Spatio-Temporal Wireless Traffic Prediction with Recurrent Neural Network

ABSTRACT

Accurate prediction of user traffic in cellular networks is crucial to improve the system performance in terms of energy efficiency and resource utilization. However, existing work mainly considers the temporal traffic correlations within each cell while neglecting the spatial correlation across neighboring cells. In this paper, machine learning models that jointly explore the spatio-temporal correlations are proposed. Specifically, several recurrent neural network structures are utilized. Furthermore, a multi-task learning approach is adopted to explore the commonalities and differences across cells in improving the prediction performance. Base on real data, we demonstrate the benefits of joint learning over spatial and temporal dimensions.

EXISTING SYSTEM

- Artificial neural networks could be easily adapted to learn and predict the base station traffic over the temporal dimension.
- General artificial neural networks to predict the base station traffic under different wireless network setups.
- Since users continuously move within a given cellular network, the traffic flows across neighboring base stations are correlated, such that learning over both the spatial and temporal dimensions would improve the traffic prediction performance.

PROPOSED SYSTEM

- We presented multiple RNN based learning models along with unified multi-task learning frameworks to explore spatio-temporal correlations among base stations, in the goal of improving the traffic prediction performance.
- The joint spatiotemporal prediction is cast as simultaneous learning over several correlated tasks.
- As the wireless traffic volumes are generated in neighboring cells, the resemblance and dissimilarity across the multiple tasks are both important components to explore.
- Therefore, employing such a multi-task learning framework should lead to performance gains.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- •Processor Intel core i3
- •RAM 2B
- •Hard Disk 20 GB

SOFTWARE REQUIREMENTS

- •Operating System : LINUX
- •Tool : Network Simulator-2
- •Front End : OTCL (Object Oriented Tool Command Language)

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