統計科學研究所
INSTITUTE OF STATISTICAL SCIENCE

SEMINAR STATAS

Seminar

Title：Learning from Data and Model: A Practical Study of Indoor Positioning

Speaker：Dr. Chun-Hsien Ko (Department of Communication Engineering, National Yang Ming Chiao Tung University)

Time：10:30 AM~12:00 PM, Monday, June 27, 2022

Place：Auditorium, B1F, Institute of Statistical Science, Academia Sinica

Abstract

A new approach for indoor positioning is presented, aimed at designing a WiFi positioning system that is feasible and convenient for both service providers and end-users. In the proposed approach, only access points (APs) need to collect the received signal strengths (RSS) of mobile devices and use these RSS samples to jointly estimate the devices' locations. To enhance the accuracy of positioning, the relationship between the RSS samples and their geometrical locations is explored, leading to a sparse Bayesian model for the radio power map (RPM) of the RSS observations of each AP. Based on the proposed RPM model, a 2-stage positioning method is further developed. In the first stage for coarse positioning, the location is determined up to a room-scale indoor space. Then, in the second stage for fine positioning, the RPMs of the given indoor space are used for location estimation in the space with a Bayesian estimator. The mean squared positioning errors are verified with the Bayesian Cramer-Rao lower bound. Extensive experiments show that the average positioning error of the proposed RPM-based approach is 1.98 meters which achieves 22 percent improvements over the state-of-the-art RSS-based indoor positioning methods. More importantly, the proposed modeling and positioning method can effectively exploit the spatial relationship in the RSS samples to improve positioning accuracy.

※ Tea reception starts at 10:10 AM.
※ Online live streaming through Cisco Webex will be available.