01 Smart city sensing using municipal vehicles

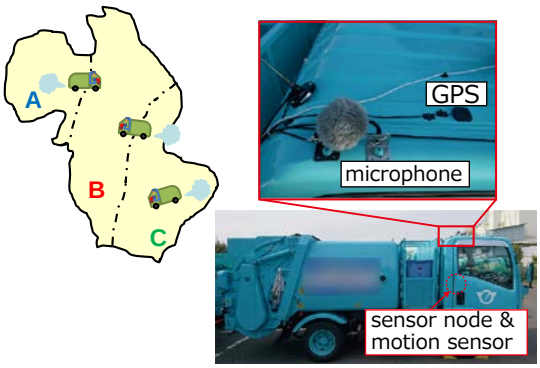
- Spatio-temporal city event detection via car-mounted sensors -

Abstract

We are researching and developing techniques for city event detection using environmental data collected via car-mounted sensors. Car-mounted sensors provide significantly more detailed data both in space and time than fixed monitoring stations. Such fine-grained environmental data help to detect more in-depth spatio-temporal city events, such as emergence of air pollution hot spots, increase in ambient noise, and accumulation of household garbage. We have been conducting field trials to evaluate our technologies in Fujisawa City. We have mounted several environmental sensors on garbage trucks to collect fine-grained data, and have investigated several event detection techniques using them.

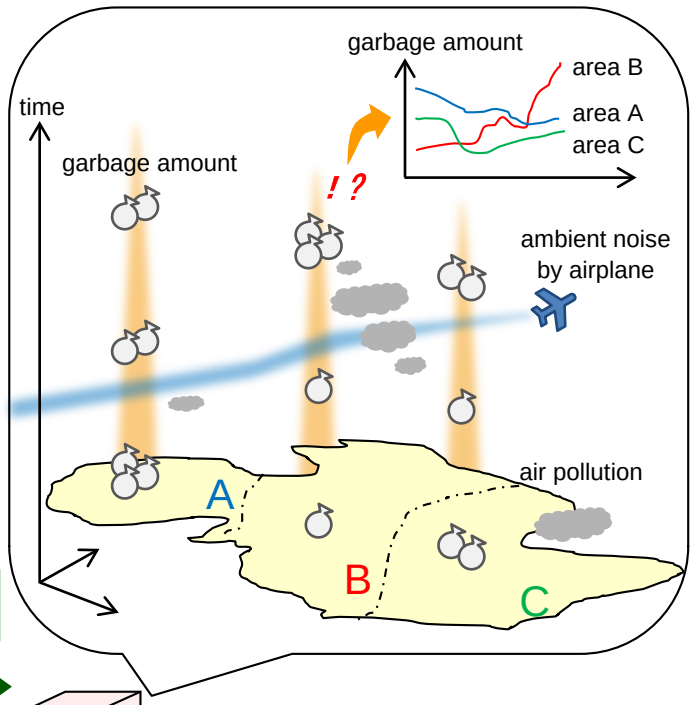
Urban monitoring using garbage trucks

- garbage trucks move around the whole city area almost every day.
- monitoring cities using car-mounted sensors.



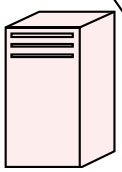
Sensorized garbage trucks in Fujisawa city.

air condition (temperature, humidity, UV, CO, O_3, $PM_{2.5}$…), motion, ambient noise, GPS



air pollution
motion
ambient noise
location(GPS)

Sensorized garbage trucks



Data mining server

Spatio-temporal city event detection

- garbage amount of each area (ambient noise, motion)
- air pollution hot spots (CO, $PM_{2.5}$…)

* The part of research results have been achieved by "Research and Development on Fundamental and Utilization Technologies for Social Big Data," the Commissioned Research of National Institute of Information and Communications Technology (NICT), JAPAN.

Reference

[1] Y. Kishino, Y. Yanagisawa, Y. Shirai, S. Mizutani, T. Suyama, F. Naya, "Agile Environmental Monitoring Exploits Rapid Prototyping and In Situ Adaptation," *IEEE Pervasive Computing Magazine*, Vol. 16, Issue 2, pp. 61-71, 2017.

[2] Y. Shirai, Y. Kishino, F. Naya, Y. Yanagisawa, "Toward On-Demand Urban Air Quality Monitoring using Public Vehicles," in *Proc. 2nd International Workshop on Smart Cities: People, Technology and Data (IWSC'16)*, pp. 1-6, 2016.

Contact

Yasue Kishino, Yoshinari Shirai
Learning and Intelligent Systems Research Group, Innovative Communication Laboratory
Email : s-room(at)lab.ntt.co.jp