosphere at Libreville station thus more ionization processes occurs. At Ny-Alesund station, winter anomaly causes the TEC values in winter goes high, approximately ~5 TECU in 2008 and ~8 TECU in 2013.

[Full Text](#)

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**Title:** Medical videos and images management system in grid environment

**Author (s):** Mien May Chong, Rohaya Latip, Hamidah Ibrahim and Masnida Hussin

**Abstract:** Nowadays, most of the medical videos and images are migrating from one dimensional (1D) (e.g. cardiograms and encephalograms) and two dimensional (2D) (e.g. x-rays) images into three dimensional (3D) (e.g. tomography) and eventually four dimensional (4D) (3 spatial dimension + time) images. The improvement in those medical images and videos has also increased their volume size on the computer disk. Thus, a huge data storage is required for storing and managing them. In this paper, a medical data storage named the Academic Grid together integrating with Exponential-and-Uniform-based Splitting Technique is introduced to reduce data transmission time and merge the storage.

[Full Text](#)

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**Title:** Energy harvesting from road by pyroelectric effect

**Author (s):** Abd Mustaqim Abd Hadi, Siti Nooraya Mohd Tawil, Tengku Norliza Tengku Mohamad and Murniati Syaripuddin

**Abstract:** Energy harvesting allows the usage of waste ambient energy such as solar, wind, thermal and vibration converted into another form of useful energy. In this paper, a study of waste heat energy harvesting from road by pyroelectric effect is presented. The main focus is to develop energy harvesting system that can modulate the high intensity sun radiation using a rotating cardboard to produce a higher rate of temperature variation on pyroelectric materials. Pyroelectric materials have the ability to generate a temporary voltage when subjected to temperature variation. In this study, Lead Zirconate Titanate (PZT) material is used as a transducer to capture heat and convert it into electrical energy for ultra-low power device usage. The developed system is applied onto road surface and heat is absorbed from the road and from the high intensity sun radiation. The maximum positive and negative voltages produced from the prototype are 133.9 mV and -146.4 mV respectively. Using the developed energy harvesting system, output voltage produced is higher compared to directly attaching the pyroelectric material onto the road which is 23 mV.

[Full Text](#)

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**Title:** Implementation of hybrid software architecture framework in clinical information system: A case study of a Malaysian clinic

**Author (s):** Omar Mukhtar Hambaran, Mohd Khanapi Abd Ghani, Raja Rina Raja Ikram and Burhanuddin Mohd Aboobaider

**Abstract:** This paper proposes an evaluation of HybridCIS, a hybrid based clinical information system in a clinic in Universiti Teknikal Malaysia Melaka. Data gathering involved repeated group discussions for a period of ten months with key clinical staff. Implementation of HybridCIS was executed in the clinic and tested by clinical staff using real time patient data. Results show that HybridCIS provides a better solution of software architecture framework compared to existing approaches during network

availability and unavailability. The result of the implementation dramatically improves the performance of the system in terms of response time.

[Full Text](#)

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**Title:** Employment of waste heat for thermoelectric-based energy harvesting  
**Author (s):** Farisyamil Jfri, Siti Nooraya Mohd Tawil, Murniati Syaripuddin, Tengku Norliza Tengku Mohamad and Azizi Miskon

**Abstract:** Nowadays, there are many global warming issues as abundance of waste heat is released to the environment. A lot of machinery, electrical and electronic appliances from heavy equipment to small machines will produce waste energy in the form of waste heat. Therefore, the study on the employment of waste heat for thermoelectric-based energy harvesting that can convert heat energy directly to electrical energy is conducted. Based on thermocouple concept, the favourable material to produce more power is thermoelectric module made from Bismuth Telluride (Bi<sub>2</sub>Te<sub>3</sub>). The thermoelectric-based energy harvesting will convert the heat energy to electrical energy when there is a temperature difference between the hot and the cold side. This temperature difference on thermoelectric generator (TEG) plays an important role in producing a voltage output. It is found that the higher the difference in temperature, the higher the voltage produced. From the experiments, the highest temperature difference which is 10.8°C at the junction generated a DC voltage output of 0.92V.

