We are very happy to publish this issue of an International Journal of Software Engineering and Its Applications by Science and Engineering Research Support Society.

This issue contains 39 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.

In the paper “Goal-Based Requirement Engineering for Fault Tolerant Security-Critical Systems”, proposes a goal-based modeling approach to develop security requirements of Security-Critical Systems (SCSs) through explicitly factoring the faults into the requirement engineering process. The approach establishes the Security Requirement Model (SRM) of the system based on its respective Security Fault Model (SFM). It incorporate fault tolerance into the SRM through considering the partial satisfaction of security goals. The proposed approach factors this partiality into the goals by using proper mitigation techniques during the refinement process. This approach eventually contributes to a fault tolerant model for security requirements of the target system.

Paper “Genetic Design of Fuzzy Neural Networks Based on Respective Input Spaces Using Interval Type-2 Fuzzy Set” proposed the genetic design of fuzzy neural networks with multi-output based on interval type-2 fuzzy set (IT2FSFNNm) for pattern recognition. IT2FSFNNm is the networks of combination between the fuzzy neural networks (FNNs) and interval type-2 fuzzy set with uncertainty. The premise part of the networks is composed of the fuzzy partition of respective input spaces and the consequence part of the networks is represented by polynomial functions with interval set. It also considers real-coded genetic algorithms to estimate the optimal values of the parameters of IT2FSFNNm. The numerical experimentation is used for evaluating the proposed networks for pattern recognition.

The paper “The Impact of Rate of Change on Object Oriented Paradigm” present a hybrid technique that relies on the paradigm of dependency graph to detect the impact of change over time on object oriented relationships such as: inheritance, class size, coupling and cohesion. The goal is to provide a systematic framework to measure how rate of change affects such features in a concurrent environment. The answer of such question takes place in code analysis and model checking of concurrent programs. The contribution of this research is to study the static and dynamic aspects that contribute in enhancing the quality of coded programs, which implies increasing maintainability.

In the paper “Study on Die Construction and Conceptual Design for High-efficiency Induction Motor Prototype”, established a concepts for high-efficiency induction motor with sharing core 37kw and below and constructed a prototype. The need for developing high-efficiency induction motor die can be analyzed in terms of electromagnetic design and analyzing technique, mechanical design technology, material technology, and production technique. In order to produce prototypes, motor design, property analysis, and comparison of
material cost and efficiency are needed. Methods for such include basic motor design, experiment design, equivalent circuit method, and finite element method. Among these, experiment design can be assessed according to optimal design, main factors, optimal regions, and others. For producing die for constructing prototype, inspection of die development process during die design, understanding of details stage by stage, and optimization of strip layout are essential. When constructing dies, improvement on causes of wear of punch, improvement of equipment and surrounding devices, adjustment of post structure for improvement of die durability, and shear load distribution analysis are necessary. Based on these factors, high-efficiency induction motor prototypes for 5.5kw, 7.5kw, 11kw, 4 polar, and 6 polar sharing cores are constructed.

Paper “A Case Study on the Application of Computational Intelligence to Identifying Relationships between Land use Characteristics and Damages caused by Natural Hazards: A SVR Approach” examines the application of a support vector regression (SVR) approach to identifying relationships between land use characteristics and damages caused by natural hazards. The empirical results show the outperformance of a SVR model over a multiple ordinary least squares (OLS) regression model in terms of the predictive performance. Nonlinear relationships between land use characteristics and damages are revealed by a SVR model.

In the paper “Requirement Reprioritization: A Multilayered Dynamic Approach”, proposed a multilayered dynamic approach for requirement reprioritization that is well suited for both agile and non agile development methodologies employing any prioritization method. The proposal is illustrated with the help of live case study of Library Management Software System developed in the Computer Programming laboratory of National Institute of Technology, Hamirpur.

