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## Foreword

### **Special Issue on Recent Technologies and Applications of Artificial Intelligence**

This special issue is devoted to papers presented at the 24th International Conference on Technologies and Applications of Artificial Intelligence (TAAI2019), held in Kaohsiung, Taiwan, Nov. 21-23, 2019. Submissions of this special issue were invited from authors of the papers awarded in TAAI2019 or highly recommended by the program committee. All submitted papers were further extended and reviewed by at least three reviewers and selected based on their originality, significance, relevance, and clarity of presentation. Among all submissions, six papers were accepted for publication in this special issue. Topics of these papers cover the new techniques and innovative applications of AI and are briefed as follows.

The paper "Local Community Detection by Local Structure Expansion and Exploring the Local Communities for Target Nodes in Complex Networks" by HAO-SHANG MA, SHIOU-CHI LI, ZHI-JIA JIAN, YOU-HUA KUO, and YOU-HUA HUANG presents two novel methods, CLOSE (Local Community Detection via Local Structure Expansion) and ELCTN (Exploring Local Communities of Target Nodes), for community detection based on local expansion. Both methods demonstrate accuracy and modularity in exploring benchmark networks as well as real-world networks.

The paper "Residual Network for Deep Reinforcement Learning with Attention Mechanism" by HANHUA ZHU and TOMOYUKI KANEKO proposes the Deep Residual Attention Reinforcement Learning (DRARL) method. DRARL incorporates an attention-based structure into the network structure of Importance Weighted Actor-Learner Architecture (IMPALA). DRARL helps the model learn a better representation by assisting the model focus on the crucial features and outperforms popular RL algorithms, IMPALA, PPO, and A2C, in a subset of Atari games.

The paper "A Study on Agent-Based Box-Manipulation Animation Using Deep Reinforcement Learning" by HSIANG-YU YANG, CHIEN-CHOU WONG, and SAI-KEUNG WONG presents reinforcement learning techniques for the controls of push-manipulation in an agent-based animation. The experiment results show that agents' behaviors are affected by the reward terms and various inputs in certain aspects, such as the agents' movement smoothness,

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wandering about the box, loss of orientation, sensitivity about collision avoidance, and pushing styles.

The paper “Position Control and Production of Various Strategies for Game of Go Using Deep Learning Methods” by YUAN SHI, TIANWEN FAN, WANXIANG LI, CHU-HSUAN HSUEH, and KOKOLO IKEDA presents several methods for position control and for producing various strategies to be used with Go programs based on AlphaGo Zero. Their proposed method hybridizes existing techniques with new ideas and demonstrate usefulness on the end-game position control and reasonableness to human players.

The paper “Escher-like Tiling Design from Video Images Using Convolutional Variational Autoencoder” by ASUKA HISATOMI, TOMOFUMI MATSUYAMA, TAKAHIRO KINOSHITA, KAZUNORI MIZUNO, and SATOSHI ONO proposes a method that deforms a prominent movie or animation character into a tileable shape. With a convolutional variational autoencoder, their proposed method searches for the poses suitable for tiling by optimization in the latent space and successfully generates tileable figures of the tested character in various poses.

The paper “Statistical Multiframe Methodology with Agnostic Thresholding for Attendance Marking System” by KUAN HENG LEE, SANJAY V. ADDICAM, ILYA KRYLOV, SERGEI NOSOV, MEE SIM LAI, ZHAN QIANG LEE, and CHUNG SHIEN CHAI presents a statistical methodology based on multi-frame for improving the attendance marking accuracy after a convergence time in a facial recognition system. Their method combines the mean thresholding scheme and achieves high accuracy even when running in full inference rate.

### • Introduction to Guest Editors •



**Chih-Hung Wu** was born in 1967. He received the B.S. degree in engineering science from National Cheng-Kung University, Taiwan, in 1990 and the M.S. and Ph.D. degrees in electronic engineering from National Sun Yat-sen University, Taiwan, in 1992 and 1996, respectively. He is currently a Professor with the Department of Electrical Engineering, National University of Kaohsiung, Taiwan. His research interests include artificial intelligence, soft computing, robotics, and cloud-computing. He is a member of the IEEE, TAAI, IAENG, and IET.

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**Chuan-Kang Ting** received the B.S. degree from National Chiao Tung University, the M.S. degree from National Tsing Hua University, and the Dr. rer. nat. degree in Computer Science from Paderborn University, Germany.