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**Title:** Tracking with multirate output feedback (MROF) based discrete sliding mode control  
**Author (s):** R. Ngadengon, Y. M. Sam, J. H. S. Osman and R. Tomari

**Abstract:** In this paper, a discrete sliding mode controller with multirate output feedback is designed to control the inverted pendulum system at the upright position. Most of the SMC control strategies are based on state feedback, however not all of the state feedbacks are available. The multirate output feedback (MROF) used output feedback, therefore the state are always available at any condition. The error state variable was added to the system to achieve reference tracking. The MROF was compared with discrete Proportional Integral Derivative (PID) and discrete Linear Quadratic Regulator (LQR).

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**Title:** Sensitivity and uncertainty analysis for calculable antenna factor of the direct-feed biconical antenna

**Author (s):** Syarfa Zahirah Sapuan, Mohd Zarar Mohd Jenu and Alireza Kazemipour

**Abstract:** Antennas calibrations are required for EMC measurements that determine the radiated disturbance of a communications product, as well as household electronics and automotive equipment. Usually, the EMC test laboratory employs equipment calibrated by calibration laboratories. The important parameter during the antenna calibration is the Antenna Factor (AF). Basically, AF was determined and calibrated by measurement techniques. Measurement methods to determine the AF require a great deal of time and expensive facilities, such as an anechoic chamber, network analysers and high precision cables. Any measurement can lead to uncertainty and worsen the calibration results. To overcome this difficulties, a calculable wideband biconical antenna has been introduced. Therefore, in this paper, the sensitivity analysis for calculable AF has been done to ensure which parameter give the most sensitive changes to the AF results. Based on the analysis, it is show that the directivity (D) is the highest contributor to the sensitivity analysis. In addition, uncertainties in the calculable AF are on average  $\pm 0.56$  dB which is smaller than  $\pm 4.1$  dB obtained using the measurement method. Therefore, any factors that contribute to the change in directivity must be taken into consideration and can be references to other researcher for AF determination in future.

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**Title:** Impact of damage evaluation of glass-fiber reinforced polymer (GFRP) using drop test rig- An experimental based approach

**Author (s):** S. N. A. Safri, M. T. H. Sultan and F. Cardona

**Abstract:** The experimental results of low-energy drop-weight impact tests on woven-roving Glass Fiber Reinforced Polymer (GFRP) type C-glass/Epoxy 600 g/m<sup>2</sup> and Type E-glass/Epoxy 800 g/m<sup>2</sup> are presented. The effects of specimen thickness based on the number of plies and impact energy are investigated. Impact damage and response was observed for eight levels of impact energies, 6, 12, 18, 24, 30, 36, 42 and 48 J. From the experimental studies, it can be concluded that for each type of GFRP, the impact energy

showed excellent correlation with the impact response. The difference in the number of plies fabricated and the mechanical properties for both types of GFRP do affect the impact response and impact damage of the specimens tested. It can be concluded that GFRP type E-800 is higher in strength compared to GFRP type C-600.

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**Title:** Optical technique for jaundice detection

**Author (s):** N. Ali, S. Z. M. Muji, A. Joret, R. Amirulah, N. Podari and N. F. Dol Risep

**Abstract:** Optical technique is one of non-contact biopotential method which can detect jaundice babies without using blood testing. Jaundice is the most common problems occurred among newborn that need special medical attention. Jaundice can cause another effect to the newborn such as Kernicterus. Kernicterus or brain damage will cause death to the babies. Therefore, in this research, a new technique that can easily detect the jaundice problem will be introduced using non invasive technique that surely could reduce the painful compared using the old technique. By using specific wavelength of electromagnetic spectrum, bilirubin will absorb the light intensity and photodiode will capture the reflection from bilirubin. This reflection will produce a voltage value to be processed by Arduino Uno. After being processed, the system will go to the online system through Dreamweaver to make it as online system. The doctor can monitor the babies condition all the time. All the data that are collected using this system can be divided into three condition level of bilirubin concentration. The level of bilirubin concentration reflects to the level of jaundice and this data are very important for further investigation.

