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Link Quality Prediction for LTE and WiFi Offloading Network Using Machine Learning

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Abstract: *The continuous growth of mobile traffic and limited spectrum resources limits the capacity and data rate. Heterogeneous Networks (HetNet) is a solution with multiple radio interfaces in smartphones to realize such demands. Simultaneous data transfer on Long Term Evolution (LTE) and WiFi has gained attention for data offloading in 5G HetNet. Maintaining the average throughput and minimum delay for LTE users is still a challenge in data offloading owing to the mobility and load in the network. This study explores the benefits of Software-Defined Networking (SDN) based multipath for data offloading schemes for LTE-WiFi integrated networks to maintain the user's average throughput based on channel quality classification. We classify future link qualities using deep learning models such as Long Short-Term Memory Networks (LSTM) and Bidirectional Long Short-Term Memory Networks (BLSTM). The received signal strength indicator (RSSI) and packet data rate (PDR) are parameters used in BLSTM. The results of the prediction were compared with those of state-of-the-art methods. We obtained a 2.1% better prediction than the state-of-the-art methods. The predicted results were used to offload the data using LTE and WiFi. The performance of HetNet was compared with the state-of-the-art method for average throughput, and with the proposed method, a 6.29% improvement was observed.*

Keywords: Software-defined network, HetNet, mininet, floodlight, deep learning, LSTM, BLSTM

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