Development of Monitoring System of Urban Activities based on Big Data for Supporting Senior-Life Marketing

Information Study Field
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1. Purpose of this study

To evaluate programs and their effects on achieving a smart aging city, wherein citizens including elders can live in comfort, safety, and ease, we must answer several questions such as “Are citizens and their cities aging smartly?”, “Can a city attract youth and incubate their dreams?”, and “How did the residential and nonresidential population change in a target city?”, in a scientific manner.

To answer those questions, the objectives of our studies are as follows. First, we analyze the migratory attributes of elderly people and forecast the spatial distribution of elderly residents based on big data related to urban structures and GPS (global positioning system) data acquired from smartphones and vehicles. Second, we develop a monitoring system of urban activities for supporting programs for achieving a smart aging city, that are planned based on our analysis and forecast.

2. Research Plan

In 2016, we intended to determine the quality of big data related to urban activities and the current situation of elderly people in terms of quality of life and policy, in order to improve their quality of life. We then surveyed volumes of big data on transportation and urban structures to determine whether they could be used for this study and monitoring system. Additionally, we collected information on the current policy related to the quality of life of elderly people.

In 2017, our studies are aimed at selecting big data for a monitoring system and investigating the social policy for elderly people. We continue to evaluate the big data on urban structures and urban activities in an aging society, and assemble data on the current policy for improving the quality of life of the elderly. In this process, we choose the data set for our study that is sustainably and feasibly generated based on our former survey.

3. Results

The study in 2016 analyzed the transition of migratory behavior around the Futago-Tamagawa station area, which is an area of 0.5×1.0 km^2 including the station, based on the big data on population distribution acquired from smartphone. Figure 1 shows the transition of migration in the area for every time zone on weekdays and holidays from 2014 to 2016. The number of migrating people in the peak times increases on average by 1000 on weekdays and by 2000 on holidays. The percentage of foreign visitors classified by their nationality, who came to the area in April 2015 and April 2016, are shown in Figure 2. The number of foreign visitors increased by 3200 over this period. It should also be noted that the charts indicate that the numbers of Korean and Taiwanese visitors have increased four-fold. Figure 3 reveals the number of migrations on weekdays from 2014 to 2016 by resident area, gender, and age group. No change in migration took place for

three years. We can also observe from the charts that many women in their 30s and 40s visit the area. Figure 4 shows the number of migrations on holidays from 2014 to 2016 by resident area, gender, and age group. Although the total number of migrations on holidays is larger than that on weekdays, we could not find any change in migration by resident area, gender, and age group. The area that functions as a business area attracts many women in their 30s and 40s on weekdays. These results indicate that the big data, which we selected, are useful for our analysis and development of a monitoring system.