[Full Text](#)

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**Title:** Harmonic signal detection based magnetic nanoparticle imaging system for breast cancer diagnosis

**Author (s):** Nurmiza Binti Othman, Takashi Yoshida and Keiji Enpuku

**Abstract:** An imaging method based on the second harmonic (Bs2) signal detection from the magnetic nanoparticles (MNPs) has been developed to be applied for the Sentinel Lymph Node (SLN) detection during the breast cancer diagnosis. SLN can be detected by measuring the magnetic field signal of the injected MNPs tracer inside the body, instead of the conventional methods such as radioisotopes and/or blue dye tracers. The position and amount of MNPs accumulated at the SLNs are determined based on the magnetic field map measurement. The developed system can detect until 100- $\mu$ g MS1 type-MNP sample located at a depth of 30 mm from the detection coil. Future improvements on the system and MNPs selection could further increase the detection sensitivity. MNPs that are accumulated at the deeper position under the body's surface can be detected and distinguished with higher spatial resolution.

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**Title:** A benchmark of classification framework for non-communicable disease prediction: A review

**Author (s):** Daniel Hartono Sutanto and Mohd. Khanapi Abd. Ghani

**Abstract:** Non-Communicable Disease (NCDs) or chronic disease is the high mortality rate in worldwide, such as diabetes mellitus, cardiovascular diseases and cancers. The accuracy of prediction model is required to enhance the quality of health care. In data mining, the classification algorithms have been applied to predict NCDs. Meanwhile, the benchmark of the classification algorithm for NCDs prediction is needed to analyze the optimal algorithm. The classification algorithms were used likely Decision Tree (DT), k-Nearest Neighbor (k-nn), Linear Discriminant Analysis (LDA), Linear Regression (LR), Naïve Bayes (NB), Neural Network (NN), Rule Induction (RI), and Support Vector Machine (SVM). In order to test the algorithms, this research used secondary data such as breast cancer, lung cancer, colon cancer, heart disease, and diabetes dataset. The research objective is benchmarking the optimal performance of classification algorithms using AUC. The optimal classifier for NCDs prediction showed by AUC Mean, such as NB (0.7938); LR (0.7569); NN (0.7436); k-nn (0.7386); SVM (0.6783), and there is no significant different both of them. DT and LDA has poor result of AUC Mean. The NCDs datasets have noisy data and irrelevant attribute. The outcome proved that NB, SVM and NN robust with noisy dataset, meanwhile irrelevant attribute problem can be handled with pre-processing technique for improving accuracy rate.

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**Title:** Enhanced classification using PSO with embedded attribute elimination techniques

**Author (s):** M. Balasaraswathi and B. Kalpana

**Abstract:** Massive information created in the current scenario has led to a major bottleneck in terms of processing. The vast data that is available is not completely usable, in the sense; it does not entirely contain data that guides to the final results. The data tends to contain missing or redundant information, or information that is irrelevant to the study. Removing these data will not only reduce the processing time, it also enhances the accuracy of the processing algorithm. This paper presents a modified PSO algorithm (HPSO) that has embedded attribute elimination techniques. Analysis proves that HPSO consumes less time and provide better accuracy when compared to PSO.

