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IEEE Transactions on Network Science and Engineering
Special Issue on Intelligent Network Management

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TOPIC SUMMARY:
With the development of IT technology, communication networks have been evolving from a medium of data exchange to a platform providing diverse services. Recently, operators have started to explore how to use Artificial Intelligence (AI) to simplify, optimize and intelligently assist with network management and control to reduce operational costs and to improve performance and user experience. Recent breakthroughs from big data technology have accelerated this interest.

In general, such AI technologies will enable operators to gain a deeper understanding of the network dynamics and enable more accurate forecasts of network trends. While it is important to gain such knowledge, the more challenging question is how to apply such knowledge to improve the network performance, i.e., to improve planning and operating decisions for managing the network. This is not straightforward for many reasons. For example, current decision making models were not developed for using such knowledge, and efforts made to gain and apply such knowledge is at an early stage. Additionally, forecasts based on such knowledge have a shelf life, and may become invalid after network operating policies are changed. For example, users may adjust their demand patterns in response to network changes. Therefore, new methods are needed for implementing intelligent network management. A three stage closed loop model is needed to uncover useful patterns through: 1) closely observing the network, 2) forecasting network trends, 3) applying the knowledge gained to improve the network.

Addressing the above challenge involves knowledge and skills from different disciplines, spanning from AI, networking, optimization, game theory, and so on. This special issue (SI) calls for research on intelligent network management. While the scope of intelligence application can be broadly defined as network performance analysis and forecasting, we are especially interested in network operational functions such as capacity planning, resource provisioning, routing, faulty recovery, etc. We welcome theoretical work for building scientific foundations, as well as cases of specific
applications to demonstrate the potential.

The topics of interest for this SI include, but are not limited to:

- Modelling and representing policies, intents, knowledge
- Mechanism design of the policy, intent, and knowledge management system
- Model Checking and Verification of the policy, intent, and knowledge system
- Resolution and Optimization for policies and intents
- Composition of knowledge and decomposition of policies and intents
- Application of AI techniques, such as Machine Learning, Deep Learning, Logic Programming, etc., for prediction, decision, and self-evolution of the network.
- Reinforcement learning based resource allocation and control
- Knowledge driven routing
- Knowledge driven network control
- Knowledge driven network slicing
- Knowledge driven fault diagnosis and recovery

Important Dates

- Manuscripts due: 05/30/2018
- Peer reviews to authors: 08/31/2018
- Revised manuscripts due: 10/31/2018
- Second-round reviews to authors: 12/30/2018
- Final accepted manuscript due: 2/28/2019

SUBMISSION GUIDELINES:
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