Workshop on Big-Data & AI to Improve 5G Network Performance and Energy Efficiency

The Key Performance Indicators identified for 5G wireless networks impose the application of comprehensive, sophisticated and energy-efficient algorithms and solutions at both radio access and core network, but also on data centers and storage. It is widely understood that the reliable and immediate access to accurate data defining – in a broad sense – the whole communication context may significantly improve the overall performance of the system. For example, accurate channel state information can be applied for better radio resource and interference management (as in CoMP, SON and other techniques) or for better channel estimation and correction. Next, the detailed knowledge on real observed link performance or knowledge of observed congestion issues in every link may improve the routing process, can be applied for better network slicing, load balancing or reduction of energy consumption.

In the context of future wireless networks, acquiring large amounts of data to harvest correlations and statistical probabilities are envisaged to enable proactive decisions and thereby improving network performance and efficiency. Thus, application of machine learning algorithms including artificial intelligence based solutions may be necessary. Although the data structures can be structured in many ways, correlating the information with geolocation is a promising concept providing both efficiency & visualization. This can be manifested as Radio Environment Maps (REM) capturing statistics on channel quality, throughput and link reliability etc. Traffic maps (e.g. distribution of requested or served traffic, traffic patterns etc.) and mobility, migration and trajectory information can enable improved short- and long term proactive resource management in the network. Implementation of historical knowledge related to the users and cells, migration patterns of users etc. may be applied for better caching of data content, fog computing and MEC. Finally, rich knowledge of user behavior can be utilized for improving energy efficiency in future networks as, for example, selected sectors (or individual carriers) of base stations can be switched off based on historical data and traffic prediction maps. In a nutshell, an access to the accurate and rich information defining the communication context (known as context information) can lead to significant improvement of various performance metrics and predictive maintenance.

This workshop focus on how to use big data processing and artificial intelligence in future wireless networks to improve network performance, radio resource utilization and energy efficiency, while delivering expected QoE. The topics covered by this workshop include, but are not limited to:

- Application of radio environment and service maps for resource management and energy efficiency
- Big data processing at 5G RAN and core for network performance and energy efficiency
- Application of artificial intelligence algorithms for big data analysis in 5G networks
- Application of rich context information for fog- and cloud computing, and MEC
- Big data delivery and application of AI in 5G
- Context Aware communications boosted by artificial intelligence
- Database supported resource and interference management
- Data storage, processing, analysis for RAN
- Big data analysis and AI for SON and network slicing
- Big data for predictive maintenance
- Orchestration of future networks
- Visualization aspects of data structures for network monitoring
- Machine learning algorithms for 5G

Important dates: submission deadline: **Oct 23, 2017**; acceptance notification: **Dec 15, 2017**; camera ready: **Jan 12, 2018**

This workshop only accepts novel, previously unpublished papers. All submissions should be written in English with a maximum paper length of five (5) printed pages (IEEE Trans. Conf format) including figures without incurring additional page charges (maximum 1 additional page with over-length page charge if accepted). All papers will be subject to a rigorous peer-review process. All accepted papers will be published in an IEEE Explore database.

Organizers: dr. Adrian Kliks, Poznan University of Technology, Poland; Marcin Dryjanski and dr. Magnus Isaksson, Huawei Technologies, Sweden; and dr. Azeddine Gati, Orange Labs, Paris, France

Web-page:
http://wcnc2018.ieee-wcnc.org/workshop/big-data-ai-improve-5g-network-performance-and-energy-efficiency