

Editorial

New techniques for intelligent networks with machine learning

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With the rapid development of data science, machine learning has been widely applied to many important fields such as computer vision, healthcare systems, and financial predictions, to support the design of constructs of Artificial Intelligence. Although significant progress has been achieved in the applications of machine learning in networks, there still exist some limitations in current works. In fact, the architectures and applications of networks are dynamic, heterogeneous, and complex, in which machine learning tasks are faced with a variety of multiple parties, such as Internet of Things (IoT), mobile telecom networks, cognitive networks, wired/wireless heterogeneous backbone networks, and so on.

To understand the complexity of networks, one should address the following main issues: 1) Enable networks to autonomously make decisions in dynamic and distributed environment; 2) How to processing and/or utilizing the data from heterogeneous networks, and find much valuable information or patterns; 3) How to develop machine learning algorithms which can possess high complexity.

In this special issue of the *Journal of High Speed Networks*, after rigorous review process, we finally accept four papers. Our selection is based on the relevance to the special issue topics, paper quality, methods and research contributions. The following papers have been selected:

One of the most important issues is traffic flow forecasting in transportation networks. In the paper entitled “A traffic flow forecasting method based on the GA-SVR”, the authors use support vector regression (SVR) to predict short-term traffic flow, and study the feasibility of SVR in short-term traffic flow prediction. The short-time traffic flow has many influencing factors, which are characterized by nonlinearity, randomness and periodicity. Therefore, SVR algorithm has advantages in dealing with such problems. In order to improve the prediction accuracy of the SVR, this paper uses genetic algorithm (GA) to optimize the SVR and other parameters to obtain the global optimal solution. The optimal parameters are used to construct the SVR prediction model. This paper selects the traffic flow data of the Jiangxi Provincial Transportation Department database to verify the feasibility and effectiveness of the proposed model.

Reputation is another important issue in complex social networks. Social networks have become an important channel for people to obtain information, and trusted user information behavior is the key to build cyberspace security. A dynamic reputation evaluation method based on supervision feedback of user information behavior is helpful to promote social network self-discipline and achieve good community autonomy. In the study entitled “Reputation evaluation model in social networks based on information behavior”, the comprehensive reputation evaluation of

each node integrates identity and behavior reputation. The reputation is dynamically updated by setting the new node evaluation period and phased update mechanism. Identity reputation is calculated by information disclosure and network characteristics, behavior reputation is calculated by information release and forwarding, and rewards or punishments will be given to self-correction of information behavior or blocking of bad information. The simulation results show that compared with the traditional trust evaluation mechanism, setting rewards and punishments guidance can improve the accuracy of reputation evaluation. At the same time, reputation incentive can also inhibit the interaction of bad information while promoting the consciousness of reporting.

Blockchain technology and its applications are also important problems. The paper entitled “Scientific research information management based on blockchain technology”, the authors combine the existing achievements and requirements in real applications. The paper explains characteristics of the blockchain technology and analyzes its disadvantages in scientific research information management compared with the traditional methods. The paper puts forward some suggestions for applications to provide a reference for the effective application of blockchain technology in scientific research information management.

For combinational optimization problem, authors propose a simple yet effective discrete artificial bee colony (DABC) algorithm for solving quadratic assignment problems (QAPs) in the work entitled “A discrete artificial bee colony algorithm for quadratic assignment problem”. Typical QAP benchmark instances are selected from QAPLIB in order to conduct the simulation experiment where common performance metrics are used to evaluate the algorithm. The paper also investigates the influence factors of the algorithm’s performance. The results show that the proposed algorithm is a quite effective and a practical new approach for handling QAP problems.

This special issue presents some of the important research work in Intelligent Networks. We believe this special issue will benefit the research community towards identifying challenges and disseminating the latest methodologies and solutions to machine learning.

Guest Editors

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