

Master of Science Kha Hoang - 24.6.2014

Parameter Estimation of Censored and Dropped Gaussian Data for Wi Fi Indoor Positioning

Abstract:

Achieving accurate positioning inside buildings is still a major technical challenge, due to the unavailability of GPS. Since the system should not come at the cost of an extra infrastructure solely for positioning purposes, solutions relying on already present devices, such as Wi Fi access points, are of particular interest. Smartphones are commonly equipped with Wi Fi and inertial sensors, such that the realization of an indoor localization functionality becomes only a matter of software.

In this talk, I will first present our work on the model estimation of the censored and dropped Gaussian data. This work is motivated by the fact that Wi Fi information which is collected by smartphones has a certain clipping and dropping problem that may occur from several reasons such as the limited sensitivity of RSSI sensors and the operation of smartphones and Wi Fi Access Points. The Expectation-Maximization algorithm and the optimal classification which takes into account the censoring and dropping problem were developed. Secondly, to further improve the positioning accuracy, I present a modified Hidden Markov Model which employs the possible path information

and fuses different sources of sensor information, i.e., Wi Fi data and inertial sensor data. The user position is then estimated by the Forward algorithm. Finally, before concluding the talk, some experimental results both on simulated and real-world data to demonstrate the effectiveness of the proposed algorithms are presented.