How Mobile Spatial Statistics Began

Atsushi Murase†

Managing Director of Research Laboratories

In this issue, we feature our efforts on "mobile spatial statistics," which contribute to the sophistication of society and industry. I have been fortunate to witness this project from its inception to its realization; it has been an extremely profound experience for me. In this preface, I would like to touch on the background of the origin of mobile spatial statistics and the efforts of those involved.

The original form of mobile spatial statistics, which had been commonly called by us as "The Mission," or "Odai" in Japanese, began as project within the labs in spring 2008. "The Mission" was a project charged to us by NTT DOCOMO's executive management to realize a grand vision that would change the world. We were called upon to pioneer new areas of growth. In the midst of intensifying competition as a result of the introduction of mobile number portability and a sense that Japan's market was saturated, the role and activities of NTT DOCOMO's laboratories were sharply questioned. However, when it comes to new business fields, there are several barriers besides technology. It is essential to obtain commitment from the executive management and to share the vision within the company, especially concerning the use of the mobile network's operational data, an important managerial resource. A landmark achievement for both NTT DOCOMO and the laboratories was gaining the entire company's cooperation for the grand worldview of "utilizing operational data to bring about sophistication in human society and economic activities, as well as to create new industries."

However, even if we could say the direction of "The Mission"was decided, it was up to the research laboratory members to think through the actual methods. Thanks to their strenuous efforts, they showed that it was possible to convert the spatial distribution of mobile terminals to population statistics, visualize social activities realistically, and conduct all-encompassing analyses of the data using the latest technologies such as big data processing platforms. This idea was announced to the public in the form of a peta-mining project and, then, as mobile spatial statistics. There were three major barriers to making it a reality.

The first barrier was whether population statistics of sufficient precision could be really calculated from massive data at the peta-scale level with realistic processing time and cost. At that time, Google's giant facilities for processing search data had already become a hot topic in the technical field. However, today's buzz word, "Big Data," had not yet become a term in general circulation. The attempt of taking the data of several ten million mobile terminals from the network and processing it speedily and economically using general-purpose servers was an immense challenge.

The second barrier was inventing applications. Unlike population statistics gathered every few years, such as the national census and the Nationwide Person Trip Survey, mobile spatial statistics make it possible to gather population statistics continuously. We needed to ascertain whether this difference revealed social and industrial needs we could address, and to pioneer new solutions, including the development of methods to utilize such population data. Because NTT DOCOMO does not have any specialists in the area of utilizing statistical information, we first focused on urban development and disaster preparedness planning. We began conducting joint research with university professors who were experts in architecture and construction. DOCOMO researchers then personally visited municipalities that were the sites of urban development and disaster preparedness planning. They developed methods of utilizing statistics by grappling with realistic community challenges head-on, such as how to make community buses run efficiently and how best to aid residents who have trouble returning home after being stranded by an inland earthquake.

The third barrier was obtaining social consensus. For NTT DOCOMO, a mobile communication carrier, it is essential that in addition to our customers, of course, society as a whole understand that our use of such operational data is safe and beneficial. The data created by mobile spatial statistics are statistical values and do not include personal information. However, to make absolutely sure, we established a research group of experts from various standpoints, including legal, statistical, and social. After several months of review by leading specialists in diverse fields, including Professor Emeritus Masao Horibe of Hitotsubashi University, an authority in the area of privacy, we announced guidelines assembling the basic points for the protection of privacy when creating and providing mobile spatial statistics [1]. Furthermore, we began by first conducting public sector demonstration experiments, including in the areas of urban development and disaster preparation planning. We publicized our experimental results so the public could widely understand the usefulness and safety of this statistical information.

With these barriers overcome, cities including municipalities in Tokyo; Kashiwa City, Chiba; and Saitama have begun using mobile spatial statistics as basic data for disaster preparedness planning, urban development, and industrial development. The hard work of the researchers, who tackled new, revolutionary technologies for creating demographic statistics from mobile networks and applying them to society and industry, has come to brilliant fruition. Of course, we cannot forget the cooperation and words of encouragement from many people inside and outside the company, which were crucial for advancing our efforts. The greatest value of mobile spatial statistics lies not in specific solutions, but in allowing general-purpose population statistics to be used regularly by ICT. I am convinced that this new information infrastructure will contribute greatly to the sophistication and development of society from here on and become essential.

Reference

[1] NTT DOCOMO: "Mobile Spatial Statistics Guidelines" (in Japanese). http://www.nttdocomo.co.jp/corporate/disclosure/mobile_spatial_statistics/guideline/

† Currently, Director of NTT Microsystem Integration Laboratories