A study on the Observation Method of Pedestrian Flow in Urban Space Using New Technology

Urban Planning Department

The Urban Planning Department is conducting research on observation methods for understanding pedestrian flows at various scales, such as from street space to inter-city travel, by introducing new technology that analyzes the movement of mobile phones and other devices using big data etc. in order to predict and analyze the effects of measures to revitalize city centers in a sophisticated and efficient manner with the aim of realizing an intensive urban structure and smart cities.

Social background and challenges

➤ In developing measures, such as the reconstruction of street space to create a space that is comfortable and makes people want to walk, it is important to develop plans based on objective data, such as the volume of pedestrian flow, and evaluate the results of implementing the plans.

➤ In recent years, pedestrian flow observation methods using new technologies, such as mobile phone base stations, Wi-Fi packet sensors, and GPS, are becoming more and more popular. Yet, each has its own advantages and disadvantages. Thus, it is necessary to select and combine methods according to the situation.

Contents of research

Observation of pedestrian flows using Wi-Fi packet sensor

The Wi-Fi packet sensor can be used in buildings and underground spaces where GPS observation is not available and can perform observations at a finer scale than mobile phone base station data.

In this study, the effectiveness of the Wi-Fi packet sensor will be verified by acquiring pedestrian flow data in areas, such as the city center where underground space exists, and comparing it with statistical data and manual observation data. Characteristics of pedestrian flow observation method using the Wi-Fi packet sensor and points to pay attention to will then be summarized.
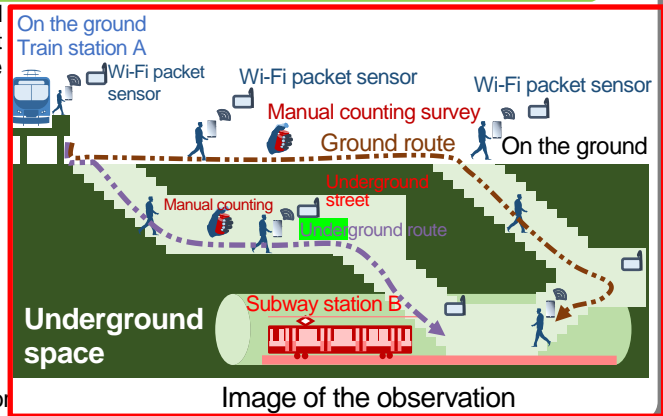
Wi-Fi packet sensor

Image of the observation

Verification of mutually complementary methods based on the combination of new technologies

There is a limit to the amount of data that can be acquired by individual methods alone even if the pedestrian flow observation method uses new technologies. Thus, methods are being explored to increase the accuracy and usefulness of acquired data by combining and mutually complementing multiple methods.

In this study, in order to compensate for the shortcomings of Wi-Fi packet sensors, such as the unstable capture rate of pedestrians, the effectiveness of the following two methods are examined: (1) combination with infrared counters, which can relatively easily estimate the actual value of pedestrian cross-sectional traffic volume; and (2) combination with mobile phone base station data, which can obtain wide- area flow and attribute information, in order to expand the use of the Wi-Fi packet sensors.
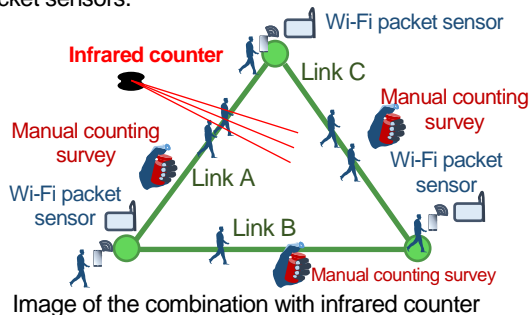

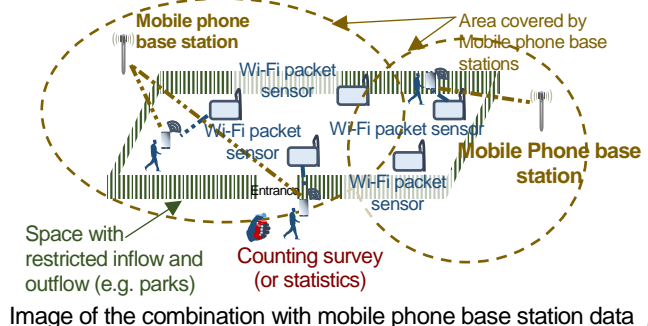
Image of the combination with infrared counter

Image of the combination with mobile phone base station data

By using new technologies to improve the efficiency and sophistication of methods for understanding pedestrian flow, and by enabling smart planning by local governments and other entities, this study will contribute to the improvement of urban sustainability and the realization of smart cities.