

Current Status of Examples of Initiatives Using Open Data in Government

Participating in the First Governor's Cup Open Data Hackathon in Tokyo

Yusuke Takamori, Junya Sato, Masahiro Fujimoto

Electronic Information Course
Polytechnic University
Kodaira-shi, Tokyo
e-mail: b19309@uitech.ac.jp, b19308@uitech.ac.jp,
b19315@uitech.ac.jp

Masaki Endo, Shigeyoshi Ohno

Division of Core Manufacturing
Polytechnic University
Kodaira-shi, Tokyo
e-mail: endou@uitech.ac.jp, ohno@uitech.ac.jp

Daiju Kato

Nihon Knowledge Co. Ltd.
Taito-ku, Tokyo
e-mail: d-kato@know-net.co.jp

Hiroshi Ishikawa

Graduate School of Systems Design
Tokyo Metropolitan University
Hino-shi, Tokyo
e-mail: ishikawa-hiroshi@tmu.ac.jp

Abstract—This paper reports on services using open data that we proposed at the "First Governor's Cup Open Data Hackathon" held by the Tokyo Metropolitan Government. The use of open data is necessary for the digitization of public administration. We participated in a hackathon organized by the Tokyo Metropolitan Government, developed an application that allows users to search for and participate in event information using open data, and proposed it as a solution for regional revitalization. This proposal demonstrated the usefulness of open data and its potential for solving administrative issues. Nevertheless, open data in Tokyo remains underdeveloped: it needs improvement. We will also report on improvements we made through this hackathon.

Keywords—big data; civic tech; Hackathon; open data.

I. INTRODUCTION

Open data are held by the national government, local governments, private companies, etc. The data are made publicly available on the Internet so that anyone can use the data freely and free of charge. Secondary use of open data by the public and by companies is permitted. In addition, the data must be in a format that is easily read by computers. In Japan, the Basic Act on the Promotion of Public-Private Data Utilization [1] was enacted in 2016 to promote the use of public-private data.

Approximately 96% of prefectures and municipalities responded to the "Questionnaire on Open Data Initiatives for Local Governments" [2] administered by the Information and Communications Technology (IT) Strategy Office, Cabinet Secretariat in 2020. Of the organizations which responded (prefectures (47 responses) and municipalities (1,668 responses)), 56.6% had already released open data. The top three open data items released to the public were basic statistical information (population, industry, etc.) at 37.7%, various information in the disaster prevention field (designated emergency evacuation sites) at 41.0%, and information related to the location of public facilities and services (list of public facilities and list of administrative services) at 33.6%. However, the top three challenges and

problems in working with open data were unclear effects, benefits, and needs of open data (50.6%), lack of human resources in charge of open data (55.4%), and lack of progress in the utilization of open data (29.2%). As indicated by survey results, open data are becoming increasingly available to the public in government. However, the lack of human resources in charge of open data and the lack of understanding of how to use open data have not promoted initiatives related to open data in Japan.

In this context, the Tokyo Metropolitan Government, led by its Digital Services Bureau, strengthened its efforts to use open data. As of December 2021, the Tokyo Metropolitan Government has released more than 49,000 items of open data [3], about 70% of which are in computer-readable Comma Separated Values (CSV) or other formats. The Tokyo Metropolitan Government, the most open data-oriented government in Japan, still has too few initiatives for open data utilization. For this reason, the Tokyo Metropolitan Government held the first Governor's Cup Open Data Hackathon as a five-day event in December 2021. This event was an effort to solve Tokyo's administrative issues and to use civic technology to implement new social digital services that are expected to improve Tokyo residents' quality of life. The Hackathon received 68 applications for participation from 186 people.

This paper reports on issues related to open data in Tokyo, based on services we proposed and prototyped at the first Governor's Cup Open Data Hackathon [4] and based on findings from the hackathon.

The remainder of the paper is organized as follows. Section 2 presents earlier research related to this topic. In Section 3, we present our proposed use of open data for public administration. Section 4 describes the open data used in the proposed methodology. Section 5 describes the prototype created using the proposed method. Section 6 describes the challenges found in the process of creating the prototype. Section 7 describes the future of open data in government.