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## MANUFACTURING OF TWO STEP CONTINUOUS OF UP-SCALED SOY-POLYURETHANE

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### ABSTRACT

The tryglyceride of vegetable oils should have at least one of unsaturated fatty acid moiety to be modified with sulfur acid catalyst in peracetic acid co-reagent, to be introduced to the desired hydroxyl functional groups in soy-polyol structure. A series of screening reactions have indicated the ratio of acetic/peroxide acid 1:7.25 (mol/mol) with temperature 60°C is the best condition for soy-epoxide to be up-scaled to 10 and 20 folds from initials. A 90 minutes is the best length of reaction for polyol to be synthesized where the oxirane value and acid value occurred are quite preferable for the proceed reactions. The recommended reactor volume is multiple of 400 mL. There are tendency of increasing the acid number if the volume enlarged 10 times, so it needs repeated neutralizations. New methods are need for the cost efficient.

**Keywords:** acid number, polyurethane, soy polyol, two step continuous, up-scale.

### INTRODUCTION

Vegetable oils are sustainable resources and the most established and abundance feedstock for chemical industry with steady in demand. Soybean oil as one among vegetable oils contains carbon-carbon double bonds in its fatty acid chain with no hydroxyl groups. Several processes used to introduce hydroxyl groups into the carbon-carbon double bond like epoxidation reaction or addition of oxygen reaction forming oxirane rings. The unreacted hydroxyl groups are account as reactive site of polyols which then act as intermediates in the formation for industrial fatty acid derivatives (Goud VV. *Et al*, 2006); (Biermann, U. *et al.*, 2000). Higher residual acidity is an undesirable polyol property as it competes with hydroxyls to react with isocyanates and consumes catalyst when is furthered processed to produced polyurethane.

#### Reactive sites of tryglycerides to modified

Soybean oil has 85% of unsaturated fatty acid chains, the reactivity of fatty acid is depend on the amount of carbon double bond, three carbon-carbon  $\pi$ -bond of linolenic acids which are more reactive to be polymerized by oxidation than linoleic (18:2) and oleic (18:1) (Li F. Larock, R.C, 2001; Li F. Larock, R.C., 2000; Erhan, S; sheng, Q., Hwang H.S., 2003).

Epoxidized soy-oil (ESO) is one of raw material used in synthesizing foams of flexible polyurethane; the double bond of soybean oils are the focus target with the multiples hydroxyl. Several methods has been used for epoxides ring opening which have resulted many different polyols, where are ready to be converted to different polyurethane characteristics (A. Guo, Cho Y., Petrovic Z.S., 2000).

Soy-based polyol retains the triglyceride backbone with hydroxyl functionality for addition reaction to increase the isocyanates reactivity. A 100% conversion

of oxirane group to hydroxyls was occurred by oxiranes dangling in central position of fatty acid chain. The short carbon chain before and after the hydroxyl group acted as plasticizer and improved polyurethane properties which then reduce the rigidity (Fedderly, Lee J.J., 2000). Oxirane ring opening reaction are effective for converting soybean oil to secondary moieties polyols but react slower than primary moieties which requires lower catalyst quantities (R. Herrington, K.Hock, 1997). Polyols from vegetable oils also known as biopolyols, performed as main substances of intermediates for polyurethane production. The hydroxyl values in polyols are related to this research design and methods.

#### The effectiveness of co-reagent for proceed reaction

Ethylene glycol is an effective co-reagent for soy epoxidised alcoholysis reaction. The increase reactivity of epoxide to ethylene glycol was attributed to the primary hydroxyl functionality (Zuleica L. Rodriguez, 2009; Flora, Firdaus E, 2014).

### METHODOLOGY AND MATERIALS

Soybean oil was purchased from local grocery, acetic acid, peroxide acid, ethanol 96% with the used of sulfur acid catalyst. The reaction was conducted in designated temperatures; at 60°C and for ring opening was at 117°C. The products obtained from epoxidation reaction was neutralized, decanted, and filtered. The ingredients of soybean oils transformation to epoxides was a blending of acetic acid and peroxide (peracetic), in the compositions ratio of acetic/peroxide (1:7.25) (mol/mol) was labelled as A; (1:7.255) (mol/mol) as B, and (1: 7.8) (mol/mol) as C. The optimized conditions of laboratory scale of soy-epoxide are prevail to the up-scaling into 10 and 20 folds from initials. Polyurethane was made by mixing polyols,



TDI: MDI (80:20), surfactants, and blowing agent; a distilled water.

