International Workshop on the Impact of Human Mobility in Pervasive Systems and Applications (PerMoby 2016) - Program

Session 1: Keynote Lecture

In this keynote, we look at the fundamental limits of the information propagation speed in large scale mobile and intermittently connected networks, where end-to-end multihop paths may not exist and communication routes may only be available through time and mobility. We first introduce some analytical tools to derive generic theoretical bounds for the information propagation speed in this networks. We upper-bound the optimal performance, in terms of delay, that can be achieved using any routing algorithm. We also show how our analysis can be applied to specific mobility models to obtain specific analytical estimates. We then look at the maximum amount of data that can be transferred: (i) from a source to a destination in a given journey, (ii) overall in the network compared to the average delay. Finally we look at the particular case of multi-lane vehicle-to-vehicle networks such as roads or highways. We focus on the impact of time-varying radio ranges and of multiple lanes of vehicles, varying in speed and in density. We show the existence of a vehicle density threshold under which information propagates on average at the fastest vehicle speed and above which information propagates dramatically faster. We characterize conditions under which the phase transition occurs and we derive bounds on the corresponding threshold as a simple relationship between the vehicle density on the fastest lane and the sum of densities on the other lanes. Our results intrinsically encompass a wide range of vehicular network scenarios, including one-way and two-way roads, as well as special cases such as road side units and/or parked cars being used as relays.

Information Propagation Speed in Large Scale Mobile and Intermittently Connected Networks
Bernard Mans (Macquarie University, Australia)

Morning Coffee

Session 2: Patterns, Dynamics, and Data

Disaster Area Mapping Using Spatially-Distributed Computing Nodes Across a DTN
Edgar Marko Trono, Manato Fujimoto and Suwa Hirohiko (Nara Institute of Science and Technology, Japan); Yutaka Arakawa (Nara Institute of Science and Technology & NAIST, Japan); Mineo Takai (University of California, Los Angeles & Osaka University, USA); Keiichi Yasumoto (Nara Institute of Science and Technology, Japan)

Impact of Time-Varying Population Density on Location Privacy Preservation Level
Yuya Matsuno and Masaki Ito (The University of Tokyo, Japan); Kaoru Sezaki (University of Tokyo, Japan)
Lunch

Session 3: Systems

**SpinSafe: An Unsupervised Smartphone-Based Wheelchair Path Monitoring System**  
Fatjon Seraj, Paul Havinga and Nirvana Meratnia (University of Twente, The Netherlands)

**Dynamic Connection Management Between Web Apps and Peripheral Devices by Web Driver**  
Takuya Sakamoto and Kazuaki Nimura (Fujitsu Laboratories Ltd., Japan)

**Opportunistic Beacon Networks: Information Dissemination via Wireless Network Identifiers**  
Okan Turkes, Hans Scholten and Paul Havinga (University of Twente, The Netherlands)

Afternoon Tea

Session 4: Activity Monitoring

**Activity Recognition on Smartphones: Efficient Sampling Rates and Window Sizes**  
Barış Yamansavaçılı and Amaç M. Güvensan (Yıldız Technical University, Turkey)

**An Indoor Localization System Based on Audio Fingerprinting**  
Hye-Seung Cho and Hyoung-Gook Kim (Kwangwoon University, Korea)