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## **Need for Adaptive Signal Processing Technique for Tool Condition Monitoring in Turning Machines**

J. Emerson Raja, W.S. Lim, C. Venkateshaiah, C. Senthilpari and S. Purushothaman

### **ABSTRACT**

This study deals with a comparative study of the processing of tool-emitted sound signal using conventional signal processing technique, FFT and an adoptive signal processing technique, HHT for Tool Condition Monitoring (TCM) in a turning machine. The tool-emitted sound signal obtained for the purpose of TCM is used to classify the condition of the cutting tool insert into one of the three states: Fresh, slightly worn and severely worn. Signal processing techniques are used in this study for extracting features from the tool-emitted sound to train a Competitive Neural Network (CNN) for tool-wear classification. Results of the study show that the CNN trained by the features extracted using HHT performs more accurate classification than the same CNN trained by the features extracted using FFT. Hence, this study leads to the conclusion that adaptive signal processing technique, HHT is more suitable than FFT for designing accurate machine tool condition monitoring systems.

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## **Jakarta North Coast Development Impact on Fishery Activities**

Supartono, J. Haluan, M.F.A. Sondita and Manuwoto

### **ABSTRACT**

Jakarta is the most important megapolitan city for Indonesia with northern part facing to the Jakarta bay as fishing ground for small-scale fishermen coast so that could provide real added value to the economy and local communities. Now-a-days, Northern coast of Jakarta has undergone some of the most drastic changes over the last in few decades. The Jakarta waters in state threatening for the sustainability of the marine environment. It is crucial to apply a research which arms the impact of coastal development to the fishery activity, to optimize the fishery resources that have been found and to arrange the follow up strategic of coastal resources management. This study has been conducted utilizing environment monitoring result in Jakarta Bay. The methodology applies Driver Pressure State Impact Response (DPSIR) approach to analyze the factors which can cause the pressure to the coastal ecosystem and representing the analysis and identification of the environment data using Geographic Information System (SIG). The results show that in terms of demography and socio-economics indicator in Jakarta, there is significant increase in population from 1,137,211 in 1998 to be 1,182,749 in 2004. The density of 7,486 km<sup>-2</sup> in 1998 increases to 8,475 km<sup>-2</sup> in 2004. The rate is the highest in Jakarta (2.09% per year). Those increasing changes bring implications for the environment, such as conversion of land use, increased water consumption and environmental pollution. In terms of environment indicator, there has been a change in land use during the period 1998-2004, from total area 16,529,0 in 1998 become 16.579,3 in 2004 deteriorating function of many fields and shrunk the extent of the reservoir. Applying six chemical parameters used in this study: pH, DO, PO<sub>4</sub>, NO<sub>3</sub>, NH<sub>3</sub> and salinity infers the condition of marine environment unsuitable for marine life. The area classified as suitable fishery category is 36,256,4 ha in 1998 and in the contrary it falls significantly into 23,993,2 ha in 2004 but 21,277,0 ha remain is in the category of unsuitable. Using DPSIR methods, the study recommends: (a) Designing programs that encourage the creation of power employment and reduce migration, community of understanding for important coastal ecosystems, and regulation of residential land, (b) Regulation to expanding industrial at outside and industry-environmental friendly and (c) Regulation on domestic and industrial waste, development in environmentally bases and allocation protection area as buffer pollution.

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## Microporous Activated Carbon Fiber from Pineapple Leaf Fiber by $H_3PO_4$ Activation

Sumrit Mopoung and Pornsawan Amornsakchai

### ABSTRACT

Activated carbon fiber was prepared from pineapple fiber by carbonization followed with chemical activation using  $H_3PO_4$ . The activation was performed using a 1:1 w/v ratio of starting materials and  $H_3PO_4$ . Activated carbon fiber was also directly prepared by soaking pineapple fiber in  $H_3PO_4$ . The surface morphology and textural characteristics of activated carbon fibers vary with the activation temperature. The carbonized and activated products were characterized by SEM-EDS, FTIR, XRD and BET methods. The results for the activated products showed that the surface area, average pore size and percent micropore were increased as the activation temperature was increased from 400–600 °C. The surface area of activated carbon fibers from pineapple fiber was 440.9211–636.3495  $m^2 g^{-1}$ . Furthermore micropores (73.40–83.92%) are present in these activated products. It was shown that the activated carbon fibers prepared using pre-carbonization and phosphoric acid activation had higher BET surface area than materials prepared without nonpre-carbonization at the same activation temperature. However, the process without pre-carbonization uses less energy than other processes. The P-containing and O-containing surface functional groups were found on materials prepared using phosphoric acid activation, pineapple leaf fiber base activated carbon fiber by without pre-carbonization and pre-carbonization. Based on the results of this study it can be concluded that pineapple fiber is a suitable material for the preparation of adsorption filters.

