EDITORIAL

JOURNAL OF INFORMATION PROCESSING SYSTEMS JIPS

Advanced Communications and Artificial Intelligence, and Introduction of the JIPS AWARD 2016

Jong Hyuk Park*

Editor-in-Chief, *JIPS*

1. Introduction

The *Journal of Information Processing Systems* (*JIPS*) is the official international journal published by the Korean Information Processing Society. As a leading and multidisciplinary journal, *JIPS* is indexed in ESCI, SCOPUS, EI COMPENDEX, DOI, DBLP, EBSCO, Google Scholar and CrossRef. Its purpose is to enable researchers and professionals to promote, share, and discuss all major research issues and developments in the field of information processing technologies and other related fields. *JIPS* publishes diverse papers, including theoretical research contributions presenting new techniques, concepts, or analyses; experience reports; experiments involving the implementation and application of new theories; and tutorials on state-of-the-art technologies related to information processing systems. The subjects covered by this journal include, but are not limited to, topics related to computer systems and theories, multimedia systems and graphics, communication systems and security, and software systems and applications.

Due to the rapid growth of *JIPS*' reputation in the field, the amount of submissions has increased and *JIPS* changed its publication period from quarterly to bimonthly. However, it should be noted that the rate of accepted papers has been decreasing.

In this issue, 14 peer-reviewed papers are published including an invited paper by Professor Sethuraman Panchanathan and his colleagues. It contains diverse papers in the area of advanced technologies and applications for systems, communication, image processing, geo-spatial data processing WSNs, platforms and security.

First, we present research by Tadayon et al. [1] on multimodal systems and other techniques related to motor learning in terms of design, implementation, and the integration of multimodal feedback with a primary focus on rehabilitation. The authors point out that for various aspects, such as motor tasks, context, spatial, and temporal variations need to be incorporated in the design.

Deschambault et al. [2] introduce their project that focuses on the design, implementation, testing,

Corresponding Author: Jong Hyuk Park (jhpark1@seoultech.ac.kr)
* Dept. of Computer Science and Engineering, Seoul National University of Science & Technology (SeoulTech), Seoul, Korea (jhpark1@seoultech.ac.kr), http://www.parkjonghyuk.net

and deployment of the MQTTc software stack so that it can be efficiently used in an embedded system. In regards to addressing the MQTT protocol's flaws [3], the authors suggest that the MQTT module be redesigned as a lightweight model with minimal RAM, flash code memory, and processing power.

Elhannachi et al. [4] study the current existing types of medical image compression algorithms using multi ROIs [5,6] that do not offer significant reduction in the volume of images. Motivated by this inefficiency, the authors proposes naïve method based on the EZW algorithm [7] to improve its performance for lossless compression. They also show that their proposed algorithm, LEZW, outperforms various state-of-the-art still image compression methods.

Goyal et al. [8] address the uncertain behaviors of people based on their knowledge, background and interests disrupts personalization of the e-learning system and applies Atanassov's intuitionistic fuzzy theory [9] to get rid of the inaccurate information from the user who takes the test and deals with the uncertainty of the user's knowledge in e-learning decision-making.

The fifth paper by Van et al. [10], presents an encryption algorithm for a geographic information system (GIS). They address a huge volume of vector map data has been accessed unlawfully by hackers, pirates, or unauthorized users and proposes the methods for vector map security that the significant objects is encrypted by key sets generated by Chaotic map with assuring the performance and the high security.

Cui and Peng [11] propose a naïve calibration algorithm for near-field source localization, which requires error-calibrating process, due to that fact that it is very sensitive to sensor gain/phase response errors. As such, the blind calibration algorithm proposed by the authors, treats near-field narrowband and independent radiating sources as uniform linear arrays. It also estimates the direction of arrival and range parameters of incident signals and sensor gain/phase responses jointly, without the need for any reference source.

Choi and Park [12] propose an evaluation platform for an interconnect network between two computing nodes using PCI Express, which is a de facto standard in the system area interconnection network. In their research, they present the design for a memory address translation mechanism of an interconnect system and implement remote DMA functions and interrupt messaging mechanism using doorbell interrupt.

Anand and Sairam [13] present an approach for transmitting data via a minimal path in a computer network. Their research proves that the problem of finding a minimal path between the source and destination is identical to that of constructing a minimal Steiner tree and suggests implementation methods in sequential and in parallel with the improvement of randomly assigning weights and with a control over the number of extra nodes in weight-Steiner tree [14].

Wang et al. [15] propose a naïve color image coding algorithm that can be widely applied in image and video compression standards. It tackles the problem of region-based image coding based on shape-adaptive DCT (SA-DCT) [16], which shows the serious blocking effects at low bit rates. They also propose a color image coding algorithm based on a shape-adaptive all phase biorthogonal transform (SA-APBT).

