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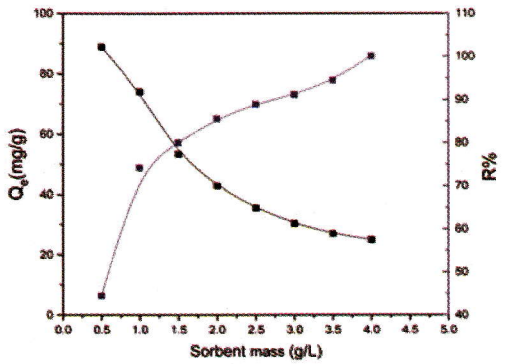
Earth, Environment & Atmospheric Sciences

203 **Isotherm and Thermodynamic Studies of the Biosorption of Humic Acid from Aqueous Solution by Pine Sawdust based Activated Charcoal**

Sobhy M Ibrahim, Mohamed R Hassan & H M H Gad

Activated charcoal was prepared from pine tree sawdust by chemical activation by means of phosphoric acid (PSDP) that was used for Humic acid bio sorption from aqueous medium. The influence of humic acid initial concentration, sorbent mass, and solution temperature on sorption process was investigated. Langmuir and Freundlich isotherm models were used to analyze the equilibrium sorption data. The maximum adsorption capacities of PSDP obtained from Langmuir were 170.9, 182.1 and 209.6 mg/g at 25°C, 45°C and 65°C, respectively. Humic acid adsorption onto PSDP was spontaneous, favorable at higher temperature and endothermic in nature. Activated charcoal from pine tree sawdust proves to have high capacity adsorptive to natural organic compound (humic acid).



Waste Utilization & Management

210 **Utilization of Iron Ore Tailings for Brick Manufacture from Donimalai Mines of Karnataka, India**

Ranjeet Kumar Singh, Debjit Pal, Shailendra Kr Signh, Nimisha Tripathi & Raj S Singh

The iron tailings were mixed in various proportions with different combinations of cement, sand, and sodium silicate to obtain or value-added product out of iron tailing waste which is suitable for use in the construction industry. Bricks were made using a variety of compositions of iron tailings, Ordinary Portland Cement, sodium silicate, and sand in cuboid mould (9″X 5″X 3″). The bricks were dried for 24 hours, and then kilned at 115 ± 10°C for 24 hours. Mechanical features such as water absorption, compressive strength, and efflorescence are tested. The maximum compressive strength rating of 8.58 N/mm^2 was recorded with ratios of 8:2 (Iron tailing and cement). However, in process of making it economical, the ratio of 9:1 has opted and this ratio complies with the requirement of the Indian standard (IS: 1077:1992) of the common burnt clay building bricks. Water absorption for the proposed bricks is less than that of burnt clay bricks. The lower capillary pore can prevent the formation of efflorescence.

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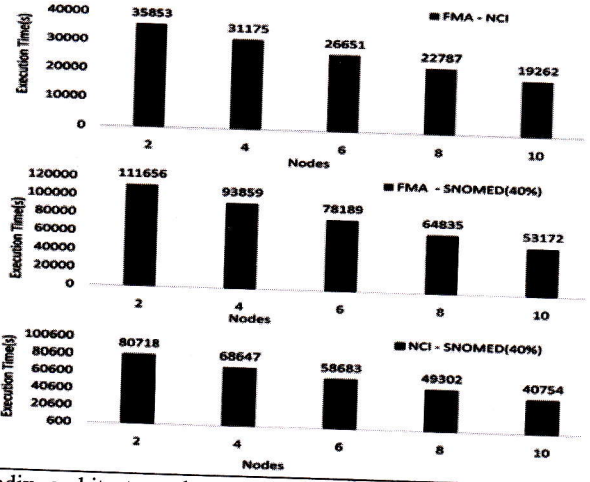
Computer Science & Information Technology

221 **MPP-MLO: Multilevel Parallel Partitioning for Efficiently Matching Large Ontologies**