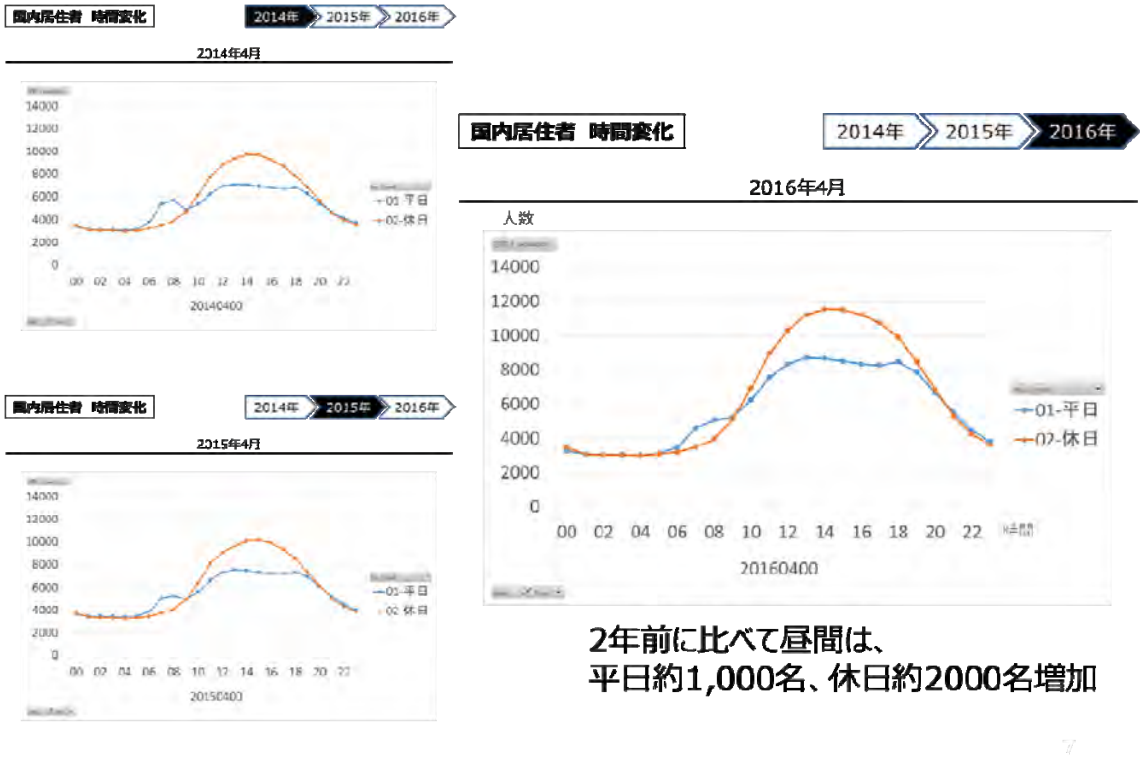
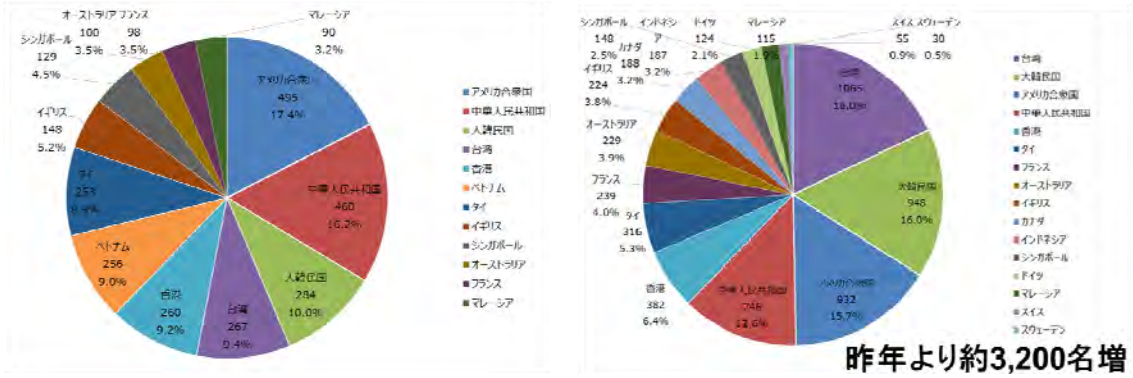


