Modeling Network User Behavior: Probabilistic Programming and Beyond

Abstract

This project involves learning to predict users’ mobility within the network topology. This topological mobility, as opposed to physical mobility, can be substantial as the user switches from LTE to wireless network, while moving minimally physically. Our dataset consists of email IMAP logs as they document associated client IP addresses, as well as the clients’ identifiers. Prediction for online mobility is of particular interest to the networks community. If we can predict online mobility with high probability, then new network architecture can be designed to optimize the caching system by minimizing resending packets. We used various approaches and techniques to model the user's behavior, including probabilistic programming, regression, neural nets, and clustering algorithms. We compare and contrast how different models differ in their prediction accuracy, speed of convergence, and complexity.