Foreword and Editorial

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We are very happy to publish this issue of an International Journal of Advanced Science and Technology by Science and Engineering Research Support soCiety.

This issue contains 12 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

The paper “RUP Certification via CRM Certification Process: Development of Software with Zero Defect Rate” discusses about RUP which is based on UP and OOP methodology in order to develop an application whose scope spans to enterprise level but it is labeled as an immature and disorganize development as it involves rework, provided any shortcomings are found in the accomplished phases. Moreover it is observed that risk identification and resolution is not properly handled in RUP as its analysis has no roots towards mathematical framework and no statistical grounds for correctness and reliability. The RUCM, Rational Unified Cleanroom Model- The proposed model, comprises of best practices and principles both of CRM and RUP. Mathematical framework, Mathematical modeling, quantification, statistical test, certification process are the implemented best practices which ultimately leads towards the complete customer satisfaction and a defect rate of zero percentage.

Paper “CBIR Using Local and Global Properties of Image Sub-blocks” proposes a content based image retrieval (CBIR) system using the local colour and texture features of selected image sub-blocks and global colour and shape features of the image. The image sub-blocks are roughly identified by segmenting the image into partitions of different configuration, finding the edge density in each partition using edge thresholding, morphological dilation and finding the corner density in each partition. The colour and texture features of the identified regions are computed from the histograms of the quantized HSV colour space and Gray Level Co-occurrence Matrix (GLCM) respectively. A combined colour and texture feature vector is computed for each region. The shape features are computed from the Edge Histogram Descriptor (EHD). Euclidean distance measure is used for computing the distance between the features of the query and target image.

In the paper “Multi-Modal Biometric Authentications: Concept Issues and Applications Strategies”, Authors sees that, as the information age matures, biometric identification technology will be at the heart of computer interaction with humans and the biosphere in which they reside. Automated biometric systems for human identification measure a “signature” of the human body, compare the resulting characteristic to a database, and render an application dependent decision. These biometric systems for personal authentication and identification are based upon physiological or behavioral features which are typically distinctive, although time varying, such as fingerprints, hand geometry, face, voice, lip movement, gait, and iris patterns. Multi-biometric systems, which consolidate information from multiple biometric sources, are gaining popularity because they are able to overcome limitations such as non-universality, noisy sensor data, large intra-user variations and
susceptibility to spoof attacks that are commonly encountered in uni-biometric systems. In this paper, it addresses the concept issues and the applications strategies of multi-biometric systems.

In the paper “Designing Disability-Aware E-Learning Systems: Disabled Students’ Recommendations”, it has been observed that disabled students in higher education are faced with a lot of difficulties accessing learning resources when e-learning systems are inaccessible. When instructional designers and developers of e-learning systems overlook the needs of disabled students, this leads to exclusion in what is termed disability divide. This paper reviews some disabilities encountered in higher education and assistive technologies used in accessing e-learning environments and presents disabled students’ recommendations on designing inclusive e-learning systems, obtained during the user evaluation of disability-aware e-learning software. It is hoped that these recommendations would be adopted by designers and developers of e-learning and web-based systems so that they can meet the needs of disabled students.

The paper “Skew Detection, Correction and Segmentation of Handwritten Kannada Document” proposed schemes for skew detection and correction, segmentation of handwritten Kannada document using bounding box technique, Hough transform and contour detection, respectively. Optical character recognition (OCR) refers to a process of generating a character input by optical means, like scanning, for recognition in subsequent stages by which a printed or handwritten text can be converted to a form which a computer can understand and manipulate. A generic character recognition system has different stages like noise removal, skew detection and correction, segmentation, feature extraction and classification. Results of the later stages can affect the performance of the subsequent stages in the OCR process. To make the results of the subsequent stages more accurate, the skew detection and correction and segmentation play an important role.