The paper “First Race Detection in Parallel Program with Random Synchronization using Trace Information” presents an algorithm which extracts first races by replaying the program and checking concurrency between sequenced traced data and candidate accesses, which are from a particular execution of parallel programs. It also presents the correctness of the algorithm by showing that all the first races are included in the traced accesses which are composed of key accesses.

The paper “Nonlinear Characteristics of Fuzzy Scatter Partition-Based Fuzzy Inference System” introduces the fuzzy scatter partition-based fuzzy inference system to construct the model for nonlinear process to analyze nonlinear characteristics. The fuzzy rules of fuzzy inference systems are generated by partitioning the input space in the scatter form using Fuzzy C-Means (FCM) clustering algorithm. The premise parameters of the rules are determined by membership matrix by means of FCM clustering algorithm. The consequence part of the rules is represented in the form of polynomial functions and the parameters of the consequence part are estimated by least square errors. The proposed model is evaluated with the performance using the data widely used in nonlinear process. Finally, this paper shows that the proposed model has the good result for high-dimension nonlinear process.

The Authors of “A Spot Matching Algorithm using the Topology of Neighbor Spots in 2D-PAGE Images” proposed a new spot matching algorithm. The algorithm compares topological patterns on two central spots to be matched that are selected each from reference and target 2D-PAGE images. Similarity transform is applied to one of two patterns in order to
consider and correct global and local distortion before comparison of topological patterns. Matching between neighbor spots from two patterns is performed and similarity is evaluated using the normalized Hausdorff distance (NHD). Finally, matching of spots is determined by the number of neighbor matched pairs, the number of outlier spots and the NHD in turn.

In the paper “A Noble Image Segmentation Using Local Area Splitting and Merging Method based on Intensity Change”, proposes a new image segmentation algorithm that involves local area splitting and merging based on intensity change. Most image segmentation algorithms take advantage of features such as pixel intensity and edge to split or merge an image. Therefore, in addition to susceptibility to noise, the latter algorithms have a problem in that they achieve different results depending on the initially selected seed location. The proposed method adaptively changes pixel intensity during the process of region segmentation to the representative intensity of the adjacent sub-area of high homogeneity. Therefore, this method is not affected by the initial seed location, and it also eliminates pre-process, such as noise removal, because the pixel intensity is progressively stabilized to the average value of object. In addition, this method preserves the edges of segmented objects and reduces the phenomenon of excessive region merger by determining the direction of the next merger upon splitting a local area into small sub-areas.

The paper “A Novel Method of Determining Parameters of CLAHE Based on Image Entropy” proposes a novel method of determining two parameters of the CLAHE using entropy of image. The key idea is based on the characteristics of entropy curves: clip limit vs entropy and block size vs entropy. Clip limit and block size are determined at the point with maximum curvature on entropy curve. Experimental results show that the proposed method improves images with very low contrast.

Paper “Using Weblogs in Foreign Language Classrooms: Possibilities and Challenges” explores the significant issues of using Weblogs in foreign language learning, examining the theoretical justification of using Web 2.0 in foreign language learning, identifying possibilities and challenges of weblogs implemented in foreign language classrooms, and discussing advantages and disadvantages of using weblogs.

In the paper “On a New Hybrid Speech Coder using Variables LPF”, proposed a new hybrid speech coding technique for high quality coding. It focuses on the naturalness and intelligibility of speech synthesis applications and the compression and signal-to-noise ratio of speech transmission applications. In this paper, to overcome this problem, it proposed new non-uniform sampling method using separated narrow and broad bandwidth by variable bandwidth LPF. The proposed technique is applied to two low-pass filters to speech signal to reduce the data rate without losing the 1st and the 2nd formants information.

The paper “Digital Restoration Skill for Realizing Virtual Experience Contents” studied digital restoration skills for original shape of cultural assets and would propose digital restoration skill for realizing virtual experience contents; including residential environment and natural environment of Hanyang in Chosun Dynasty, by means of digital restoration skills using virtual reality, such as interaction, navigation, file size and restoration of non-existing ruins.