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## Implementation of Distributed Arithmetic Based Reconfigurable FIR Digital Filter

Sivanantham Sathasivam, Shah Jay Dilipbhai, Bhatt Anand Jitendrabha and Subhajit Sinha

### ABSTRACT

This study presents an implementation of a Distributed Arithmetic (DA) based reconfigurable Finite Impulse Response (FIR) filter whose filter coefficient dynamically change during runtime. This DA based structure replaces all required multiplication and addition by a Look Up Table (LUT) and shift accumulator. The dual port dynamic RAM (DRAM) used in this work is to reduce the total size of LUT by half. The scheme which are using in shift accumulator doubles the throughput, since two inner products are computed concurrently. Systolic system which consists of an array of processing element in a pipeline structure is used for application such as image processing and signal processing. The proposed work uses mainly a DA based systolic architecture which yields faster output compared to the multiplier-accumulator based design because it stores the pre computed partial result in the memory and used it in computation. The entire architecture is implemented in FPGA from ALTERA family. The proposed architecture consumes 70 nW thermal power in which core static and I/O thermal power dissipations are 47.36 and 22.64 nW, respectively. Another main advantage over DRAM is high data rate, wide data bus size and maximum throughput.

### How to cite this article:

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## Modeling the Asymmetric in Conditional Variance

Ayodele Abraham Agboluaje, Suzilah Bt Ismail and Chee Yin Yip

### ABSTRACT

The purpose of this study is to model the asymmetric in conditional variance of Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) with Combine White Noise (CWN) model to obtain suitable results. Combine white noise has the minimum information criteria and high log likelihood when compare with EGARCH estimation. The determinant of the residual covariance matrix value indicates that CWN estimation is efficient. Combine white noise has minimum information criteria and high log likelihood value that signify suitable estimation. Combine white noise has a minimum forecast errors which indicates forecast accuracy. Combine white noise estimation results have proved more efficient when compared with EGARCH model estimation.

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## Physical, Chemical and Adsorptive Characteristics of Local Oak Sawdust Based Activated Carbons

Atef S. Alzaydien

### ABSTRACT

**Objective:** The aim of this study was to prepare and characterize activated carbon from local oak sawdust in order to relate the preparation conditions (carbonization and chemical activation) to the carbon's essential physical, chemical and adsorptive properties. **Methodology:** Activated carbons were prepared from raw sawdust carbon (SDC) and by first activation with 3.07 N  $\text{H}_3\text{PO}_4$  (PASC). The carbon yield for SDC was 33.8% while, phosphoric acid activated sawdust carbon (PASC) showed 29.4% of carbon yield. The pH values for the SDC and PASC solutions were found to be 7.4 and 6.0, respectively. The electrical conductivities for the SDC and PASC solutions were found to be 144 and 327  $\mu\text{S cm}^{-1}$ . Moisture contents for SDC and PASC were 5.4 and 4.6% and ash contents for SDC and PASC were 6.8 and 6.6% respectively. The surface concentration of the functional groups on SDC titrated by the equilibrium Boehm method is 1.508  $\text{mmol g}^{-1}$ , of which 1.062  $\text{mmol g}^{-1}$  have acidic and 0.446  $\text{mmol g}^{-1}$  have basic character. While, the surface concentration of the functional groups on PASC titrated by the equilibrium Boehm method is 2.615  $\text{mmol g}^{-1}$ , of which 2.467  $\text{mmol g}^{-1}$  have acidic and 0.148  $\text{mmol g}^{-1}$  have basic character. **Results:** The values of iodine number obtained for PASC (872.4  $\text{mg g}^{-1}$ ) is greater than the value obtained for SDC (554.6  $\text{mg g}^{-1}$ ). The methylene blue number obtained for PASC (306.0  $\text{mg g}^{-1}$ ) is greater than the value obtained for SDC (180.3  $\text{mg g}^{-1}$ ). The Langmuir maximum adsorption capacity of phenol on the resultant PASC and SDC was equal 99.0 and 72.4  $\text{mg g}^{-1}$  respectively. **Conclusion:** The results show that agricultural waste oak sawdust can be used as a promising precursor material for the production of low cost activated carbon.