II. RELATED WORK

Various applications using open data have been developed. Although the number of applications in Tokyo is small, there are some published examples [5]. The Fuchu Barrier-Free Restroom MAP [6] visualizes barrier-free restrooms in Fuchu City using the Tokyo Metropolitan Open Data Catalog. In addition, the River Camera Dashboard [7] application, a one-stop dashboard, visualizes the locations and transmitted images of river-monitoring cameras managed by the Bureau of Construction of the Tokyo Metropolitan Government and sea surface live cameras managed by the Bureau of Ports and Harbors of the Tokyo Metropolitan Government. "LinkedSpending: OpenSpending becomes Linked Open Data" [8] presents a platform for using government spending as open data in countries around the world. Also, "Interactive Navigation of Open Data Linkages" [9] shows a web application for utilizing open data.

Next is an example of a hackathon conducted by governments. Few examples exist in Japan, but hackathons use civic technology in other countries. The President's Cup Hackathon [10] in Taiwan, to which the Tokyo hackathon referred, has been held since 2018. The international track in that hackathon is open to international participants. Hack the Crisis is a hackathon proposed by Accelerate Estonia, an Innovation Lab led by the Estonian government, and organized by Garage48 [11], a hackathon management organization, to fight the new coronavirus. Approximately 1,300 people from more than 20 countries participated in this online hackathon. An operations manual was also published. The event became a worldwide event, especially in Europe.

Consequently, hackathons that use open data and civic technology are becoming popular. In Japan, a need exists for activities using digital technology to promote available data by bringing together those who use data, such as companies and citizens, and those who own the data, such as governments.

III. PROPOSED SERVICE

We developed an application to help revitalize local communities in Tokyo using open data. In Tokyo, the declining birthrate, aging population, and influx of people from rural areas have diluted local communities and have become an administrative issue. Furthermore, in recent years, the Corona pandemic has reduced the number of neighborhoods and has accelerated the weakening of local communities. In addition, community ties are an essential element of smooth communication during a disaster and are necessary for an earthquake or fire. We responded to this challenge by creating an application that provides an opportunity to develop local communities using open data.

This proposal will be developed as a smartphone application that anyone can use. The smartphone application allows users to find and participate in data on events that are the first step in building community connections. The application is divided by ward, city, town, and village, allowing users to browse events in the neighborhoods where they live. The application targets elderly people, people who are moving to Tokyo for higher education or employment,

and singles in households. By helping them find new places to live, we can create a comfortable living environment for Tokyo residents.

IV. USED OPEN DATA

Widely diverse open data are available, including data of local stores and public facilities. Among them, we chose event data as the target for utilization. Event data include information related to events held by local communities: the data are more relevant to issues of regional revitalization than other related data. The Tokyo Metropolitan Government publishes open data on events in each ward, city, town, and village. Event information is uploaded to the catalog site by each ward, city, town, and village; the information is released as open data. We confirmed that 17 wards, cities, towns, and villages published event information related to the Tokyo Metropolitan Government's portal site.

Information related to events in various municipalities is available, but we used open data of Koto-ku as a demonstration, mainly for two reasons. The first is the abundance of information. Unlike other wards, cities, towns, and villages, Koto-ku has large amounts of information related to events. We were able to confirm various information about the possibilities. We decided to use Koto-ku data because we judged that this amount of detailed event information was sufficient to realize our application. The second reason was the data precision. Most open data published by the Tokyo Metropolitan Government included large amounts of null information. Among them, Koto-ku was selected as a demonstration because it has few nulls and

TABLE I. OPEN DATA CONTENT OF THE EVENT

Category	Description
Place	Prefectures, Municipality, Address, Latitude, Longitude, How to access, Postcode, Distance
Event	Event name, Event details, Description
Date and time	Start date and time, End date and time, Start time, Ending time
Contact	Contact name, Phone number
Organizer	Organizer name
Participation information	How to apply for participation, Description of the deadline date and time information, Participation Conditions
Home page	Description of homepage Uniform Resource Locator (URL), Event image
Capacity	Description of capacity by age
Remarks	Presence or absence of parking lot, Presence or absence of a nursery center and details

large amounts of event information, which we judged to be easy to handle for our use. For these reasons, we created an application using event information of Koto-ku as the first demonstration data among the data of many wards, cities, towns, and villages.