The Authors of “Forecasting Red Tide using Ensemble Method” proposed a red tide forecast method using ensemble method to enhance the prediction results. The preprocessing is
proposed to model variable data to improve the classifier performance. The ensemble model is proposed to enhance the categorical prediction result.

Paper “Combining Particle Swarm Optimization based Feature Selection and Bagging Technique for Software Defect Prediction” the accuracy of the software defect prediction. Particle swarm optimization is applied to deal with the feature selection, and bagging technique is employed to deal with the class imbalance problem. The proposed method is evaluated using the data sets from NASA metric data repository. Results have indicated that the proposed method makes an impressive improvement in prediction performance for most classifiers.

In the paper “Automating Software Development Process: Analysis-PIMs to Design-PIM Model Transformation”, presents an approach to semi-automate the generation through a model transformation of one among of the most important increment of the design phase, the sequence diagram of system’s internal behavior using the sequence diagram of system’s external behavior. For this and to trace correctly the interactions in the SDSIB it propose a semantic based on the LARMAN operation contract that integrates new details to better describe system’s states and propose an improved and formal syntax to determine operations and their concerned source and responsible objects.

The paper “A Distinctive Suite of Performance Metrics for Software Design” improved the quality of software projects by producing and using quantitative measures. All these theories improve the quality of a software project and mend all the issues relating to software refactoring. As the software industry moves to a more mature state, the need for employing more effective tools, techniques and benchmarks for managing software projects has become significantly critical to minimize the negative risk factors as well as ensuring augmented adherence to quality assurance. In this study, it intends to explore how distinctive metrics with respect to different knowledge areas, especially in design engineering, could be useful to manage knowledgeably the software projects. The focus of this research study is to evaluate and highlight the importance of various performance metrics and measures to track the software project performance followed by some already proposed metrics for software design, development and management.

The paper “A Formal Model of Conformity Testing of Inheritance for Object Oriented Constraint Programming” presents an approach for extending the constraint model defined for conformity testing of a given method of class to its overriding method in subclass using inheritance principle. The main objective of the proposed work is to find the relationship between the test model of an overriding method and its overridden method using the constraint propagation. The approach shows that the test cases developed for testing an original method can be used for testing its overriding method in a subclass and then the number of test cases can be reduced considerably.

The Authors of “Minimum Error Classification Clustering” study on the problem of clustering categorical data, where data objects are made up of non-numerical attributes. It proposes MECC (Minimum Error Classification Clustering), an alternative technique for categorical data clustering using VPRS taking into account minimum error classification. The technique is implemented in MATLAB. Experimental results on two benchmark UCI datasets show that MECC technique is better than the baseline categorical data clustering techniques with respect to selecting the clustering attribute.
The paper “Segmented Leap-Ahead LFSR Architecture for Uniform Random Number Generator” presents new architecture of URNG (uniform random number generator) employing Leap-Ahead LFSR architecture for hardware implementation. In particular, the proposed URNG consists of two more segmented Leap-Ahead LFSRs to overcome the drawback of the conventional URNG employing Leap-Ahead architecture, that is, the sharp decrease of a maximum period of the generated random numbers. Thus, the proposed URNG with segmented LFSR architecture can generate multiple bits random number in a cycle without the frequent diminishing of maximum period of the generated random numbers. It proves the efficiency of the proposed segmented LFSR-architecture through the mathematical analysis. The simulation results show that the proposed URNG employing segmented Leap-Ahead LFSR architecture can be increased 2.5 times of the maximum period of generated random numbers compared to the URNG using the conventional Leap-Ahead architecture.

In the paper “User Testing for Moodle Application”, focuses on the Moodle application as an e-learning platform in a local college. A user testing method was used to identify problems and possible solutions that could best improve the current Moodle application. The data gathering technique employed was focus group interviews. The findings from the analysed results show that the usability issue encountered by both users that holds the highest average mean was the layout design. The results also prove that the current Moodle application needs to be amended for its interface. The recommendations for interface design were furthered discussed and described, together with the adaptive user interface techniques that can best implement the interface.