## EXPERIMENTAL SET UP

### Screening study

Screening studies was conducted to evaluate conditions to the effectiveness of soybean oil epoxidation. These conditions are; temperature, amount of catalyst, amount of peroxide, and amount of acetic acid. For the screening study, 100 mL of soybean oil was charged with peracetic acid in fixed formula using concentration of sulfur acid 1%; 2%; and 3% (v/v) as catalyst, with temperature at 60°C. Oxiranes numbers are values of measuring the unsaturated fatty acid which has transformed and forming oxiranes ring.

The best oxirane number occurred for the designated sulfur acid concentration at 1% (v/v) was 6.7%, at 2% (v/v) was 7.3% and the best oxirane number at 3% (v/v) was 3.9% and 4.5%. However for the proceeds reaction for the catalysis purposes, the amount of catalyst used was 1% (v/v).

### Epoxidation reaction

Soybean oil (400 mL) and acetic acid were added into the 500 mL round bottom flask which equipped with a thermometer, and mechanical stirrer. The hydrogen peroxide was added slowly to this mixture. The temperature was maintained at 60±0.5°C.

The slow addition of hydrogen peroxide was performed to prevent overheating of the exothermic reaction occurred during reaction.

The ratios of acetic/peroxide acid were designed in three forms: (1:7.25); (1:7.255) and (1:7.8) (mol/mol) as respectively was named as A, B, and C. The volume of bodied soybean oil was designed in laboratory scale for A: 400 mL was named as A-400 and up-scaled to 1200, 2400, and 4000 was named as AA-1200, AA-2400, and AA-4000. The second was B, the volume of bodied soybean oil was made in 400 mL was named as B-400 and the volume of up-scale was made in 800 mL and 1600 mL was named as B-800 and B-1600. The third was C, it was named as C-600 with no up-scale this is was set up as control variable. The concentrations were summarized in Table-1.

**Table-1.** The concentration at laboratory and up-scale of peracetic ratio for epoxidation.

Foam Code	Initial Volume	Up-Scaling
A	A-400	AA-1200
		AA-2400
		AA-4000
B	B-400	B-600
		B-1600
C	C-600	ND

Peracetic ratio A (1:7.25); B(1:7.255); and C (1:7.8) (mol/mol)

Epoxy content of the samples and the acid number of of all products were measured and evaluated by AOCS official method (AOCS, 1997).

The samples were analysed using FTIR to qualitatively follow the disappearance of double bonds and formation of oxirane ring.

### Hydroxylation reaction

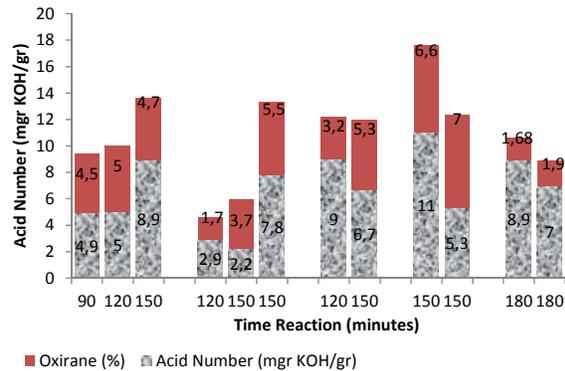
The hydroxylation reaction is the ring opening reaction of epoxide by ethylene glycol. The ethylene glycol is made in fixed ratio 1:0.19 (mol/mol), the volume of epoxide was made in eight; (50); (100); (300); (500); (700); (1000); (1000), and (2000) mL. The hydroxyl number, reduction of oxirane number, and the scale-up of epoxide were observed to know the consistency properties from laboratory to up-scale.

