GUEST EDITORIAL
SPECIAL ISSUE ON FUTURE NETWORK DEVELOPMENT AND INNOVATION

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Internet, as a vital infrastructure of our society, has played an important role in promoting social development and industrial automation. With the rapid development of network applications, the Internet is gradually penetrating into the real economy from traditional consumption, such as industry Internet, energy Internet, Internet of Vehicles and other new fields. The in-depth fusion between the Internet and the real economy can bring a broader market prospect. Meanwhile, it also has a higher requirement for the service quality and guarantee, which brings severe challenges for current Internet architecture. This is because that the Internet was initially designed to mainly meet the demand of interconnection among computers, which is very difficult to meet the new requirement brought by the fusion between Internet and the real economy due to the limitations in aspects such as scalability, security, and controllability.

In this case, future network such as software defined networking (SDN), information centric-networking, cloud computing, 5G, mobile Internet, and big data has been proposed and attracted a lot of attention in recent years. Many countries have viewed future network as strategic emerging industries. The United States of America, European Union, China, Japan, and other countries in recent years have launched a series of future network test infrastructure projects at the domestic level. From the perspective of industry, many well-known ISP operators and equipment manufacturers such as Google, Microsoft, AT&T, and IBM have also pre-empted the future network commanding heights and gained footing in the layout of this field. And based on the capital M&A tide, billions of dollars in mergers and acquisitions have been happened in many companies. Moreover, emerging technologies as well as the rapid development of businesses are affecting the economic, social and cultural development in unprecedented depth and breadth.

To promote the development of future network technology, the international conference on China Future Network Development and Innovation Forum (CFN) has been held consecutive five sessions since 2010. The fifth CFN was held on December 9–10, 2015, at the Nanjing, Jiangsu, which has been jointly hosted by the Chinese Academy of Engineering, Nanjing Municipal People's Government, and Jiangsu Future Networks Innovation Institute. The forum focuses on the challenges in the current network and countermeasures, the future trend of the development of network technology and future network industry development, which has attracted a lot of world-renowned experts and scholars, telecom operators, Internet service providers, telecom equipment manufacturers, and nearly thousands of colleges, universities and research institutes attending this activity.

Based on the recommendations from conference reviewers, authors of selected papers were invited to submit extended versions for this special issue of the *International Journal of Robotics and Automation.* By rigorous and thorough reviewing of these submissions, 10 papers are selected for this issue, representing each of the four major conference disciplines.

The first two papers are in SDN field. To address the security issue of SDN, Xu *et al.* (Abnormal User Behavior Perception Method in SDN) proposed an abnormal user behaviour perception solution. Comparing with traditional user behaviour perception methods, the proposed solution has higher recognition accuracy and lower algorithm complexity. Thus, it effectively improved the computing efficiency. To make UDP, flows the quasi-TCP-friendly characteristics. Chen *et al.* (FUDP: A SDN Based Mechanism for Controlling UDP Flows) designed a FUDP mechanism based on SDN, which controls UDP traffic by flows in a closed loop way.

The third and fourth papers are from the robots area. You *et al.* (An Improved Ant Colony System Algorithm for Robot Path Planning and Performance Analysis), proposed an improved ACS algorithm to solve the mobile robot path planning problem. The authors adopted MAK-LINK graph and grids to establish the environment model, and the simulation results indicate that the proposed algorithm is effective and has better performance in solution quality and search efficiency as compared with the path planning method in the literature. Due to various reasons, the robots in multi-robot system cannot communicate with each other. To guarantee high system revenue

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even if the robots are self-interested, Fu *et al.* (Coalitional Skill Games for Self-interested Robots with SVO) proposed an algorithm named Agency Recruiting Algorithm (ARA).

The papers from fifth to eighth are in networking area, including satellite network, wireless sensors networks, wireless broadband network and multi-hop D2D networks. As a backbone transmission network, satellite network needs to carry a variety of services to meet the new businesses and functions. Based on the analysis of the performance evaluation standard of the QoS system in satellite network, She *et al.* (QoS-guaranteed Model Research of Satellite Network) proposed a comprehensive evaluation criterion, and the simulation results show that this criterion can guarantee the QoS of various businesses in satellite network. Clustering is considered to eliminate the kind of data redundancy and improve in-network data aggregation efficiency. Wang *et al.* (Energy Balancing Local Data Correlation Aware Clustering Algorithm for Wireless Sensor Network) proposed an energy balancing local data correlation aware (LDCA) clustering algorithm for wireless sensor network. Simulation results indicated that the LDCA clustering algorithm achieves a higher aggregation ratio and performs better on energy consumption and load balance compared to other algorithms. To make full use of the idle channels, Guo *et al.* (Spectrum Aggregation Scheme in Wireless Broadband Data Transceiver System) proposed a new Spectrum Aggregation method named Maximum Space First Assignment (MSFA) after analysing the performance of WBDT. MSFA provides a way to reduce the negative effect of guard gap. The simulation and analysis results show that the novel system architecture and MSFA improve spectral efficiency. Zhang *et al.* (Opportunistic Content Dissemination in Intermitted Multi-hop Device-to-Device Network), focused on a hybrid network architecture that integrated cellular link and intermitted multi-hop D2D link and studied the content dissemination problem from one publisher to subscribers. Then, the Dijkstra-like algorithm named as Relay Set Search Algorithm is proposed for set cover problem.

The final two papers selected are in algorithm and application. Ding *et al.* (Anomaly Detection in Large-scale Trajectories Using Hybrid Grid-based Hierarchical Clustering), detected trajectory anomaly of human trajectory data *via* a hybrid grid-based hierarchical clustering method based on Hausdorff distance. It is suitable to measure the similarity between trajectories of different lengths by the Hausdorff. The experimental results demonstrated that the proposed algorithm is more effective and much faster than the traditional hierarchical clustering algorithm according to the pairwise comparison results. Yu *et al.* (A Control Policy of Harmful Information using Information Flow Behavior Model based on Node's Heterogeneity) established information flow model based on the heterogeneity of node in network and studied the influencing factors of node's information flow behaviour from the internal factor and the external factor of node.

Finally, we hope that you enjoyed this special issue. We sincerely thank all the authors and reviewers for their help and efforts. We would also like to thank the editors and staff members of *International Journal of Robotics and Automation* for their guidance and help.

Biographies

Xiaonv Hu is an assistant director of the China Institute of Communications, and an associate senior editor for People's Posts and Telecommunications Press. She had 10 years as a journalist and editor. Her research direction is the content of the construction, operation and management, academic periodicals published rules, *etc.*, following the evolution of the global information technology and related industry development.

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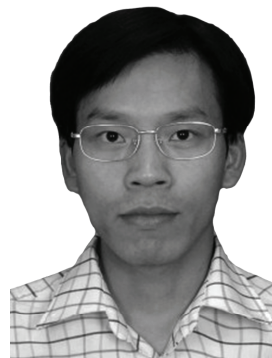
Tao Huang received his B.S degree in communication engineering from Nankai University, Tianjin, China, in 2002 and the M.S. and Ph.D. degree in communication and information system from Beijing University of Posts and Telecommunications, Beijing, China, in 2004 and 2007, respectively. He is currently the professor in Beijing University of Posts and Telecommunications. His current research interests include network architecture, software-defined networking.