The paper “Prediction of Research Topics on Science & Technology (S&T) using Ensemble Forecasting” reports the implementation of the new forecast combination method which selects the best methods used by similar validation dataset on Indonesian journal database, namely the Garuda dataset, especially on the subject of Science and Technology. The experimental result indicates that the proposed method may perform better compared to the fix combination of predictors. In addition, based on the prediction result, the emerging research topics for the next few years can be objectively identified.

Paper “Building and Querying a Decision Tree Model with Constraint Logic Programming” presents a discussion that in order to realize location in cellular networks, the location model with uniform noise based on AOA is established when seven base stations are available. Then a maximum likelihood estimation (MLE) method is proposed and realized by an iterative algorithm under this model. Finally, the simulation result of the iterative algorithm as compared to least squares estimation(LSE) algorithm under this AOA model is shown that the iterative algorithm is less error and more robust to noise disturbance than LSE algorithm.

The paper “Tabu Search-Based Method for Bézier Curve Parameterization” introduces a new method to obtain an optimal solution for the parameterization problem of the least-squares fitting Bézier curve. The method is based on a local search metaheuristic approach for optimization problems called tabu search. The method is applied to some simple yet illustrative examples for the cases of 2D and 3D curves. The proposed method is simple to understand, easy to implement and can be applied to any kind of smooth data points. The experimental results show that the presented method performs very well, being able to fit the data points with a high degree of accuracy.
The paper “Variation of SIFT Descriptor for Affine Invariant Object Matching” proposed a novel affine invariant descriptor for object matching. The advantage of Maximally Stable Extremal Regions (MSER) method is applied to get the most stable regions in the image. Inside each region, it picks the seeds as keypoints since MSER regions are invariant to affine transformation. Besides that, Voronoi diagram is employed to split the image into small Voronoi cells or local regions based on the key points picked in the previous step. Finally, local features inside each local region including color, texture and geometric properties are extracted to generate the descriptor.

Paper “A Knowledge Identification Framework for Component based Dependency Analysis Process” presents a systematic approach to knowledge identification in dependency analysis process in context of CBSE, which results a well-defined approach for representing dependency analysis information in form of knowledge artifacts. The identified knowledge artifacts and knowledge relationships may help in design optimization, fault management, configuration management and testing processes.

In the paper “Window Size Zooming for Lower Resolution Contents”, introduced an image zooming technique. The proposed method includes four steps: ‘obtain original image,’ ‘image downscaling by image zooming,’ ‘artifact removal process by circle shaped low pass filtering,’ and ‘detail preserving process by unsharp masking.’ The experimental results confirmed that the presented approach successfully reduced blocking artifact of image upscaling and preserved edge details by unsharp masking.

The paper “A Model Building of the Multi-Functional Digital Archives System for Traditional Knowledge” proposes a solution for storing and conjugating the traditional knowledge archives system which draws international attention. The world’s traditional knowledge is disappearing so fast that its documentation and archives should be considered urgently and significantly. It has created the traditional knowledge archives system based on the Web 2.0 platform to enhance the preservation of traditional knowledge. The major contributions of the system in the areas of both digital archives and traditional knowledge are twofold: an integrated archive structure using high technical mechanism and a multi-functional application for the public.

The paper “A System for detecting the Stray of Objects within User-defined Region using Location-Based Services” propose a system for sensing the stray of any objects within user-specified region as passive service mechanism. The proposed system has been initially authenticated the target objects and then matched between smartphone and a target object using LBS in smartphones. After a period of time, if the object has been break away from the specified boundary region, it is that the smartphone detects the straying status of the object. This system presents a virtual barrier such as a geofence. Therefore, the proposed mechanism will can be used of many applications such as anti-theft/anti-lost of any objects, preventing of stray children. Especially, it will be more opportunities combining with active service mechanism.