We obtained data for Koto-ku from the Tokyo Metropolitan Government's Open Data Portal site. The open data for Koto-ku events included 107 event data, and included 55 pieces of detailed event information. Table I shows typical events, put into nine categories: location, event, date and time, contact information, organizer, participation information, website, capacity, and remarks. The nulls, representing missing data among these open data, were 911 out of 5564 pieces of total data, or approximately 17% of the total. Koto-ku event data had the lowest level of missing data among the 17 wards and municipalities in the Tokyo portal.

V. PROTOTYPE

To provide services using open data, we created a prototype of an application. The prototype implemented the functions and User Interface (UI) to search for and participate in Tokyo Metropolitan Government event information. We developed the prototype as a smartphone application. Smartphones are currently gaining popularity rapidly in Japan. As of May 2021, the smartphone penetration rate in Japan is 92.8%. To enable more people to use them, we chose a smartphone application because it is accessible to everyone.

The prototype of this application targets Koto-ku, Tokyo. Its essential functions are to search for event information in the area to obtain details and to participate in events. It is also necessary to maintain the new community created through the event. For this reason, we implemented a chat function within the community. The application consists of a screen for seeking event information to find a suitable event, a screen displaying detailed information about each event, and a screen for chatting with other event participants.

Figure 1 shows the UI of the screen intended for searching for event information and finding an event. We divided this

screen into search items and event search results. The event information matches the conditions entered in the search items displayed immediately in the results. In this prototype, to search for necessary information from the vast amounts of data, we added a function that allows users to search by any of the following items: date, time, address, category, keyword, and distance. By narrowing down event information from multiple criteria, one can obtain the exact information users want from a vast amount of data. Additionally, we implemented a function to switch between list (Figure 1a) and mapping (Figure 1b) formats to display results of retrieved event information. By making it possible to switch the display format, the UI design facilitates the comparison of items of importance according to user needs.

The screen displaying detailed information for each event is displayed when the event in Figure 1 shown earlier is selected. It consists of detailed information for that event. The detailed information includes the location, date and time, event details, contact information, and other information required by event participants. Event participants can chat freely with other participants. We generated a chat room for each event. The chat room can be accessed from event details. Participants are provided a place for participants in the same event to communicate.

This application realized open data by providing the information desired by users in a visual, easily understandable form. We also believe that using open data will help revitalize the community.

VI. RESULTS OF WORKING ON THE HACKATHON

We used open data of event information published in only 17 of the 62 wards, towns, and villages in Tokyo. The percentage of wards, towns, and villages that publish open data was 27%. Of the 17 wards, cities, towns, and villages which publish open data on events, 15 publish open data in CSV files. The remaining two publish open data in different formats. They updated only one within one month of the 15 wards, towns, and villages which published their open data in CSV files. Consequently, the open data released by the Tokyo Metropolitan Government are of various formats. The stated update frequency is not reliable, making it difficult for users to use the data. For future data use, we hope that the Tokyo Metropolitan Government will create a unified standard for data to be released using the recommended dataset of the Government Chief Information Officers (CIO) Portal and other data and create mechanisms to increase the update frequency.

The prototype we created was intended to solve the problem by providing open data information to users in an easily searchable format. However, in terms of using open data, it is preferable to process event information into an easy-to-read format and to provide it in combination with open data of public facilities and generate new data and value by making predictions and inferences from the original data before providing the data. We regard the true meaning of using open data as providing newly created value that has not been available until now, only from event information by combining event information and information of other types.



Figure 1. Event information search screen.

Administrative issues include employment, public safety, air pollution, and many others. To resolve administrative difficulties, we use open data to leverage the digital skills of residents. This goal necessitates enhancement of open data that the government makes available free of charge in a form that is useful for secondary purposes. This event confirmed that open data help resolve administrative issues.

VII. CONCLUSION

This paper reports services using open data proposed by the Tokyo Metropolitan Government in the first Governor's Cup Open Data Hackathon held by the Tokyo Metropolitan Government. For this effort, developing an application that will become a service through the utilization of open data and civic technology is also underway. Consequently, the hackathon conducted by the government demonstrated the possibility of solving administrative issues. However, results also clarified that a need exists for measures to enhance open data in public administration and to create a mechanism to involve more engineers with digital skills in the digitization of public administration. Our future reports will present proposals to the administration, including points for improving the Tokyo Metropolitan Government's open data, which we have learned through our research using open data.

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