Moustafa and Hafid [17] introduce a method for WSNs to be able to reduce routing protocol failures and packet loss and to increase the lifetime of a network. This research is motivated by the feature that if each node has the information that one of those neighbors is a border node, it can make a better choice for the next hop. And according to this feature, this research proposes a reliable method that the deployed sensor nodes detect the network borders themselves with a support for routing protocols.

Li et al. [18] propose a wireless channel identification algorithm based on feature extraction and a

backpropagation (BP) neural network (NN). First, the authors point to the phenomena that a multipath channel reduces the quality of a received signal and causes serious multipath interference. To overcome this problem, it models a wireless channel with a discrete linear system and selects five indicators for identifying a wireless channel using a BPNN.

Abdelkader et al. [19] point out the weaknesses in the GSM authentication protocol that cause security issue, such as man-in-the-middle attacks, vast bandwidth consumption between VLR and HLR, storage space overhead in VLR, and computation costs in VLR and HLR. Furthermore, they propose a secure authentication mechanism based a new mobility management method to improve location management in the GSM network.

Mishra et al. [20] introduce a novel feature for recognizing handwritten Odia numerals. According to the distinct characteristics of the Odia character set, their proposed scheme, named CFNC, represents the character a one-dimensional contour descriptor with primitive contour features, distance, angle and arc-chord ratio, are extracted from segments and applies these feature sets to classify the numerals using the BPNN subsequently.

Finally, Sharma et al. [21] propose a distributed architecture based on the Block-VN model in order for the vehicle network to be able to meet current challenges as well as future and required services. Based on the challenges incorporate issues in regards to portability of the nodes and robustness of vehicular network and privacy and security features of vehicular network, this research proposes a Block-VN model, an architecture based on blockchain in the smart city for the vehicle network, which allows the development of the distributed network of large-scale vehicles in a more efficient and effective way.

We would not be able to continue to expand the growth of *JIPS* without the efforts made by these exceptional researchers. As such, I would like to express my sincere appreciation and gratitude to them for their continued hard work and dedication to *JIPS*. It is my great pleasure to introduce their research outcomes in this current issue.

2. JIPS AWARD 2016

The JIPS AWARD honors the researchers, reviewers and editorial boards who have committed greatest achievements and contributions for *JIPS*. Each year, the editorial board nominates deserving researchers and members for a variety of categories of citation, publication, and activity. A citation is awarded to the researcher whose paper earns the highest number of citations for the past two years. The publication as an author award is given to the researcher who published the most number of papers for the year and Publication as first author is awarded to the person who published the most number of papers for the last two years as a first author. Activity as an Associate Editor is awarded to the one who is fully committed the role of associate editor. It is awarded to the person who completed paper to be reviewed timely. An honoree is selected according to his or her activities and contributions in each category. They are presented with an award and prize on the evening of the Information Society event in Seoul.

The JIPS AWARD 2016 ceremony was conducted in December 2016 to reward and show gratitude to researchers and members for their contributions. As a result, five researchers have been honored for their outstanding achievements in each category.

In the Citation category, Amine Dahane, Nasr-Eddine Berrached, and Abdelhamid Loukil of the University of Sciences and Technology in Oran, Algeria were selected. Their paper [22] on the virtual laboratory, has been cited 10 times since 2015. Abdelhamid Loukil obtained a Ph.D. from the Paris12 University (France) in 1993. Currently, he is an associate professor in the Electronic Department at USTO, Algeria. He is also a member of LARESI Laboratory (Research in Intelligent Systems Laboratory) where he leads the Mobile Robot and Artificial Vision research team. His research interests focus on robotics, artificial vision, image processing, design of human-machine interfaces (HMIs), virtual reality, and augmented reality.
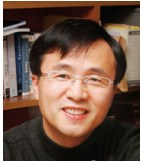
The Publication as an Author Award went to Deokjai Choi of Chonnam National University in Korea. He has submitted four papers on the topics of clustering, activity logging, adaptive sampling, etc. He is a full professor in the Department of Computer Engineering at Chonnam National University in Korea. He received his B.S. from the Department of Computer Science at Seoul National University in 1982. He got his M.S. from the Department of Computer Science at KAIST in Korea in 1984, and in 1995, he got his Ph.D. from the Department of Computer Science and Telecommunications at the University of Missouri-Kansas City in the United States. His research interests span from context awareness, pervasive computing, sensor networks, the future Internet, and IPv6.

