Mobility Prediction and Resource Allocation in Wireless Networks

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Abstract

Mobility presents a challenging issue in network design. The network must adapt to frequent changing network topologies caused by end user movement. Access to mobility information and prior knowledge of user mobility patterns can help in better network design and resource allocation. A mobile user usually travels with a destination in mind and the movements of users are, in general, preplanned and are highly dependent on the individual characteristics. Exploiting this regularity, we propose a framework for mobility prediction using Hidden Markov Model (HMM). Real mobility traces are used to train the HMM model and perform predictions on users’ next destinations. Also, a Neural Network (NN) model is used separately and as a hybrid NN-HMM model to perform predictions. The prediction results are analyzed and found to be very accurate and match actual user movements. Also, the proposed framework is generic and the HMM/NN based engine can be replaced by other suitable models such as Auto Regressive Moving Average (ARMA) depending on the scenario.

Bio

Pratap S Prasad is a graduate student in the Department of Electrical and Computer Engineering at Auburn University. He received his M.S degree from the same department in 2006 and is currently pursuing a doctoral degree under the supervision of Prof. Prathima Agrawal. His research interests include mobility prediction, mobility modeling, network routing algorithms and sensor and mesh networks.

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