Usha Yadav & Neelam Duhan

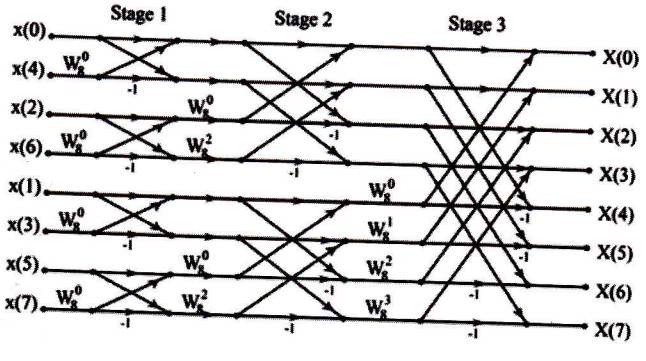
The growing usage of Semantic Web has resulted in an increasing number, size and heterogeneity of ontologies on the web. Therefore, the necessity of ontology matching techniques, which could solve these issues, is highly required. Due to high computational requirements, scalability is always a major concern in ontology matching system. In this work, a partition-based ontology matching system is proposed, which deals with parallel partitioning of the ontologies at multilevel. At first level, the root based ontology partitioning is proposed. Matchable sub-ontology pair is generated using an efficient linguistic matcher (IEI-Sub) to uncover anchors and then based on maximum similarity values, pairs are generated. However, a distributed and parallel approach of MapReduce-based IEI-sub process has been proposed to efficiently handle the anchor discovery process which is highly time-consuming. In second level partitioning, an efficient approach is proposed to form non-overlapping clusters. Extensive experimental evaluation is done by comparing existing approaches with the proposed approach, and the results shows that MPP-MLO turns out to be an efficient and scalable ontology matching system with 58.7% reduction in overall execution time.



230 **ASIC Design of Radix-2,8-Point FFT Processor**

Prasad Kulkarni, B G Hogade, Vidula Kulkarni & Varsha Turkar

In split radix architecture, large sizes Fast Fourier Transforms (FFT) are decomposed into small independent computations to reduce storage burden. Radix-2, 8-point is one the popular choice in split radix for small independent computation. Author propose the FFT processor architecture for this small independent computation i.e. radix-2, 8-point FFT. This paper brief architecture comprising Butterfly Unit (BU), register set and controller. The novelty of this architecture is that it replaces the series of Processing Elements (PE) by single BU. BU computes two halves of the computations concurrently. Arithmetic computations are performed in floating point form to overcome the nonlinearities. All computations are controlled by tailored instruction set. All instructions are of same size and have same execution time.



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239 **Energy Detector Based Spectrum Sensing Performance Analysis over Fading Environment**

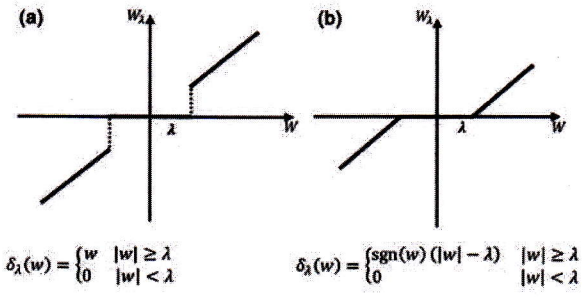
Brijesh Kumar Singh & Mainak Mukhopadhyay

Energy detection approach for sensing of spectrum is an extremely effective method of detection in comparison of other spectrum sensing methods when secondary user lacks adequate knowledge of primary user's channel conditions. Because of multipath propagation and shadowing effects, performance of energy detector employed in a cognitive radio system is severely influenced. In this paper, we have evaluated performance of energy detector over fading environment. Hypothesis testing was utilized for spectrum sensing to find out whether the primary user's signal was available or missing. Performance assessment for spectrum sensing using the energy detector was carried out primarily on the basis of probability of false alarm and probability of detection

245 **Reconstruction of Level Cross Sampled Signals using Sparse Signals & Backtracking Iterative Hard Thresholding**

