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English

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Geographical names data management

Experiment in continuous update methods for the web map entitled "Japan map in multilingual notation"

Submitted by Japan**

Summary:

The Geospatial Information Authority of Japan has been developing various geospatial data on Japan and providing that information in an easy-to-use manner. As part of this effort, the Geospatial Information Authority experimentally released the multilingual web map entitled "Japan map in multilingual notation" on 14 February 2020.

The web map not only displays annotations in Japanese, Romanized Japanese and English, but also automatically converts to display annotations in Chinese, French and Korean.

In addition, the notation rules for geographical names in English established by the Authority are applied in various cases, such as in English references on road signs or citations of the English notation guidelines by many local governments. The guidelines have spread to become standard English notation rules for foreigners. The "Japan map in multilingual notation" is also referred to as a representative example of a web map that fully complies with the English notation rules. Developing annotation vector tiles based on the rules and disseminating them has made a positive contribution to the standardization of the English notation of geographical names in Japan.

In the experiment covered in the report, the Authority aims to continuously update the web map, which serves as a kind of standard for the English notation of geographical names in Japan. The experiment involves a new method to regularly create annotation vector tiles.

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Experiment in continuous update methods for the web map entitled "Japan map in multilingual notation"

1. Introduction

Geospatial Information Authority of Japan (GSI) is the national geospatial information authority of Japan. GSI is working to organize data on Japan's national land and provide it in an easy-to-use manner. As part of this effort, the web map entitled "Japan map in multilingual notation" has been experimentally released since February 14, 2020 (Figure 1).

Unfortunately, the impact of the corona virus COVID-19, which began to spread around the time of the release, had a direct impact on inbound projects. According to the Japan National Tourism Organization (JNTO), the number of inbound tourists, which hit a record high of 31.88 million in 2019, had shrunk to less than 1/100 of that, or 240,000 in 2021.

Against this backdrop, "Notation Rules of Geographical Names, etc. in English" established by GSI are used in traffic infrastructure, such as displaying road signs in English, and are quoted in the guidelines for English notation used by local governments. It is being used in various cases, and has spread as a kind of standard of English notation for foreigners. Regarding "Japan map in multilingual notation", reference is made as a representative example of a web map that fully complies with the English notation rules, and annotation vector tiles are used, and information based on the rules is organized and distributed as a map. This has made a certain contribution to the standardization of the English notation of geographical names in Japan.

Since the main purpose of the "Japan map in multilingual notation" was to test its mechanism, the annotation vector tiles used to display annotations were specially created. This time, we will introduce a method that we tried to enable regular updating of annotation vector tiles for this web map, which can be said to be a kind of standard for English notation of geographical names in Japan, aiming at continuous updating.
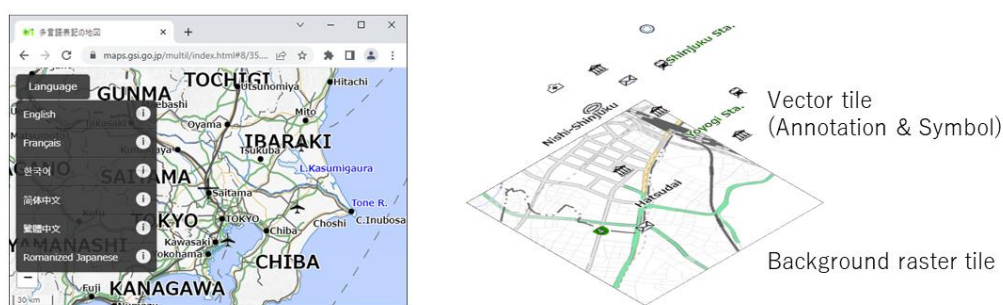

Figure 1: Japan map in multilingual notation

2. Creating annotation vector tiles for multilingual notation

The annotation vector tiles used in the " Japan map in multilingual notation" released in 2020 were specially created by adding necessary information such as English notation to Japanese map data. Since we will continue to release the "Japan map in multilingual notation", we have established a

method for creating annotation vector tiles, focusing on continuous updating of annotation information (Figure 2).