He is currently a Professor and the Chair of Department of Power Mechanical Engineering, National Tsing Hua University, Taiwan. Before joining NTHU, he was a Professor of Department of Computer Science and Information Engineering, National Chung Cheng University. His research interests include evolutionary computation, artificial intelligence, machine learning, and their applications in machinery, manufacturing, ethics, music and arts.

Dr. Ting is the Editor-in-Chief of IEEE Computational Intelligence Magazine (IEEE) and the Editor-in-Chief of Memetic Computing (Springer). He is an Associate Editor of the IEEE Transactions on Emerging Topics in Computational Intelligence and an Editorial Board Member of Soft Computing. He serves as the Chair of IEEE CIS Creative Intelligence Task Force. Dr. Ting has been involved in organization of many international conferences, symposiums, workshops, and special sessions. He served as the Special Session Chair of IEEE WCCI 2016, WCCI 2018, and CEC 2019. He was the IEEE CIS Newsletter Editor, Chair of IEEE Symposium on Computational Intelligence for Creativity and Affective Computing 2013, Program Chair of TAAI (2012, 2015, 2019), and Organizing Chair of AI Forum 2012. He is an Executive Board Member of Taiwanese Association for Artificial Intelligence.



**Mong-Fong Horng** received his B.S. and M.S degree in control engineering from National Chiao-Tung University in 1989 and 1991, respectively, and his Ph.D degree in computer science from National Cheng-Kung University, Taiwan, in 2003. He is now a professor with the department of Electronic Engineering, National Kaohsiung University of Science and Technology, an joint professor with Ph.D program in Biomedical Engineering, Kaohsiung Medical University and a joint research fellow with Information

Industrial Institute (III).

He served as the chair of Taiwanese Association of Consumer Electronics (TACE 2016-2020) and Tainan Chapter, IEEE Signal Processing Society (2019-

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2022) and the program chair of IEEE ISPACS 2021, WCE2020, MC 2017, IEEE GTSD2016, TAAI 2015, 2012, IEA-AIE 2014, IBICA 2013, ACIIDS 2012, IIH-MSP2011 and domestic conferences. He served as the editorial board member and reviewer of MDPI Electronics, Information Sciences, IMLC and Applied Sciences. Dr. Horng promotes the industry-academics cooperation and raises startups in Taiwan. He won an excellent award from Ministry of Science and Technology, in 2018.

He published more than 200 Journal/conference papers, 10 volumes of books and 14 Taiwan/US patents. His research interest includes smart sensing, computational intelligence, communication networks, Internet and business model innovation.



**Chia-Hui Chang** obtained her Ph.D. in Computer Science and Information Engineering from National Taiwan University, Taiwan in 1999. Her research interests focus on information extraction, web intelligence, data mining, machine learning and system integration. Dr. Chang has published more than 80 papers at refereed conferences and journals including WWW, PAKDD, TKDE, IEEE Intelligent Systems, etc. She served as area co-chairs for ACL 2017, NAACL 2018 and PC members for ICDE, CIKM, PAKDD, AAI, ICTIR, etc. She was the President of Taiwan Association for Artificial Intelligence (TAAI) from 2019 to 2020 and currently the President of the Association for Computational Linguistics and Chinese Language Processing (ACLCLP).



**Tzung-Pei Hong** received his B.S. degree in chemical engineering from National Taiwan University in 1985, and his Ph.D. degree in computer science and information engineering from National Chiao-Tung University in 1992. He served at the Department of Computer Science in Chung-Hua Polytechnic Institute from 1992 to 1994, and at the Department of Information Management in I-Shou University from 1994 to 2001.

He was in charge of the whole computerization and library planning for National University of Kaohsiung in Preparation from 1997 to 2000 and served as the First Director of the Library and Computer Center in

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National University of Kaohsiung from 2000 to 2001, as the Dean of Academic Affairs from 2003 to 2006, as the Administrative Vice President from 2007 to 2008, and as the Academic Vice President in 2010. He is currently a distinguished professor at the Department of Computer Science and Information Engineering and at the Department of Electrical Engineering, National University of Kaohsiung, and a joint professor at the Department of Computer Science and Engineering, National Sun Yat-sen University, Taiwan. He got the first national flexible wage award from Ministry of Education in Taiwan.

He has published more than 500 research papers in international/national journals and conferences and has planned more than fifty information systems. He is also the board member of more than forty journals and the program committee member of more than five hundred conferences. His current research interests include knowledge engineering, data mining, soft computing, management information systems, and www applications.

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