Hydroxyl values of polyols were determined according to ASTM Procedure (ASTM, 2005).

## RESULTS and DISCUSSIONS

### Synthesis of polyol

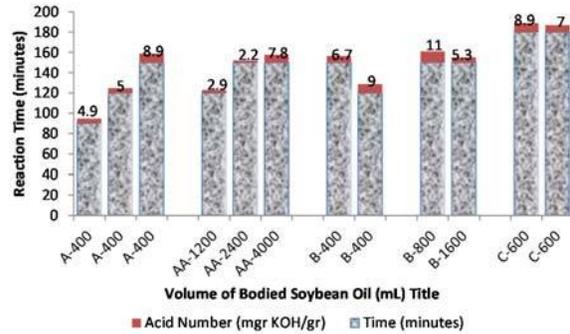
The epoxide occurred from soybean oil epoxidation by variations of time reaction which are: 90, 120, 150, and 180 minutes at varied ratio peracetic 1:7.25; 1:7.255; and 1:7.8 (mol/mol). The time reaction at 150 minutes has resulted the best oxirane number among other designated time reactions which are above 4 mgr KOH/gr. Time reaction either below or above 150 minutes at averages are below 4 mgr KOH/gr. The oxirane value indicates the degree of epoxidation that has occurred, which understood can influenced physical properties of polyurethane, because the -OH formation from alcoholysis of epoxide are performed as reactive sites to isocyanates, which performed as soft domain in polyurethanes.



**Figure-1.** Effect of time reaction to acid number and oxirane number on epoxide synthesis.

The acid number is increased eventhough undertaken by fixed ratio of epoxide/ethylene glycol, and at fixed temperature  $60\pm 0.5^{\circ}\text{C}$  it is a matter of time reaction where epoxide and ethylene glycol were contacted longer. In this study the epoxides occurred were meant to be neutralized in once as to know the acid content remain. As can be seen in Figure-1.

During the hydroxylation reaction, the acidity of polyol was made from ratio of peracetic acid 1:7.25 (mol/mol) in 400 mL volume of soybean oil was 4.9 mgr KOH/gr in 90 minutes reaction which gradually increased to 5 mgr KOH/gr to 8.9 mgr KOH/gr sample at 120 minutes and 150 minutes. The up-scaling to volume 1200 mL for time reaction 120 minutes, the acid number was declined to 2.9%. If the volume doubled to 2400 mL for time reaction 150 minutes the oxirane was continue lowering to 2.2 mgr KOH/gr eventhough still at same length of reaction (150 minutes). But if the volume were enlarged to 4000 mL the acid number again risen to 7.8%. For ratio 1:7.255 (mol/mol) with volume of soybean oil 400 mL for 120 minutes was 9 mgr KOH/gr sample but were declined in 150 minutes to 6.7 mgr KOH/gr. Low acidity in epoxide either is important which is preferable under 10 mgr KOH/gr (Monteavaro, 2005). The brief result were drawn in Figure-2.



**Figure-2.** Acid number volume of bodied soy-bean, ratio of acetic to peroxide acid to reaction time at fixed temperature at  $60\pm 0.5^{\circ}\text{C}$ .

The formation of epoxide, certain side reaction can occurred, and decomposition of peroxy acid. The multiple sites of unsaturation per tryglycerides and per fatty acid chain in vegetable oils which makes the result with peroxy acids does not directly to the formation of fully epoxidised oil but also formation of partially epoxidised precursors.