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## **A Data-driven Approach to Allogeneic Stem Cell Transplantation**

T. Jayanthi and S. Rajalakshmi

### **ABSTRACT**

**Background:** Healthcare organizations today are capable of generating and collecting large amounts of data. This increase in volume of data requires automatic way for these data to be extracted and analyzed when needed. Millions of people would like to store cell specimens, for use in all sorts of contingencies. This study explores innovations in life sciences sector with the case of stem cells, an emerging and promising field. Stem cells research plays a key role in regenerative medicine because of the variable potentials it offers in basic, clinical research and development. **Methodology:** Applications from the stem cell research and developments can be categorized into four key fields as the application of the pluripotent cells, application in the field of drug discovery, cell therapy and diagnosis for example in identifying new treatment options for any organ failure or any fatal disease. Stem cells have the unique ability to become any cell in the body. This can keep on renewing themselves. These basic building blocks of life are fast becoming the ultimate repair-kit of the future. **Results:** Statistics show that there is a greater chance for success in a stem cell transplant between siblings (syngenic) as well as there may be chance to solve the disease of unrelated donors (allogenic) and recipients. **Conclusion:** Basing on these findings, it can be concluded that the data-driven approach to retrieve the knowledge from the stem cell database helps to solve the disease of unrelated donors and recipients also. This offers a new insight to the data mining techniques in the field of medical practices.

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## **Intellectual Capital, Accountability and Sustainability in Non-profit Organizations**

Roshayani Arshad, Nur Hayati Ab Samad, Amrizah Kamaluddin and Nurfarahin Roslan

### **ABSTRACT**

**Background:** In order to successfully accomplish the social and business mission, social enterprises need to identify the appropriate elements of resources that affect their performance since the management of resources is important to ensure organizational accountability and in turn sustainability in the future. **Objective:** Thus, this study aims to examine the role of intellectual capital, in terms of human capital, structural capital and relational capital on the sustainability of social enterprise. **Methodology:** Information on the sustainability of social enterprise and intellectual capital were obtained from the content analysis of the annual reports of 210 social enterprises registered under the Registry of Societies (ROS) in Malaysia for the financial period 2010. **Results:** The results from the statistical analysis revealed that on average, most of the social enterprises in Malaysia would be able to survive in the future. In addition, the results also highlighted that of the intellectual capital and structural capital has the most significant positive influence on the sustainability of social enterprise while, human capital and relational capital have weaker significant positive relationship with the sustainability of social enterprise. **Conclusion:** Overall, this study concludes that efficient management of human capital is critical as it can act as a catalyst in converting the bundle of intellectual capital possess by an entity into market value.

### **How to cite this article:**

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## **Modeling of MEMS Based Piezoelectric Cantilever Design Using Flow Induced Vibration for Low Power Micro Generator: A Review**

Md. Naim Uddin, Md. Shabiul Islam, Jahariah Sampe and M.S. Bhuyan

### **ABSTRACT**

Low power micro/nano devices are tremendously used in our daily life. Battery is a traditional energy source for portable or wearable devices and remote system application. But it has limited lifetime, bulky size and harmful during disposal to the environment. Ambient vibration energy can be considered for small-scale application and converted into electrical energy using three mechanisms: Piezoelectric, electrostatic and electromagnetic. In this study, piezoelectric mechanism will be used to develop a piezoelectric cantilever with a proof mass on its free-end to reduce resonant frequency. An ambient fluid flow energy will be applied to generate vibration of the cantilever. An analytical model will be developed to get an optimised geometrical dimensions of the cantilever which will be designed using SolidWorks. A bluff body will be placed in front of the piezoelectric cantilever with the integration of electronic circuits in a micro-channel where ambient fluid will get barrier due to the bluff body. As a result, turbulence will be created to displace the free-end and then generate vibration of the cantilever. The simulation of Finite Element Analysis (FEA) on the piezoelectric cantilever in CoventorWare will be carried out the modules of fluid dynamics, structural vibration and electrical response. The simulated results can be obtained such as stress, strain, resonant frequency, displacement, voltage and power output. A voltage output is expected from 2.9-4.5 mV at the wind speed of 2-5 m sec<sup>-1</sup> from the developed piezoelectric energy harvester system. The achievement of the voltage can be used to drive an ultra-low power micro generator circuits.

### **How to cite this article:**

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## **Spirit and Brain Signal Analogy for Brain Science Study**

S. Sappajak and P.P. Yupapin

### **ABSTRACT**

A new insight of brain signal oscillation within a brain is proposed using the spirit signal, which is formed by the vector soliton pulse after Big Bang and localized in the Hilbert space. The spirit signal is entered into the suitable brain via the nerve center and linked to the entire body. The spirit signal oscillation can be configured by the propagation of photon within the circular like motion device, which is a nonlinear material device known as a panda ring resonator. A spirit signal is a form of energy and configured by a photon, from which the traveling spirit signal behavior can be described by using the standard time dependent Schrodinger equation. Preliminary results obtained have shown that the use of the spirit signal traveling in the nonlinear ring resonator can be formed and investigated. The proposed spirit signal can be used for brain signal manipulation, which is useful for brain science researches and investigations.

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