Hoang Duy Trinh received the B.Sc. degree in Information Engineering and the M.Sc. in Telecommunication Engineering from the University of Padova, Italy, in 2013 and 2015, respectively. Currently, he's pursuing a Ph.D. at the department of Network Engineering of Polytechnical University of Catalonia (UPC), Spain. Starting from September 2016, he worked as European Commission's Marie Skłodowska-Curie fellow in the EU H2020 MSCA SCAVENGE (Sustainable Cellular Networks Harvesting Ambient Energy) project at the Mobile Networks department of CTTC. His current research interests are in the area of Big Data, Machine Learning for Mobile Network, Wireless Communications and 5G.

Abstract

This thesis collects the research works I pursued as Ph.D. candidate at the Universitat Politecnica de Catalunya (UPC). Most of the work has been accomplished at the Mobile Network Department Centre Tecnologic de Telecomunicacions de Catalunya (CTTC).

The main topic of my research is the study of mobile network traffic through the analysis of operative networks dataset using machine learning techniques. Understanding first the actual network deployments is fundamental for next-generation network (5G) for improving the performance and Quality of Service (QoS) of the users. The work starts from the collection of a novel type of dataset, using an over-the-air monitoring tool, that allows to extract the control information from the radio-link channel, without harming the users' identities. The subsequent analysis comprehends a statistical characterization of the traffic and the derivation of prediction models for the network traffic. A wide group of algorithms are implemented and compared, in order to identify the highest performances. Moreover, the thesis addresses a set of applications in the context of mobile networks that are prerogatives in the future mobile networks. This includes the detection of urban anomalies, the user classification based on the demanded network services, the assistance to network optimization frameworks (e.g., mobile device wake-up schemes).

Data Analytics for Mobile Traffic in 5G Networks using Machine Learning

Hoang Duy TRINH

2020

CTTC'

PhD Dissertation

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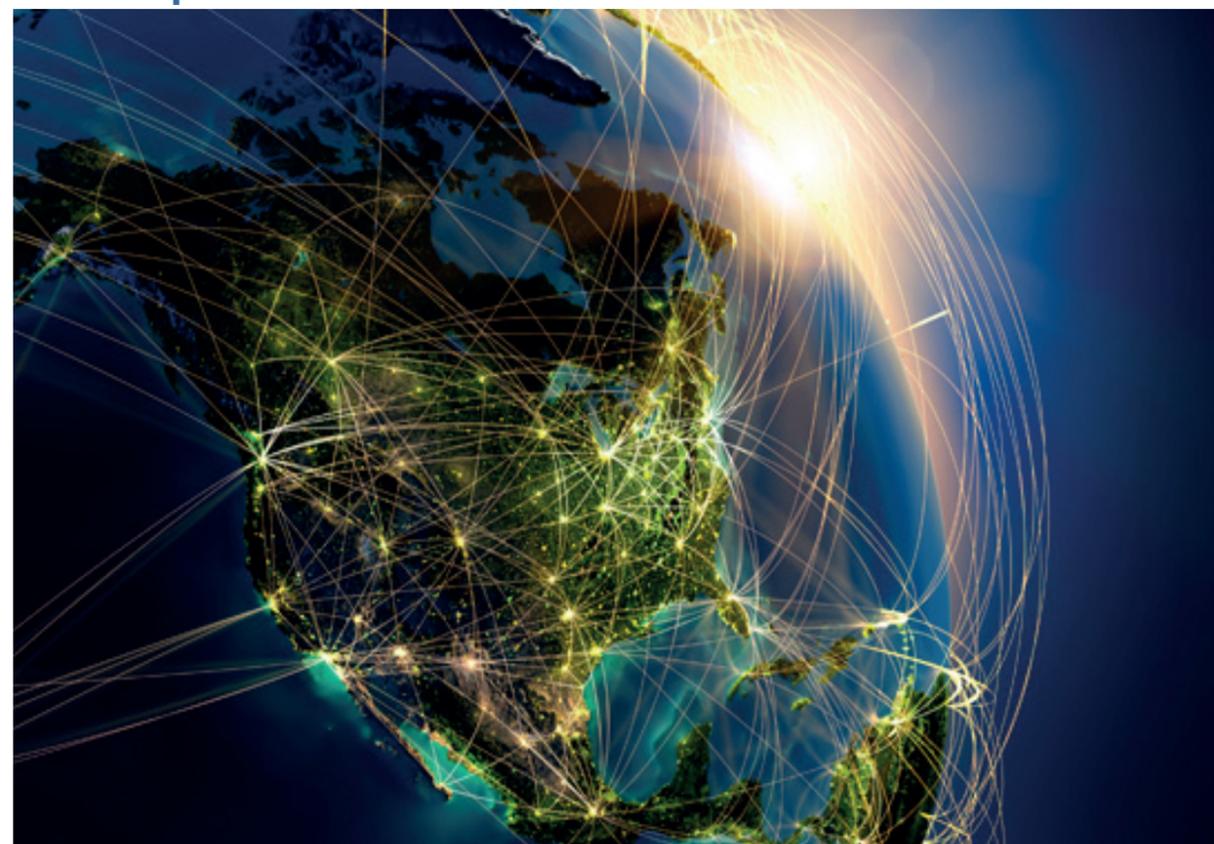
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