Title:

Forwarding with Prediction over Machine Learning based Nodes in Wireless Mesh Networks

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**Abstract**:

As part of the next generation Internet, Wireless Mesh Networks have emerged as a key technology to deliver Internet broadband access, wireless local area network coverage and network connectivity at low costs. The capacity of a wireless mesh network is improved by equipping mesh nodes with multi-radios tuned to non-overlapping channels. Hence the data forwarding between two nodes has multiple selections of links and the bandwidth between the pair of nodes varies dynamically. The new technology makes mesh nodes cognitive, thus a mesh node is able to adopt machine learning mechanisms to choose the possible best next hop which has maximum bandwidth when it intends to forward data. In this paper, we present a new forwarding algorithm by which a forwarding node dynamically select its next hop with highest potential bandwidth capacity to resume communication based on learning algorithm. The efficiency of this approach is that a node only maintains three past status, and then it is able to learn and predict the potential bandwidth capacities of its links. Then, the node selects the next hop with potential maximal link bandwidth. Additionally, a geometrical based algorithm is developed to let the forwarding node ﬁgure out the best forwarding region in order to avoid ﬂooding. Simulations demonstrate that our approach signiﬁcantly outperforms peer algorithms.

**Keywords**:

mesh networks, machine learning, forwarding, highest bandwidth capacity, geometrical routing.