**SEZAKI LAB.**

[Urban Sensing and Mobility Analysis]

Center for Spatial Information Science

---

**Socio-cultural Environmental Studies**
Information & Communication Engineering

https://www.mcl.iis.u-tokyo.ac.jp

---

**Estimating Ultra Violation (UV) by Using GPS Signal**

**Background:** Sufficient Vitamin-D is an important factor for a healthy life, and it is generated at human skin by UV. However, excessive UV exposure increases the risk of skin cancer.

**Goal:** Monitoring daily UV exposure dose only by a mobile device

**Approach:** Estimating UV exposure dose from a strength of GPS signal

---

**Mobile-assisted Ad Hoc Networking Architecture Based on Location Information**

The proposed architecture achieves the significant reduction of the unnecessary packets and the improvement of the packet arrival rate

**Proposed Method:**
- **Location layer:** The roles of the location layer are to manage the locations of nodes and to determine the virtual area of each ad hoc network by a management server via mobile network.
- **Ad-hoc layer:** The roles of the ad hoc layer are to establish an actual route and then to send data along the established route via local networks

---

**Crowd and People Flow Detection by Using Bluetooth Scanning**

**Goal:** Detecting crowd and people flow by using surrounding Bluetooth devices

This method can be applied to recognize crowds and people flows by offline, and suggest a detour in the evacuation situation.

---

**Toward Classifying Usage Pattern of Dockless-Micromobility by Non-Negative Tensor Factorization**

**Background:** Dockless micromobility services spread to major cities

- **Benefit:** Improving last one-mile mobility
- **Risk:** Increase rate of traffic accident, and deterioration of landscape

**Method:** Extracting “potential mobility patterns” from Non-negative Tensor Factorization (NTF)
- Our methods extracted a number of mobility patterns that seem like work-trips and tourists. This information can be used for urban design with Dockless micromobility services

---

**AWARE : Developing and Managing Open Source Mobile Sensing Framework**

**Background:** The smartphone is used as a sensing platform among a great number of researches. However, the development cost for a stable sensing application is quite high and takes lots of tedious works.

**Goal:**
- Providing a stable mobile crowd sensing framework
- Continues integration by open source community, and flexible framework integration

---

**Position Estimation Using LPWAN for Natural Environment Monitoring by Animals**

**Background:** Continuous natural environment monitoring is required for environmental conservation

**Issue:** In the deep forest area, mobile network (4G/LTE) is not reachable, and human can not visit the place easily.

**Approach:** Attaching sensor to wild animals that living in the forest, and collect the sensor data via LPWAN (Low-Power Wide-Area Network)

---