

# Editorial

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This third issue (September 2020) of *CIT. Journal of Computing and Information Technology* comprises four papers from the regular section, tackling topics from the areas of software testing and debugging, machine learning, natural language processing and business management processing.

The first paper of this September issue tackles the area of software reliability testing. Specifically, in their paper *A Review of Software Reliability Testing Techniques* Zhouxian Jiang, Honghui Li, Dalin Zhang, Rui Wang, Junwen Zhang, Xiuru Li, Meng Zhang and Penghao Wang provide a survey on both traditional and intelligent software reliability testing (SRT). The authors contrast the features of traditional software systems (typically found in safety-critical areas like railway or aerospace control software), to the intelligent ones, based on big data and artificial intelligence (such as image/speech recognition, autopilot or machine translation software). Building on the inherent differences between these kinds of software, respective reliability testing methodologies have been developed since, which have typically been considered separately. The authors thus analyze both traditional and intelligent SRTs in terms of testing standards, testing methods, testing adequacy, challenges, and prospects, so as to propose a general framework for SRT. Finally, they also discuss future development trends and provide reference for research in the area of SRT.

The next paper of the issue studies the impact of Korean language in the part of the Arab world encompassed by the Gulf Cooperation Council (GCC), which arises from the ever growing economic, cultural and educational presence of Korea in this area. Consequently, Luai A. Al-Shalabi performed a research directed to determine the minimal set of important factors that influence the desire to learn Korean language in GCC countries, and especially in Kuwait, reporting the results in his paper *A WGFS Based Approach to Extract Factors Influencing the Marketing of Korean Language in GCC*. The author uses the Weight Guided Feature Selection (WGFS) model to generate the reduct from the Korean dataset, subsequently applying a number of known classifiers (linear regression, logistic regression, fast large margin, deep learning, gradient boosted trees, support vector machines) in order to select the most appropriate one to achieve the goal. The result of this comparison shows that, out of the six analyzed and compared, logistic regression is the best classifier regarding accuracy, recall and precision. Empirical results obtained using this method show that the generated reduct provides attributes significant for testing the ability/disability of learning the Korean language.

The paper *A Survey of Citation Recommendation Tasks and Methods* by Zoran Medić and Jan Šnajder provides a survey of the state-of-the-art research of the problem of citation recommendation, *i.e.* the task of automatically identifying, from a collection of scientific papers, a paper that may or should have been cited in another paper or that may be cited in a yet unpublished manuscript. The problem of citation recommendation has arisen lately, as the result of the enormous scientific production, which makes it difficult even for experts to keep up with the work in their field of research. To alleviate these difficulties, specialized search engines are nowadays being deployed, incorporating novel natural language processing and machine learning methods. The authors thus present an overview of the respective area as well as a survey of the related research and practices. Besides describing the two approaches – global and local – to the citation recommendation task, they underscore the desirability of another feature a citation recommender system should exhibit, *i.e.* to provide reason for citing a paper, hence expanding the survey by including both extraction of key aspects from scientific papers and citation function classification. The paper also presents a review of metrics for evaluating citation recommendation systems and discusses possible avenues for future research.

Influenced by the steadily improving economy in China and the accompanying public concern for the financial situation of enterprises in mainstream industries, Yanhua Li addresses a problem otherwise rarely discussed in the literature, which is efficient fighting financial statement frauds by accurately identifying and evaluating the respective audit risks. In his paper *Audit Risk Evaluation Model for Financial Statement Based on Artificial Intelligence*, he proposes an audit risk evaluation model which is based on artificial neural networks (ANNs). The model builds on the decomposition into four-valued indices of two financial statement fraud substitutive factors, *i.e.* fraud motivation and fraud opportunity in the financial statement, which eventually form a verification model to test the predictions of audit violation penalty (AVP), audit violation announcement (AVA), and financial statement restatement (FSR). A feedforward neural network based on the homomorphic encryption algorithm is then used to evaluate and predict audit risks of the financial statement. Experimental results show that the proposed artificial intelligence model outperforms the state-of-the-art methods in prediction accuracy and time complexity, such as SVM (Support Vector Machine) + ANN model, SVM model, and GM (Gaussian Mixture) model.

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Editor-in-Chief