The paper “Effective PCG Signals Compression Technique Using an Enhanced 1-D EZW” presents an Enhanced version of the Embedded Zerotree Wavelet (EEZW) dedicated to Phonocardiogram (PCG) compression. This algorithm is constituted of six steps: applying Discrete Wavelet Transform, uniform scalar quantizing, creating dominant and subordinate lists, generating preliminary symbol stream and finally using arithmetic coding. The adapted 1-D algorithm shows better performance than the original EZW, the modified Ouafi’s EZW (MEZW) and the popular MP3 audio-specific format, regarding to the well-known trade-off rate/distortion. Also a low computational complexity of the method is obtained due to the only one time subordinate pass calculated one time after the achievement of all dominant passes.

In the paper “Study of Residence Time Distribution of Rough Rice in a Plug Flow Fluid Bed Dryer”, due to the motion of gas-bubbles and the particles back-mixing, the particles flow pattern through the plug flow fluid bed dryer deviates from the ideal plug flow and is considered as a dispersed plug flow. The residence time distribution (RTD) characteristics, flow pattern, and dispersion coefficient of rough rice in a plug flow fluid bed dryer under
various experimental conditions were investigated. The flow of particles in the dryer is a dispersed plug flow with large deviation from ideal plug flow. The flow in the dryer approaches plug flow with increase in the solid feed rate, decrease in the weir height, and increase in the inlet solid moisture content.

The paper “A Fault Tolerant Scheduling System Based on Checkpointing for Computational Grids” presents and evaluates a fault-tolerant job scheduling system based on checkpointing technique. Job checkpointing is one of the most common utilized techniques for providing fault tolerance in computational grids. The efficiency of checkpointing depends on the choice of the checkpoint interval. Inappropriate checkpointing interval can delay job execution. When scheduling a job, the system uses both average failure time and failure rate of grid resources combined with resources response time to generate scheduling decisions. The system uses the failure rate of the assigned resources to calculate the checkpoint interval for each job.

The paper “An FPGA Based High Performance IEEE-754 Digit Recurrence Floating Point Double Precision Divisor Using Verilog” focuses on the current floating-point divisor architectures that have low frequency, larger area and high latency in nature. With advent of more graphic, scientific and medical applications, floating point dividers have become indispensable and increasingly important. However, most of these modern applications need higher frequency or low latency of operations with minimal area occupancy. A highly optimized pipelined architecture of an IEEE-754 standard double precision floating point divider is designed to achieve high frequency on FPGAs.

The paper “Security Framework Design Intended for Networked Devices” presents a security framework for securing computer networks, to guide organizations, businesses and individuals to prevent information leak or being passed to unauthorized users. As more organizations and businesses are using computer networks and the Internet, the need for a secure computing environment must also be increased. A secure computing environment must consist of the provisions and policies to prevent and monitor unauthorized access, misuse, modification, and distribution of computing resources.

The Authors of “Application of an Intelligent Self-Tuning Fuzzy PID Controller on DC-DC Buck Converter” presents a development of a self-tuning fuzzy PID controller to overcome the appearance of nonlinearities and uncertainties in the system. The self-tuning fuzzy PID controller is the combination of a classical PID and fuzzy controller. The controller is designed based on the expert knowledge of the system. Fuzzy logic is used to tune each parameter of PID controller. The fuzzy logic controller is designed to implement proportional, integral, and derivative gain when they are appropriate to reduce the error signal of the system. The time-domain response of the closed-loop system with FPID controller is improved with respect to the closed-loop system with PID and fuzzy controller.

Paper “Classification Algorithm for Feature Extraction using Linear Discriminant Analysis and Cross-correlation on ECG Signals” develops a novel framework for feature extraction based on a combination of Linear Discriminant Analysis and cross-correlation. Multiple Electrocardiogram (ECG) signals, acquired from the human heart in different states such as in fear, during exercise, etc. are used for simulations. They are characterized by several parameters and the important information relies on its HRV (Heart Rate Variability). Human interpretation of such signals requires experience and incorrect readings could result in
potentially life threatening and even fatal consequences. This work focuses on designing a machine based classification algorithm for ECG signals. The proposed algorithm filters the ECG signals to reduce the effects of noise. It then uses the Fourier transform to transform the signals into the frequency domain for analysis. The frequency domain signal is then cross correlated with predefined classes of ECG signals, in a manner similar to pattern recognition.

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