Guest Editorial Preface

Special Issue on Innovations in System Design and Methodologies

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Computing is the process of using computer technology to complete a given goal-oriented task. It may encompass the design and development of software and hardware systems for a broad range of purposes - often structuring, processing and managing any kind of information - to aid in the pursuit of scientific studies, making intelligent systems, and creating and using different media for entertainment and communication. Computing has also been defined as a branch of engineering science that deals with the systematic study of algorithmic processes, which are used to describe and transform information.

Considering the importance of research in this domain, this special issue aims to invite researchers to submit unpublished original works / reviews / case-studies addressing system design, simulation and modelling. The diversity of software has increased considerably over the last decade. The journal seeks for high quality papers to address the challenges of developing analytical and simulation models for various software systems and services. It is of paramount importance for researchers in both academia and industry to step-up and provide reproducible strategies based on analytical and simulation models to shed some light on suitable ways to deploy such highly complex system architectures.

We are pleased to present the Special Issue of the "International Journal of Information System Modeling and Design" entitled "Innovations in System Design & Methodologies" published as volume 12, issue 1. This special issue contains seven articles in total. All the papers in this special issue cover a range of aspects of System Design. Each of these papers has undergone full double blind peer review, prior to being selected for this special issue.

It opens with the research paper on 'Plant Leaf Disease Detection Using CNN Algorithm' by Deepalakshmi P, et al. The main aim of this paper is to identify the diseased and healthy leaves of distinct plants by extracting features from input images using CNN algorithm. The extracted features help in identifying the most relevant class for images from the datasets. The authors have observed that the proposed system consumes an average time of 3.8 seconds for identifying the image class with more than 94.5% accuracy.

The next paper is by Kirankumar V Kataraki, et al., titled 'Power-Aware Mechanism for Scheduling Scientific Workflows in Cloud Environment'. It focuses on the cloud resources that need to be allocated efficiently, and task needs to be scheduled efficiently such that the performance can be enhanced. In this research work, authors have proposed a novel mechanism named PAMP (Performance Aware Mechanism for Parallel Computation) for scheduling scientific workflows. At first, the resources are allocated using the optimal resource allocation mechanism. Then tasks are scheduled in parallel

utilizing the task scheduling algorithm. Further, they considered energy and time as constrained to make span optimization. The evaluation is carried out by considering the scientific workflows cyber snake with its different variant, and the comparative analysis is carried out by varying the number of virtual machines.

Next comes the paper from Law Kumar Singh, et. al, titled 'Robustness for Authentication of the Human Using Face, Ear, and Gait Multimodal Biometric System'. In this work, the novel and imperative biometric feature gait is fused with face and ear biometric features for authentication and to overcome problems of the unimodal biometric recognition system. They also applied various normalization methods to sort out the best solution for such a challenge. The feature fusion of the proposed multimodal biometric system has been tested using Min-Max and Z-score techniques. The computed results demonstrate that Z-Score outperforms the Min-Max technique. It is deduced that the Z-score is a promising method which generates a high recognition rate of 95% and a false acceptance rate of 10%.

The next paper is 'Estimation of Target Defect Prediction Coverage in Heterogeneous Cross Software Projects' by Rohit Vashisht, et. al. The article discusses a particular source project group's problem of Defect Prediction Coverage (DPC) and also proposes a novel two phase model for addressing this isuue in HCPDP. The study has evaluated DPC on 13 benchmarked datasets in three open source software projects. 100% DPC is achieved with higher defect prediction accuracy for two project group pairs. The issue of Partial DPC is found in third prediction pair and a new strategy is proposed in the research study to overcome this issue. Furthermore, this paper compares HCPDP modeling with reference to With-in Project Defect Prediction (WPDP), both empirically and theoretically and it is found that the performance of WPDP is highly comparable to HCPDP & Gradient Boosting Method performs best among all three classifiers.

Next comes the paper from Deepti Aggarwal, et. al, titled 'Identifying Non-Performing Students in Higher Educational Institutions Using Data Mining Techniques'. It highlights the educational institutes that are focusing on improving the performance of students by using several data mining techniques. Since there is an increase in the number of drop out students every year, if we are able to predict whether a student will complete the course or not, it is possible to take some preventive actions beforehand. The primary data set used for modelling has been taken from a reputed technical institute of Uttar Pradesh which consists of data of 6807 students containing twenty academic and non-academic attributes. The most relevant attributes are extracted using CorrelationAttributeEval (in WEKA) technique using Ranker search method which ranks the attributes as per their evaluation. Synthetic Minority Oversampling Technique (SMOTE) filter is applied to deal with the skewed data set. The models are built from eight classifiers, which are analysed for predicting the most appropriate model to classify whether a student will complete the course or withdraw his/her admission.

The next paper is 'Proposal of Iterative Genetic Algorithm for Test Suite Generation' by Ankita Bansal, et. al. The authors have proposed a test-case generation technique based on iterative listener Genetic Algorithm that generates test cases automatically. The proposed technique uses its adaptive nature and solves the issues like redundant test cases, inefficient test coverage percentage, high execution time and increased computation complexity by maintaining the diversity of the population which will decrease the redundancy in test cases. The performance of the technique is compared with four existing test-case generation algorithms in terms of computational complexity, execution time, coverage and it is observed that the proposed technique outperformed.

The last title in the special issue is 'Comparative Analysis of Intelligent Driving and Safety Assistance Systems Using YOLO and SSD model of Deep learning' by Nidhi Sindhwani, et. al. This paper suggests a system that will not only help in reducing the chances of these accidents by making the driver aware of the upcoming distress/potholes on the road but also saving the location of these potholes which can be sent to respective authorities so that they can be repaired. We have used technologies like Image processing, Computer Vision, Deep Learning and Internet of Things (IoT) to make this happen. It uses a camera mounted in front near windshield that will capture the

images which will be further be processed to get the location of the potholes and distress on road. These detected potholes can be projected on a Heads-Up Display (HUD) placed near windshield which will notify the driver of the potholes.

As the official journal of the IGI Global Inc., IJISMD is proud to bring you this special issue. We hope that reading these high quality papers will inspire you to make your own submissions to future conferences and journals, and to support the research community.

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