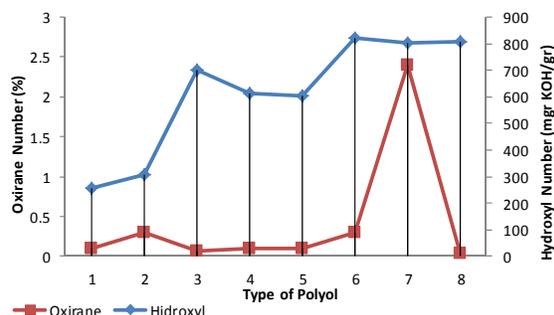
As the volume doubled to 800 mL with reaction time 150 minutes has declined of oxirane number to 5.3 mgr KOH/gr which previously was analysed because the unhomegenized mixing process, but this analysis were prematurely fall as up-scaled to 1600 mL followed by risen of oxirane to 11 mgr KOH/gr sample. The acid number was found high at concentration 1:7.8 (mol/mol) is 7 mgr KOH/gr sample and 8.9 mgr KOH/gr sample in 150 minutes for 600 mL.

The acid number and oxirane number is a function of time and temperature. The acid number at 5.3 mgr KOH/gr sample has reached the highest oxirane number it was 7 %. The value of acid number below and above 5.3 mgr KOH/gr sample. The low acidity in polyol is still preferable because high acid valued in polyols tend to neutralize the urethane formulation catalyst. The oligomer polyol product may have light yellow to dark brown yellow. The increased of acid number could be due to the degradation of as a result of the reaction over 150-180 minutes, even the reaction was at fixed temperature. But the time reaction predominantly effected to hydroxylation reaction of epoxide which assume was completed and the product occurred has oxirane number as a function of time of which was increase.

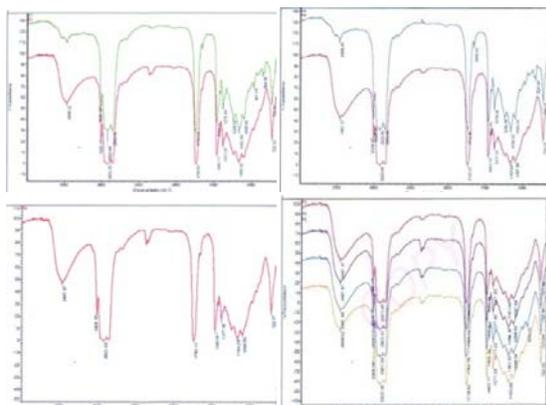
The steady increase in hydroxyl number may attribute to continued breaking of ester bond. Ethylene glycol to epoxide was made in fixed ratio which was 1: 0.19 (mol/mol) and in fact the volume of epoxide was 10 and 20 folds from initials which have reached the optimum condition and the high value of hydroxyl number of polyol. The crosslinking performance correlates to hydroxyl values of soy-based polyols, achieved from



bodying the partially epoxidized functional groups and ethylene glycol addition which had caused to increasing alcohol functional groups. The bodying of soy-based epoxide was employed to control moieties and avoid reaction with hydroxyl groups. It seems the high amount of unreacted oil could not be avoided as we can see the value of acid number increase with a function of time.



**Figure-3.** Hydroxyl number related to oxirane number of polyol at fixed ratio of ethylene glycol/epoxide (1:0.19) (mol/mol).



**Figure-4.** FTIR of soy-epoxide and soy-polyol.

The FTIR spectra of soy-base epoxide, the disappearance of epoxy groups at 825 and 845  $\text{cm}^{-1}$  the appearance of hydroxyls at 3450  $\text{cm}^{-1}$  are clear. The final product of soy-based polyol shows the characteristic signal at 1050  $\text{cm}^{-1}$  which showed the existence of esters group.

## CONCLUSIONS

The acid number and oxirane number are correlates to the time and temperature function. The steady temperature with increment time reaction will degrade oil and resulted the high acid number. The steady increase of hydroxyl number may attributed to continued breaking of ester bond. The upscaling from the bench scale does not gives the significantly different in physical properties.

## ACKNOWLEDGEMENT

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