Figure 1 Transition of number of migrations on weekdays and holidays



April 2015 April 2016

Figure 2 Percentage of foreign visitors by nationality

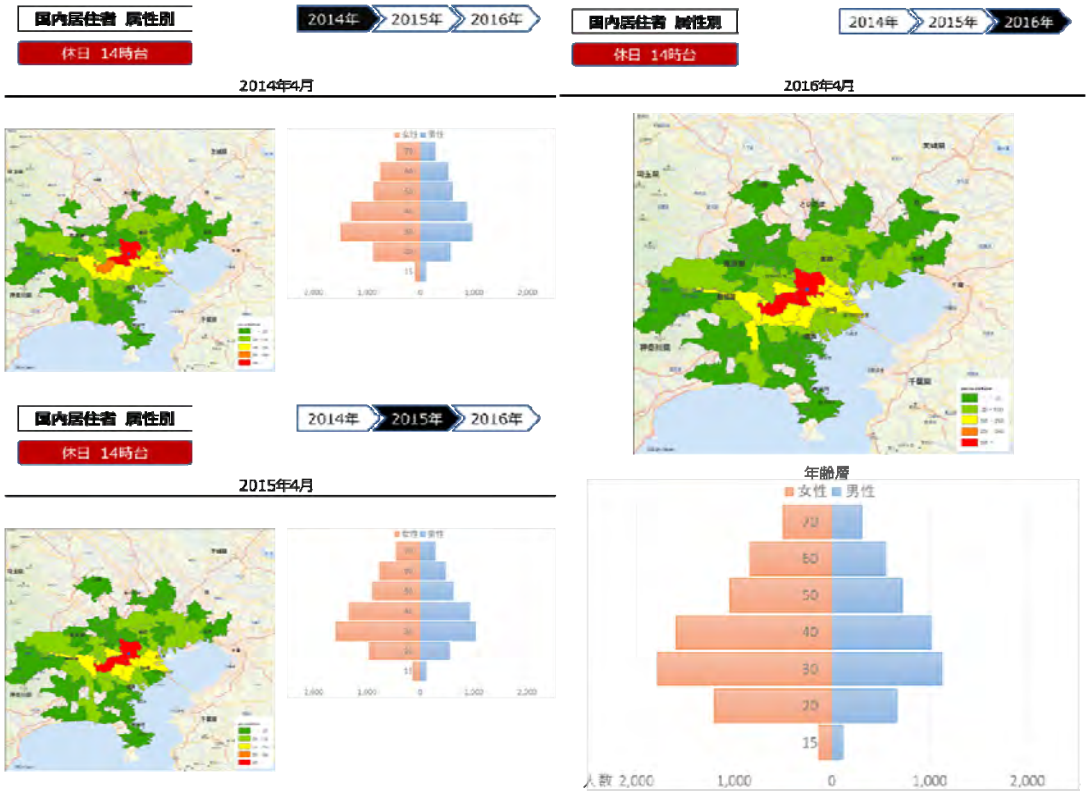


Figure 3 Number of migrations on holidays by resident area, gender, and age group

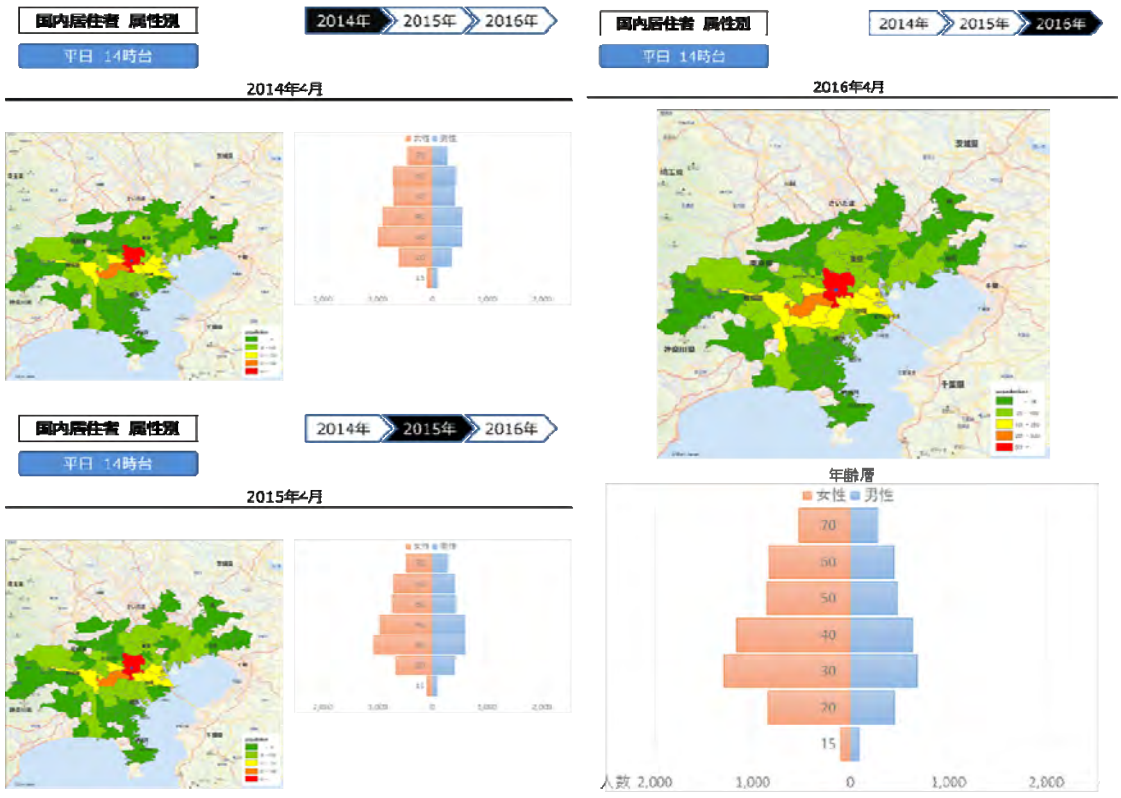


Figure. 4 Number of migrations on weekdays by resident area, gender, and age group

As we can monitor the current situation of urban activities on a real-time basis, it is possible to predict answers to questions such as “Can this area sustain the number of migrations?” and “How will individual attributes of migration change in the future?”. Although we present the results regarding the characteristics of demographic distribution based on our analysis in this report, we will uncover the basic characteristics of floating population and examine patterns through a combined analysis of big data on transportation.

Apart from the above, our study involves efforts to implement a system to achieve our goals, to exchange ideas with experts on big data, and to hold an open seminar for the promotion of our study.

4. Future Development

We now undertake the tasks described in Section 2. In the next year, our study will be able to measure performance bound of big data on transportation of the elderly. It will also devise analysis methods for understanding the current situation and forecasting demand based on a point of view, which the present statistical survey cannot determine.