



Guest Editorial: Advanced ICT and IoT Technologies for the Fourth Industrial Revolution

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1 INTRODUCTION

THIS special issue is intended to 4th industrial revolution in the area of advanced Information and Communication Technologies (ICT) and Internet of Things (IoT) technologies. Based on the rapid advancement in computers, internet, and ICT infrastructures, the 4th industrial revolution has recently begun. In this industrial era, diverse technological innovations that are focused on connectivity and convergence integrate the physical, biological, and digital boundaries and affects all areas of economy and industry. Accordingly, these technologies connect people and thing with things through the internet, analyze a vast amount of data produced by such connectivity to obtain a certain pattern, and predict human behaviors based on the results of the analysis to create new values.

The goals of this special issue is to emerge ICT and IoT technologies breakthroughs that are essential for moving towards the 4th industrial revolution. These ICT and IoT innovations enable connectivity of smart things and seamless convergence of diverse technologies to provide productivity and efficiency improvements, a better quality of life, and even solutions for environmental issues.

2 RELATED WORKS

THE first paper entitled “Finding Temporal Influential Users in Social Media Using Association Rule Learning” by Seungmin Rho et al. The social media has become an integral part of our daily life. The social web users interact and thus influence each other influence in many aspects. Blogging is one of the most important features of the social web. The bloggers share their views, opinions, and ideas in the form of blog posts. The influential bloggers are the leading bloggers who influence the other bloggers in their online communities. The relevant literature presents several studies related to the identification of top influential bloggers in the last decade. The research domain of finding the top influential bloggers mainly focuses on feature centric models. This research study proposes to apply association rule learning for finding the temporal influential bloggers. The widely used Apriori algorithm

is applied using Oracle data miner to find the frequent pattern of bloggers having blog activities together and then we find who influences others based on the rules learned from the association rule mining. The use of standard evaluation measures such as accuracy, precision and F1 score verifies the results. This research study uses the standard dataset of TechCrunch that is a real-world blog. During the empirical analysis, we gathered standard dataset and evaluated the performance of the system through standard measures. The proposed methodology computed the influential users from different perspective and time periods. We computed influential users of overall time periods, 2005-2006, 2007-2008 and 2009-2010. In order to show the evidence of change of influence of the users from a different time perspective, we divide the whole dataset into three parts. During experiments, we explore the influential users through three diverse approaches: by applying confidence, support and lift. The results show that the proposed approach is efficient and effective as it is capable to get good confidence level with a high number of rules showing that there are many influential users in the blogosphere. The proposed method achieved an accuracy as high as 98% for a confidence level of 90%. The identification of the top influential bloggers has enormous applications in advertising, online marketing, e-commerce, promoting a political agenda, influencing elections and affect the government policies.

The potential future work includes applying the concept of association rule learning and apriori algorithm on the dataset of Facebook and Twitter to find out the influential Facebook and Twitter users. As Facebook and Twitter are active social sites, finding influential bloggers on those social sites can have deep social, financial and political impacts.

Paper entitled “Implementation of Local Area VR Environment using Mobile HMD and Multiple Kinects” by Lee et al. Commercial VR HMDs lead to an additional cost increase in configuring the VR system. Also, additional space is required when the treadmill is installed. In this paper, we propose a local area VR environment that solves cost and space problems using human tracking using several Kinects

and solves the hygiene problems using smartphone-based mobile HMD.

The paper entitled “A Novel Knowledge-based Battery Drain Reducer for Smart Meters” by Scott Uk-Jin Lee et al. presented an approach to implement a semantic web-based data management strategy using faster R2RML mapping generation and using it for accessing the relational database via SPARQL query protocol. The approach is applied to battery energy data explicitly for the smart meters’ energy data storage and its management. The authors have presented a pertinent implementation for green energy solution for smart meter and is foreseen as a beneficial contribution on the industrial level.

The fourth paper entitled “A Method for Planning the Routes of Harvesting Equipment Using Unmanned Aerial Vehicles” by Dmitry Chyrchenko et al. considers the problem of identifying optimal routes of UHE movement as a multicriteria evaluation problem, which can be solved by a nonlinear scheme of compromises. Author’s method uses machine learning algorithms and statistical processing of the spectral characteristics obtained from UAV digital images. The developed method minimizes the resources needed for a harvesting campaign and reduces the costs of fuel consumption.

The fifth paper entitled “Word Embedding based text mining for extracting relationship in science data” authored by Mucbeol Kim aims to develop proposed a method to analyze scientific terminologies with word embedding approach. In particular, they collect scientific data in the BT (Bio Technology) field and analyze the relationship between the scientific terminologies for enhancing knowledge representation. In this process, the word embedding approach is applied to query expansion. As a result, it was confirmed that query expansion can be performed in accordance with the user’s intention.

The next paper entitled “Noise Cancellation based on Voice Activity Detection Using Spectral Variation for Speech Recognition in Smart Home Devices” by Kim et al. deals with an issue of voice interface to be applied for IoT devices in a smart home. The paper proposes an efficient noise cancellation approach based on voice activity detection to improve the performance of speech recognition systems that are vulnerable to background noises in home environments. Authors validate its efficiency in comparison with the conventional noise reduction method using several measurement ways.