In creating the notation vector tiles, we used the Digital Japan Basic Map (map information dataset) and the geographical names database currently in operation at GSI as a base, and devised a framework that does not interfere with the operation of these existing databases.

The main data used in creating the annotation vector tiles is the map information dataset, which is the original data of the GSI maps. This is because there are data such as traffic facility names that can only be found in the map information dataset, and by translating the map information dataset that has the location information of the annotations into multiple languages, the balance and placement of the annotations can be properly maintained. However, since Japanese nouns are basically expressed in *kanji*, the annotation data (as domestic annotation data) of the map information dataset used for mapping does not have the information (as multilingual information) of English, Romanized Japanese, or Japanese phonetic *kana* characters required for multilingual notation.

On the other hand, since the geographical names database is created as basic data of geographical names, English notations and names that are not used in notes are also acquired as information. When creating multilingual vector tiles, we added multilingual information to domestic annotation data by associating domestic annotation data with the geographical names database.

In addition, since the geographical name information database does not include facility names such as traffic facility names, this multilingual information was newly developed.
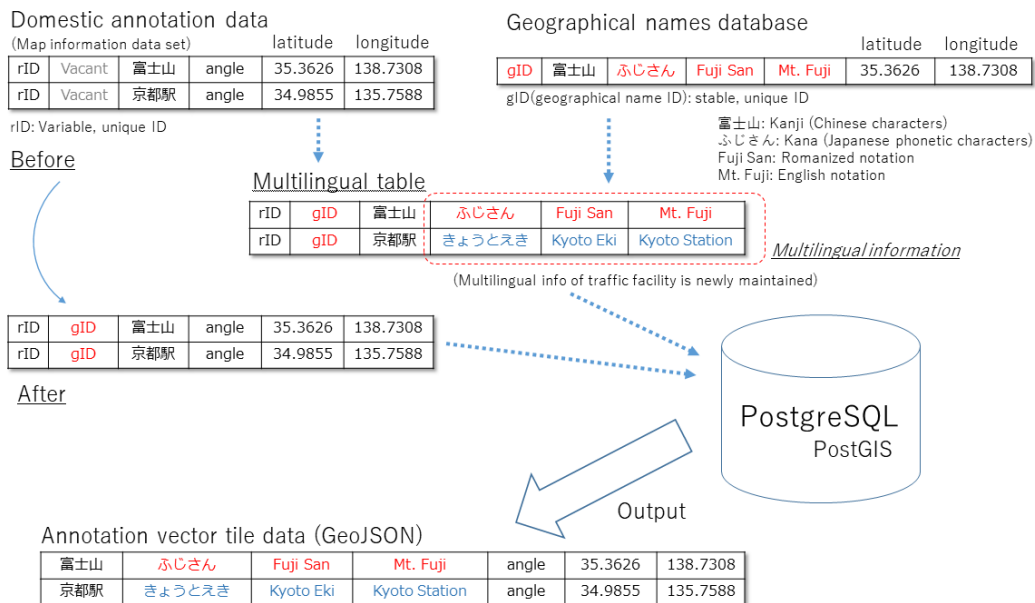

Figure 2: Method for creating annotation vector tiles

In order to minimize the impact on the operation of the original data set, we decided to create a new "multilingual table" and use this table to link domestic annotation data with the multilingual information. The multilingual table is a table in which key information and multilingual information are aggregated, and has the role of linking the information necessary for annotation vector tile creation while being separated from the data set that is in operation.

For the IDs, which are the key to the relation, we used the stable and unique geographical name IDs of the geographical names database without modification. New geographical name IDs were

assigned to facilities that were not included in the geographical names database, such as traffic facility names. After linking these IDs with the multilingual table, entries were made in the vacant column of domestic annotation data.