The Publication as a First Author Award went to Jayaprakash Kar of King Abdulaziz University in Saudi Arabia. As a first-time author, he submitted four papers for the year on the topics of key establishment protocols, security metrics, key exchange protocols, etc., to *JIPS*. He received his M.Sc. and M.Phil in Mathematics from Sambalpur University, and his M.Tech. and Ph.D. in Computer Science from Utkal University, India. Currently, he is working as an assistant professor in the Department of Information Systems of FCIT at King Abdulaziz University in Saudi Arabia. He is actively associated with the Information Security Research Group at King Abdulaziz University. His research interests are on the development and design of provably secure cryptographic protocols and primitives using elliptic curve and pairing-based cryptography.

For Activity as Associate Editor Award, Joon-Min Gil of the Catholic University of Daegu in Korea was selected due his editing 106 papers in 2016. He received his B.S. and M.S. degrees in Computer Science from Korea University in Seoul, Korea in 1994 and 1996, respectively. He received his Ph.D. in Computer Science and Engineering from Korea University in Korea in 2000. Before joining the School of Information Technology Engineering at the Catholic University of Daegu, he was a senior researcher at the Supercomputing Center of the Korea Institute of Science and Technology Information (KISTI) in Daejeon, Korea from October 2002 to February 2006. From June 2001 to May 2002, he was a visiting research associate in the Department of Computer Science at the University of Illinois in Chicago, Illinois. His recent research interests include cloud computing, big data computing, distributed and parallel computing, and wireless sensor networks.

For Activity as Reviewer Award, Seung-Won Jung of Dongguk University in Korea was chosen thanks to his reviewing 27 papers. He received his B.S. and Ph.D. in Electrical Engineering from Korea University in Seoul, Korea, in 2005 and 2011, respectively. He was a research professor with the Research Institute of Information and Communication Technology at Korea University from 2011 to 2012. He was a research scientist with the Samsung Advanced Institute of Technology in Yongin, Korea, from 2012 to 2014. He is currently an assistant professor in the Department of Multimedia Engineering at Dongguk University in Seoul, Korea. He has published over 40 peer-reviewed articles in international journals. His current research interests include three-dimensional image processing, augmented reality, virtual reality, and computer vision.
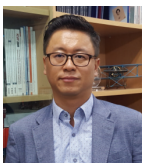
3. Conclusion

This issue presents 14 originally you said 1 invited paper plus 13 others important papers from around the world. We introduce research on subjects that vary from multimodal systems, embedded systems, image compression and classification, to security in the various technical environments. However, more than anything else, we want to express our deepest appreciation to all of the authors who have contributed to this issue by sharing their valuable research results with us. We also want to sincerely thank all the reviewers who kindly accepted our review invitations. Without their hard work, putting together this high-quality journal would not have been possible.

References

[1] R. Tadayon, T. McDaniel, and S. Panchanathan, "A survey of multimodal systems and techniques for motor learning," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 8-25, 2017. https://doi.org/10.3745/JIPS.02.0051.

[2] O. Deschambault, A. Gherbi, and C. Legare, "Efficient implementation of the MQTT protocol for embedded systems," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 26-39, 2017. https://doi.org/10.3745/JIPS.04.0028.

[3] S. Lee, H. Kim, D. K. Hong, and H. Ju, "Correlation analysis of MQTT loss and delay according to QoS level," in *Proceedings of International Conference on Information Networking (ICOIN)*, Bangkok, Thailand, 2013, pp. 714-717.

[4] S. A. Elhannachi, N. Benamrane, and T. A. Abdelmalik, "Adaptive medical image compression based on lossy and lossless embedded zerotree methods," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 40-56, 2017. https://doi.org/10.3745/JIPS.02.0052.

[5] H. Min, C. Zhang, J. Lu, and B. Zhou, "A multi ROIs medical image compression with edge feature preserving," in *Proceedings of the 3rd International Conference on Intelligent System and Knowledge Engineering*, Beijing, China, 2008, pp. 1075-1080.

[6] M. Firoozbakht, J. Dehmeshki, M. Martini, Y. Ebrahimdoost, H. Amin, M. Dehkordi, A. Youannic, and S. D. Qanadli, "Compression of digital medical images based on multiple regions of interest," in *Proceedings of the 4th International Conference on Digital Society*, St. Maarten, Netherlands Antilles, 2010, pp. 260-263.

[7] J. M. Shapiro, "Embedded image coding using zerotrees of wavelet coefficients," *IEEE Transactions on Signal Processing*, vol. 41, no. 12, pp. 3445-3462, 1993.

[8] M. Goyal, D. Yadav, and A. Tripathi, "An intuitionistic fuzzy approach to classify the user based on an assessment of the learner's knowledge level in e-learning decision-making," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 57-67, 2017. https://doi.org/10.3745/JIPS.04.0011.

[9] K. T. Atanassov, "Intuitionistic fuzzy sets," *Fuzzy Sets and Systems*, vol. 20, no. 1, pp. 87-96, 1986.