The seventh paper entitled “Variable Block Scheme for Minimizing File I/O” by Ko et al. proposes propose a variable length block scheme that can minimize file I/O by creating a bumper area in a block. With this

approach, we can mimics byte stream operation on block-based disk storage system, which prevents excessive file I/O overhead in a storage system.

The eighth paper entitled “An E-Assessment Methodology Based on Artificial Intelligence Techniques to Determine Students’ Language Quality and Programming Assignments’ Plagiarism” by Kaleem Razzaq Malik et al.. This paper aims to an electronic assessment (e-assessment) of students’ replies in response to the standard answer of teacher’s question to automate the assessment by WordNet semantic similarity. For this purpose, a new methodology for Semantic Similarity through WordNet Semantic Similarity Techniques (SS-WSST) has been proposed to calculate semantic similarity among teacher’ query and student’s reply. In the pilot study-1 42 words’ pairs extracted from 8 students’ replies, which marked by semantic similarity measures and compared with manually assigned teacher’s marks.

The ninth paper entitled “Emotion-based painting image display system” by Sanghyun Seo et al. propose a system that automatically recommends a painting to users based on their feeling. Using a smartphone application, users take a self-portrait. Then, the application reads the user’s facial expression, and obtains an Arousal-Valence (A.V) emotion value.

The paper entitled “Weighted or non-weighted negative tree pattern discovery from sensor-rich environments” by Juryon Paik et al. proposes that JSON is a lightweight data-interchange format and preferred for IoT applications. Its structure scheme is the tree. Tree structure provides an easy to use human readable format for storing and transmitting sensor values. However, it is more challenging than ever to discover valuable and hidden information from the continuously generated tree-structured data. In the paper, we define and suggest an original method to predict and evaluate the values from them.

The last paper “Detecting Outlier Behavior of Game Player Using Multimodal Physiology Data” by Taiwoo Park et al. describes an outlier detection system based on a multimodal physiology data-clustering algorithm in a PC gaming environment. The goal of this system is to provide information on a game player’s abnormal behavior with a bio-signal analysis. Using this information, the game platform can easily identify players with abnormal behavior in specific events. This paper confirms that a mouse coupled with a physiology multimodal system is useful for game players’ analysis.

3 CONCLUSIONS

WE would like also to take this opportunity to thank Prof. Mo Jamshidi, Editor-in-Chief of AutoSoft Journal for giving us the privilege to edit this special issue.

NOTES ON CONTRIBUTORS



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He is now a professor at Department of Computer Engineering at Jeju National University, Korea. Dr. Kim has published many research papers in international journals and conferences. Dr. Kim has been served as Chairs, program committee or organizing committee chair for many international conferences and workshops; Chair of ICCCT'11, ITCS'10, HumanCom'10, EMC'10, ICA3PP'10,, FutureTech'10, ACSA'09, Em-Com'09, CSA'09, CGMS'09, ISA'09, SIP'08,FGCN'08 and so on. Also Dr. Kim is guest editor of the International Journal of "IET Image Processing" and "Multimedia Tools and Applications".



Mario Köppen, studied physics at the Humboldt-University of Berlin. He received the doctoral degree at the Technical University Berlin with his thesis works: "Development of an intelligent image processing system by using soft computing" with honors, after

working several years for the Fraunhofer Institute for Production Systems and Design Technology on applied research. He has published more than 150 peer-reviewed papers in conference proceedings, journals and books and was active in the foundation and operation of various conferences as chair or member of the program committee, incl. the WSC on-line conference series on Soft Computing in Industrial Applications, and the HIS conference series on Hybrid Intelligent Systems. He is also founding member of the World Federation on Soft Computing, and since 2016 Editor-in-Chief of its flagship Elsevier Applied Soft Computing journal (2018 IF 4.873). In 2006, he became JSPS fellow at the Kyushu Institute of Technology in Japan, and in 2008 Professor at the Network Design and Research Center (NDRC) and 2013 Professor at the Graduate School of Creative Informatics of the Kyushu Institute of Technology, where he is currently conducting research in the fields of soft computing, esp. for multi-objective and relational optimization, digital convergence and human-centered computing.



Ali Kashif Bashir received his Ph.D. in computer science and engineering from Korea University, South Korea. Currently, he is a Senior Lecturer at the Department of Computing and Mathematics, Manchester Metropolitan

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He has authored over 90 peer-reviewed articles. He has served as a chair (program, publicity, and track) on top conferences and workshops. He has organized several guest editorials in journals of IEEE, Springer, Elsevier, etc. He has delivered over 20 invited and keynote talks in seven countries. His research interests include Iot, distributed systems, network/cybersecurity, network function virtualization, etc.

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Yuho Jin received the BS and MS degrees in computer science from the Department of Computer Science, KAIST. He received the PhD degree in computer engineering from the Department of Computer Science and Engineering, Texas A&M University. He is a

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