Viswanadham Ravuri, Sudheer Kumar Terlapu & S S Nayak

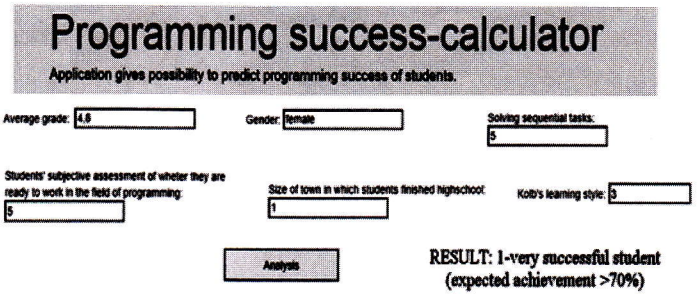
Industry 4.0 applications involve more number of sensors or Internet of Things (IoT) devices to support automation in the industry. It involves more number of computations to analyze the sensor data collected from several critical parts of the processing units. Sparse signal processing is one which has numerous applications in area of communication and signal processing. This paper presents a novel approach to reduce the computations with the help of level cross sampling (LCS) and a backtracking based iterative hard thresholding (BIHT) algorithm for reconstruction. The process involves, an information signal is converted to a random sparse signal using non-uniform sampling at the transmitter side and then it can be reconstructed back using BIHT algorithm at receiver side. Simulation results exhibit the superior performance of the proposed BIHT reconstruction in comparison with the literature.



249 **Artificial Neural Network Model for Prediction of Students' Success in Learning Programming**

Nebojša Ljubomir Stanković, Marija Dragovan Blagojević, Miloš Željko Papić & Dijana Ivan Karuović

The model for predicting students' success in acquiring programming knowledge and skills is presented in this paper. In order to collect the data needed for development of the model, 159 undergraduate IT students from Faculty of Technical Sciences in Čačak were analyzed. Besides the score on programming knowledge test, the following data were also gathered for each student: high school, the subject he/she took at the entrance exam, size of student's birthplace, average high school grade, points from high school, gender, previous education, existence of IT educational profile in high school, study year, percentage of attendance on classes, reason for enrolment, subjective assessment of preparedness for programming, solving sequential tasks, type of programming student prefers, subjective assessment of preparedness for working in industry, solving tasks with branching and cycle, solving complex tasks, knowledge level, formal education, informal education, Kolb's learning style. In order to predict students' success in learning programming multilayer perceptron was used with backpropagation learning algorithm.



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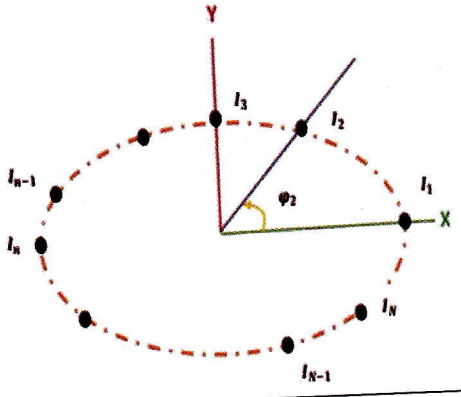
255 **Evolutionary Computing Tools based Design of Elliptical Antenna Array for Amplitude-Position Technique**

B S S V Ramesh Babu, P S R Chowdary & Satyasis Mishra

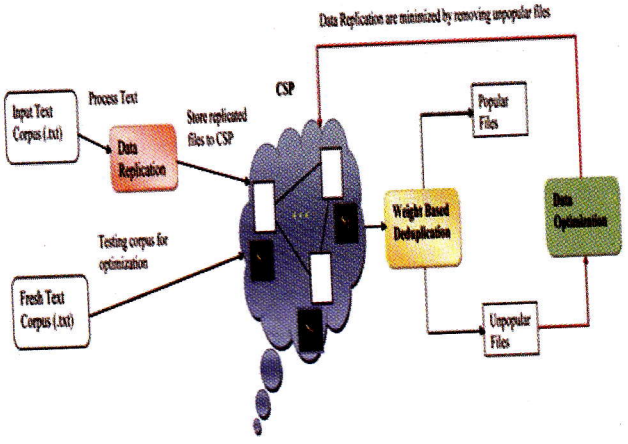
The work presented in this paper refers to synthesis of elliptical antenna array for a desired radiation pattern in which the SLL is optimized using evolutionary computation algorithms like Accelerated Particle Swarm Optimization (APSO), Flower Pollination (FPA) and Antlion Optimization (ALO) algorithms. The amplitude-position technique of synthesis is used in which both amplitude and angular positions of the element on the circumference of the ellipse are determined using the evolutionary computing algorithms. The simulation-based experimentation is carried out for elliptical array of 12 and 20 elements arranged aperiodically with non-uniform amplitude distribution. The Simulations are performed in MATLAB 2019 and SLL are obtained from the corresponding radiation pattern for analysis.