[10] B. N. Van, S. H. Lee, and K. R. Kwon, "Selective encryption algorithm using hybrid transform for GIS vector map," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 68-82, 2017. https://doi.org/10.3745/JIPS.03.0059.

[11] H. Cui and W. Peng, "Joint estimation of near-field source parameters and array response," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 83-94, 2017. https://doi.org/10.3745/JIPS.03.0060.

[12] M. Choi and J. H. Park, "Feasibility and performance analysis of RDMA transfer through PCI express," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 95-103, 2017. https://doi.org/10.3745/JIPS.01.0013.

[13] V. Anand and N. Sairam, "Parallel and sequential implementation to minimize the time for data transmission using Steiner trees," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 104-113, 2017. https://doi.org/10.3745/JIPS.03.0061.

[14] A. Segev, "The node-weighted Steiner tree problem," *Networks*, vol. 17, no. 1, pp. 1-17, 1987.

[15] X. Wang, C. Wang, X. Zhou, and Z. Yang, "Color image coding based on shape-adaptive all phase biorthogonal transform," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 114-127, 2017. https://doi.org/10.3745/JIPS.02.0053.

[16] T. Sikora and B. Makai, "Shape-adaptive DCT for generic coding of video," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 5, no. 1, pp. 59-62, 1995.

[17] K. E. Moustafa and H. Hafid, "Self-identification of boundary's nodes in wireless sensor networks," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 128-140, 2017. https://doi.org/10.3745/JIPS.03.0062.

[18] D. Li, G. Wu, J. Zhao, W. Niu, and Q. Liu, "Wireless channel identification algorithm based on feature extraction and BP neural network," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 141-151, 2017. https://doi.org/10.3745/JIPS.03.0063.

[19] G. Abdelkader, H. S. Naima, and A. P. Adda, "Secure authentication approach based new mobility management schemes for mobile communication," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 152-173, 2017. https://doi.org/10.3745/JIPS.03.0064.

[20] T. K. Mishra, B. Majhi, and R. Dash, "A contour descriptors-based generalized scheme for handwritten Odia numerals recognition," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 174-183, 2017. https://doi.org/10.3745/JIPS.02.0012.

[21] P. K. Sharma, S. Y. Moon, and J. H. Park, "Block-VN: a distributed blockchain based vehicular network architecture in smart city," *Journal of Information Processing Systems*, vol. 13, no. 1, pp. 184-195, 2017. https://doi.org/10.3745/JIPS.03.0065.

[22] A. Dahane, N. E. Berrached, and A. Loukil, "A virtual laboratory to practice mobile wireless sensor networks: a case study on energy efficient and safe weighted clustering algorithm," *Journal of Information Processing Systems*, vol. 11, no. 2, pp. 205-228, 2015. http://doi.org/10.3745/JIPS.02.0019.

James J. (Jong Hyuk) Park http://orcid.org/0000-0003-1831-0309

He received Ph.D. degrees in Graduate School of Information Security from Korea University, Korea and Graduate School of Human Sciences from Waseda University, Japan. From December 2002 to July 2007, Dr. Park had been a research scientist of R&D Institute, Hanwha S&C Co., Ltd., Korea. From September 2007 to August 2009, he had been a professor at the Department of Computer Science and Engineering, Kyungnam University, Korea. He is now a professor at the Department of Computer

Science and Engineering and Department of Interdisciplinary Bio IT Materials, Seoul National University of Science and Technology (SeoulTech), Korea. Dr. Park has published about 200 research papers in international journals and conferences. He has been serving as chairs, program committee, or organizing committee chair for many international conferences and workshops. He is a founding steering chair of some international conferences—MUE, FutureTech, CSA, UCAWSN, etc. He is editor-in-chief of *Human-centric Computing and Information Sciences (HCIS)* by Springer, *The Journal of Information Processing Systems (JIPS)* by KIPS, and *Journal of Convergence (JoC)* by KIPS CSWRG. He is Associate Editor / Editor of 14 international journals including 8 journals indexed by SCI(E). In addition, he has been serving as a Guest Editor for international journals by some publishers: Springer, Elsevier, Wiley, Oxford University press, Hindawi, Emerald, Inderscience. His research interests include security and digital forensics, human-centric ubiquitous computing, context awareness, multimedia services, etc. He got the best paper awards from ISA-08 and ITCS-11 conferences and the outstanding leadership awards from IEEE HPCC-09, ICA3PP-10, IEE ISPA-11, and PDCAT-11. Furthermore, he got the outstanding research awards from the SeoulTech in 2014. Dr. Park's research interests include human-centric ubiquitous computing, vehicular cloud computing, information security, digital forensics, secure communications, multimedia computing, etc. He is a member of the IEEE, IEEE Computer Society, KIPS, and KMMS.