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Artificial Intelligence and Machine Learning for Networking and Communications

CALL FOR PAPERS

IEEE JSAC Special Issue on Artificial Intelligence and Machine Learning for Networking and Communications

Artificial Intelligence (AI) and Machine Learning (ML) approaches, well known from IT disciplines, are beginning to emerge in the networking domain. These approaches can be clustered into AI/ML techniques for network management; network design for AI/ML applications and system aspects. AI/ML techniques for network management, operations & automation address the design and application of AI/ML techniques to improve the way we address networking today. Recently, networking has become the focus of a huge transformation enabled by new models resulting from virtualization and cloud computing. This has led to a number of novel architectures supported by emerging technologies such as Software-Defined Networking (SDN), Network Function Virtualization (NFV) and more recently, edge cloud and fog. This development towards enhanced design opportunities along with increased complexity in networking as well as in networked applications has fueled the need for improved network automation in agile infrastructures. This new networking environment calls for even more automation, as exemplified by recent initiatives to set-up network automation platforms. This can be combined with Artificial Intelligence techniques to execute efficient, rapid, trustworthy management operations. Network design and optimization for AI/ML applications addresses a complementing topic namely the support of AI/ML-based systems through novel networking techniques including new architectures as well as performance models. A third topic area is system implementation and open-source software development

This evolution has drawn particular attention to inter-disciplinary approaches from communication networks and the AI/ML research community. On the one hand, researchers in communication networks are tapping into machine learning and AI techniques to optimize network architecture, control and management, leading to more automation in network operations. On the other hand,

researchers in the AI community are working with networking researchers to optimize network architecture and design.

In this special issue, we invite submissions of high-quality original technical and survey papers, which have not been published previously, on artificial intelligence and machine learning techniques and their applications for computer and communications networks, including the following non-exhaustive list of topics, falling into four sub-categories:

- Theoretic approaches and methodologies
    - Usable theory of networks inspired by machine learning
    - Transfer learning and reinforcement learning for networking and communications
    - Big data analytics frameworks for networking data
- Network analytics
    - Machine learning, data mining and big data analytics in networking
    - Data mining, statistical modeling, and machine learning for network management
    - Network problem diagnosis through machine learning
- Network applications
    - Network architecture and optimization for AI/ML applications at scale
    - Machine learning for multimedia networking
    - Resource allocation for shared/virtualized networks using machine learning
    - Protocol design and optimization using machine learning
    - AI/ML for wireless network resource management and medium access control
    - Energy-efficient network operations via AI/ML algorithms
    - Reliability, robustness and safety for networks optimized and operated based on AI techniques
    - Security concepts for networks optimized and operated based on AI/ML concepts
    - AI/ML Algorithms for network security
- Network automation
    - Deep learning and reinforcement learning in network control & management
    - Proactive network monitoring architecture
    - Self-learning and adaptive networking protocols and algorithms
    - Predictive and self-aware networking maintenance
    - Open-source AI algorithms and software for networking
    - Open-source networking optimization software for AI/ML applications

Submission Guideline

All submissions have to be prepared according to the Guide for Authors as published in the

Journal website at http://www.comsoc.org/jsac/paper-submission-guidelines and must be submitted via EDAS at https://edas.info/N24637.

Manuscript Due: July 15, 2018
First revision notification: October 19, 2018
Acceptance notification: December 7, 2018
Final manuscript due: January 3, 2019
Expected Publication of the Special Issue: First quarter 2019

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