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Guest editorial special issue on "P2P computing for deep learning"

Ying Li[1] · R. K. Shyamasundar[2] · Mohammad S. Obaidat[3] · Yuyu Yin[4]

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With the emergence of big data and efficient computing resources, deep learning has made breakthroughs in many areas of artificial intelligence. However, in the face of increasingly complex tasks, the scale of data and deep learning models have become increasingly large. To improve the training efficiency of the deep learning model and reduce the training time, distributed technology should be used to perform training tasks. Distributed technology, such as peer-to-peer (P2P) networks, is an accelerator of deep learning technology, which can significantly improve the training efficiency of deep learning and further increase its application range. We accepted 7 papers from open special issue submissions. A summary of these papers is outlined below.

In the paper entitled "*Group Task Allocation Approach for Heterogeneous Software Crowdsourcing Tasks*" by Xiaojing Yin et.al, an allocation approach of crowd intelligence software development task in which multiple individuals collaborate to complete software development tasks. The heterogeneous task allocation problem in the crowd intelligence software development system is formulated as an optimization problem. Then, the process of task allocation is modeled using the hidden Markov model. Moreover, they propose to construct a generator using Generative Adversarial Networks(GANs) to solve this problem. And the Baum-Welch algorithm is used for detailed analysis and calculation of model parameters. In the paper entitled "*The throughput optimization for wireless sensor networks adopting interference alignment and successive interference cancellation*" by Xu Ding et.al, interference management is studied. They propose an interference management technology that combines Interference Alignment (IA) and Successive Interference Cancellation (SIC) technologies. In the paper entitled "*Surface and High-altitude Combined Rainfall Forecasting Using Convolutional Neural Network*" by Pengcheng Zhang et.al, a surface and high-Altitude Combined Rainfall Forecasting model(ACRF) is proposed for short-term rainfall forecasting. In the paper entitled "*Machine Learning Models and Techniques for VANET Based Traffic Management: Implementation Issues and Challenges*" by Sahil Khatr et.al, they studied Vehicular Ad hoc Network (VANET). In detail, they highlighted the safety, communication, and traffic-related issues in VANET systems and their implementation in-feasibility and explored how machine learning algorithms can overcome these issues. And then, they discussed future direction and challenges, along with a case study depicting a VANET based scenario. In the paper entitled "*Improved Differentiable Neural Architecture Search for Single Image Super-Resolution*" by Yu Weng, D.R. et.al, they use differentiable neural architecture search (DARTS) over Single Image Super-Resolution (SISR). According to characteristics of SISR, they remove redundant operations and redesign some operations in the cell to achieve an improved DARTS. Then they use the improved DARTS to search convolution cells as a nonlinear mapping part of the super-resolution network. In the paper entitled "*Influencing Factors Analysis in Pear Disease Recognition using Deep Learning*" by Fang Yang et.al, they explore the key influencing factors and severity recognition of pear diseases using deep learning based on their established pear disease database (PDD2018), which contains 4944 pieces of diseased leaves. A "DL network + resolution" scheme is developed to use 15 in influencing factors analysis and disease recognition at six different levels. In the paper entitled "*AENEA: A Novel Autoencoder-based Network Embedding Algorithm*" by Xiaolong Xu, et.al, a novel Autoencoderbased Network Embedding Algorithm (AENEA) is proposed for network embedding. AENEA firstly uses a surfing model to process the

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Guest Editors: Ying Li, R.K. Shyamasundar, Yuyu Yin, Mohammad S. Obaidat

✉ Ying Li
yingli.zju@gmail.com

[1] Zhejiang University, Hangzhou, China

[2] Indian Institute of Technology, Delhi, India

[3] University of Sharjah, Sharjah, UAE

[4] Hangzhou Dianzi University, Hangzhou, China

original network to obtain the Probabilistic Cooccurrence (PCO) matrix between the nodes. And then, the Probabilistic Co-occurrence (PCO) matrix is processed to generate the corresponding Positive Pointwise Mutual Information (PPMI) matrix. Finally, the PPMI matrix is used to learn the representation of vertices in the network by using a semi-supervised autoencoder.

In conclusion, we would like to thank all the authors who submitted their research articles to our Special Issue. We highly appreciate the contributions of the reviewers for their constructive comments and suggestions. We also would like to acknowledge the guidance from the Editor-in-Chief and staff members of Peer-to-Peer Networking and Applications