The Authors of “Applying Bloom Filter in Resource Management” applies bloom filter for data grid information system. In proposed structure resource registration and inquiring are done based on bloom filter mechanism. This approach increases performance of the grid system. Additionally it increases the performance of performing applications and satisfies client requirement.
In the paper “Emotional Preferred Type of Smart Phone Based on the Quality Factor”, analyzed the previous studies that the user perceived quality of design factors. As a result, the most representative factors and functional classification is divided into non-functional factors showed that. In the level of human behavior, the needs can be distinguished between functional aspects factor and motivator factor. When it access to the level of user's expectation, fundamental factor, performance level, and interest level were represented as the main three levels. Also, this study analyzed the sensitivity quality factors that are important in choosing smart-phone using PQ method of Q methodology. It was possible to find representative types such as sensibility focusing type, use-convenience focusing type and stability focusing type by the analysis. The discriminative sensibility focusing type thinks personality expression and social pride as important and this type prefers differentiation from others. The sensibility quality causes of sensibility focusing type are uniqueness, fun, curiosity, surprise, fashion, attracting others’ view, ostentation and emotional attachment. The use-convenience focusing type prefers convenience cumulated by personal experience. This type thinks the sensibility quality causes such as comfort, freedom, expandability and control of device as important. The stability focusing type prefers familiarity by use experience, attachment by intimacy and harmony with personal image as important. This type thinks the sensibility quality causes such as experience, habits, intimacy, conciseness and fun as important.

The paper “Estimation of Energy Consumption for Mobile Software using UML State Machine Diagram” proposed an energy consumption analysis technique using software design model, UML state machine diagram. The design model is transferred to Coloured Petri-Net to estimate the energy consumption. The technique gives a chance to reduce the energy consumption in the process of software development.

In the paper “Autonomous Vehicle Simulation Project”, presents a step to simulate an autonomous vehicle control algorithm in the virtual space with the real world scale. So far, it did not perform comparisons of the simulator and the real world since the plotting method is not developed. Additionally, an accurate physics module for propulsion, braking, and steering systems is needed to be developed by professionals in advance.

In the paper “Debugging in the Extreme: Spectrum-based Fault Localization with Limited Test Cases”, evaluate the performance of SBFL metrics in these extreme scenarios to identify the best performing SBFL metric for each of these scenarios. From the experiment results, it has further discovered the convergence in performance for SBFL metrics under these extreme scenarios.

The paper “A Study of Different Coding Styles Affecting Code Readability” tested the effects of coding convention violations on the readability of programmed code. It identified several influential violations and their individual effects by analyzing five open source projects. The analytical process will help programmers or QA managers to specify regulations and to generate more readable code.

The Authors of “Integration Model Design Strategy for Cadastral Information System: Case Study of a Cadastral Management System in Korea” suggests an integration model design strategy of cadastral information systems and analyzed the current operating status and condition of cadastral-related information systems which are diversely established and operated in Korea.
Paper “Bugs Pattern Detection Application in JDBC using Static Analysis Non-Linear Method” explained about an application which able to analyze the quality of java program code in implementing Java Database Connectivity (JDBC). The analysis will be based on existing best practice in implement JDBC. To analyze JDBC, bugs patterns are needed to be compared with existing best practice. Various methods are available to be used in constructing this kind of application, but in this paper, static analysis non-linear method is used in designing this application. Static analysis means the java program code will be read and analyzed without executing. Non-linear means the java program code will not read sequentially, but it will follow the flow of the program code itself. And this application will be called Bedhigasan, which able to detect bugs pattern in implementing JDBC and it will report those bugs to the web page including with location of the bugs.

In the paper “Study of Function Design to Improve the Convenience of #-Mail Solution Aspect of User Experience”, suggests a method to improve convenience of #-Mail solution, the service of which is about to start according to Framework Act on Electronic Commerce, in the aspect of user experience.

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Haeng-kon Kim, Catholic University of Daegu, Daegu, Korea
Jinan Fiaidhi, Lakehead University, Canada

Editors of the September Issue on
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