260 **Weight Based Deduplication for Minimizing Data Replication in Public Cloud Storage**

E Pugazhendi, M R Sumalatha & Lakshmi Harika P

The approach to optimize the data replication in public cloud storage when targeting the multiple instances is one of the challenging issues to process the text data. The amount of digital data has been increasing exponentially. There is a need to reduce the amount of storage space by storing the data efficiently. In cloud storage environment, the data replication provides high availability with fault tolerance system. An effective approach of deduplication system using weight based method is proposed at the target level in order to reduce the unwanted storage spaces in cloud. Storage space can be efficiently utilized by removing the unpopular files from the secondary servers. Target level consumes less processing power than source level deduplication. Multiple input text documents are stored into dropbox cloud. The top text features are detected using the Term Frequency (TF) and Named Entity Recognition (NER) and they are stored in text database.



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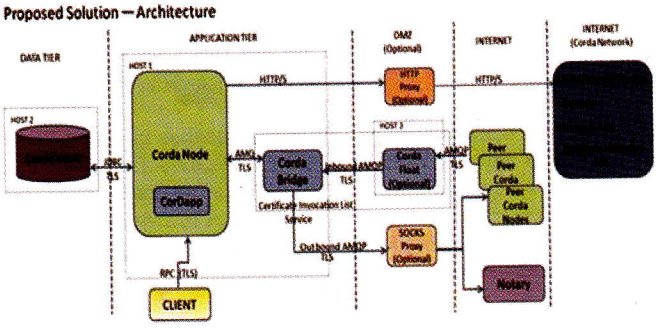
270 **Proposed Framework for Dealing COVID-19 Pandemic Using Blockchain Technology**

The production and distribution of COVID-19 testing kits is an urgent and increasingly worldwide requirement, due to the ongoing pandemic. The accuracy of the kit is critically important and to save the world from the faulty kit becomes an issue. The kit before use has to be approved by an authorized medical research agency like US-FDA, ICMR, etc. In this paper, we proposed a framework that ensures that the testing kit is validated by various measures and gives the history of the supply chain of the testing kit. The parties that are used in the supply chain are Notary, Manufacturer, and Validating Party. A Consumer also plays an important role and can punch the batch number to check whether the kit is approved or not. The framework is developed using R3 Corda, a permissioned distributed ledger technology. A permissioned blockchain is used for data privacy and security so that only trusted parties can leave or join the system.

Mansi Gupta, Vimal Kumar, Vikash Yadav, Rajesh Kumar Singh & Mohd Sadim

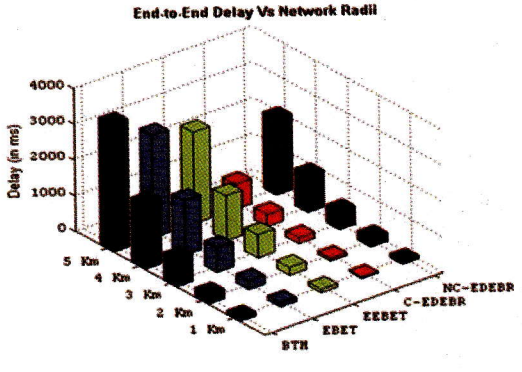


Science & Technology Management

276 **Event Driven Application Specific Prioritized Data Transmission Approach for Underwater Wireless Sensor Networks**

The paper presents a novel framework based on prioritized event detection for Underwater Wireless Sensor Network (UWSN). The proposed approach named Event Driven Energy Balanced Routing (EDEBR) takes the routing decision based on oceanic environment parameters (temperature, density, salinity and pressure). The approach of EDEBR considers two routing phase based on annotated parameters of Critical and Non-critical event priority. Here critical data routing phase focuses on fast and reliable delivery of data and Non-critical data routing phase focuses on the network lifetime through energy balancing technique. The proposal is evaluated and compared against the standard state-of-art protocol on the basis of following three evaluation parameters i) end to end delay, ii) Network lifetime and iii) Throughput of the network. Here in case of critical data the end to end delay is reduced this satisfies the condition for fast delivery.

Rakesh Kumar, Diwakar Bhardwaj & Manas Kumar Mishra



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