By developing multilingual tables, it is now possible to add multilingual information while outputting vector tiles based on domestic annotation data.

3. Updating annotation vector tiles for multilingual notation

By preparing the multilingual table, it became possible to link the information required for multilingual notation with domestic annotation data. As a result, the multilingual table can be updated in conjunction with changes in domestic annotation data (Figure 3).
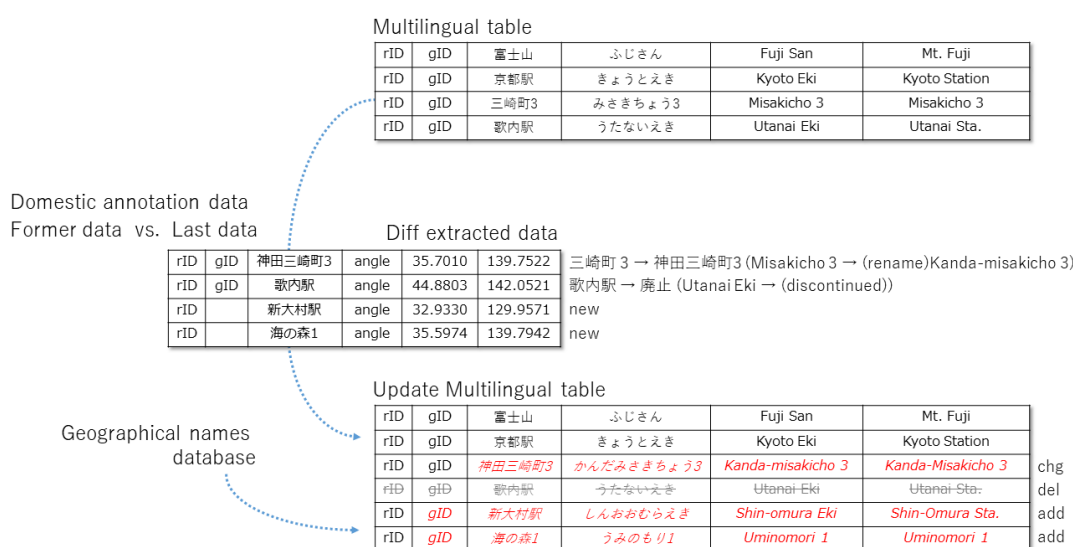

Figure 3: Updating multilingual tables

Updating work of annotation vector tiles is carried out in the following order:

i.   Comparisons are made between former and last domestic annotation data.

ii. Multilingual table are updated from extracted data where names have changed.

iii. Multilingual table are updated from extracted data that have either been added or deleted.

iv. Annotation vector tiles of changed sections are created by combining domestic annotation data and multilingual tables.

Using this method, in November 2022, the annotation vector tiles were updated for the first time since their initial creation in 2020 (Figure 4).

| Before | After |

Figure 4: Display example (Before and after updating)

4. Conclusion

Experimental methods have been devised to continuously update the annotation vector tiles for multilingual notation while minimizing the impact on the basic map update flow of Japanese while saving as much effort as possible. We have presented a method for managing additional information by creating a multilingual table between map annotation data and geographical name basic data, which are not linked directly. Currently, GSI is experimenting with expressing all GSI maps with vector tiles. Multilingual information is information added to Japanese annotation data, so it has a high affinity with vector tiles that can hold various types of information. Geospatial Information Authority of Japan (GSI), as a national cartographic authority that maintains national base maps, has developed annotations in multiple character notations (*kanji*, *kana*, Romanized Japanese, and English) in order to provide more appropriate annotation information. We will continue to promote efforts to disseminate information that is easy for users to understand and use.

Point for discussion

The Group of Experts is invited to:

(a) Comment and provide on similar work being carried out in other countries.

(b) Comment on the annotation vector tile creation method and updating method.