

INFORMED FEATURE: GRAPHIC USER INTERFACE BETWEEN PEOPLE AND GEO-INFORMATION

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INTRODUCTION

A map is an abstract presentation of the real world. In addition, conventional map works as geospatial data storage using paper media. However today, a marker put on the map presented on the screen indicates that you can get information. What does it mean? A modern digital map is not only a language but also an interface to get information from data storage, and map itself is not data storage anymore. However, for example, a map showing the center part of the city become difficult to read because bunch of markers stand on the map. In this paper, we will recommend to use a geometric attribute in a feature (e.g., shape of building, land, or road) as an interface to get thematic information instead of a marker, whereby users can find information interactively without stress.

ROLES OF A MAP

We produced maps using analogue instrument such as a mechanical stereo-plotter until about two decades ago. At that time, producers were creative with symbols putting in the small space as many as possible, because they thought the paper is not only for presentation but also for storage of geospatial data.

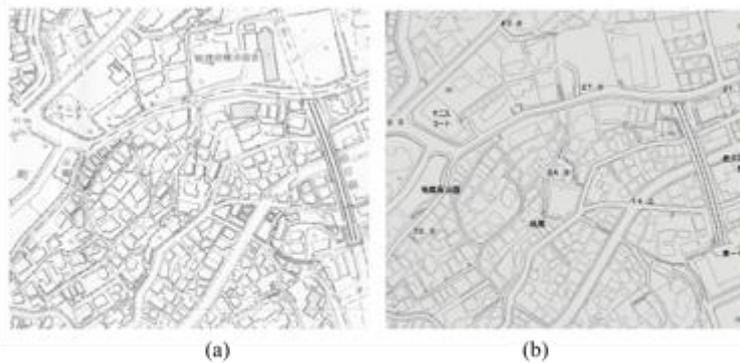


Figure 1. 1/2500 map for the city planning at Yokohama City, Japan
(a) Paper map published in 1982, (b) Map on the Web provided in 2011

However today, the symbols using in Web Mapping Services are rather simpler comparing with the conventional maps (Figure 1).

On the other hand, the ability to present information is more than before. Because, a digital map on the screen is connected to the client computer, and it connects with application servers and multimedia data servers through the network. In other words, digital map today works as an interface between people and Spatial Data Infrastructure (SDI) (Figure 2). User can run geometric operations such as zooming, panning, and rotation; user can see different views, such as birds eye view, street view and orthogonal view; user can select which geographic features he/she want to see; and user can analyze geographic data [1]. Actually, a modern mapping service is a mechanism to realize ‘engineered serendipity’ noted by William Cartwright [2].

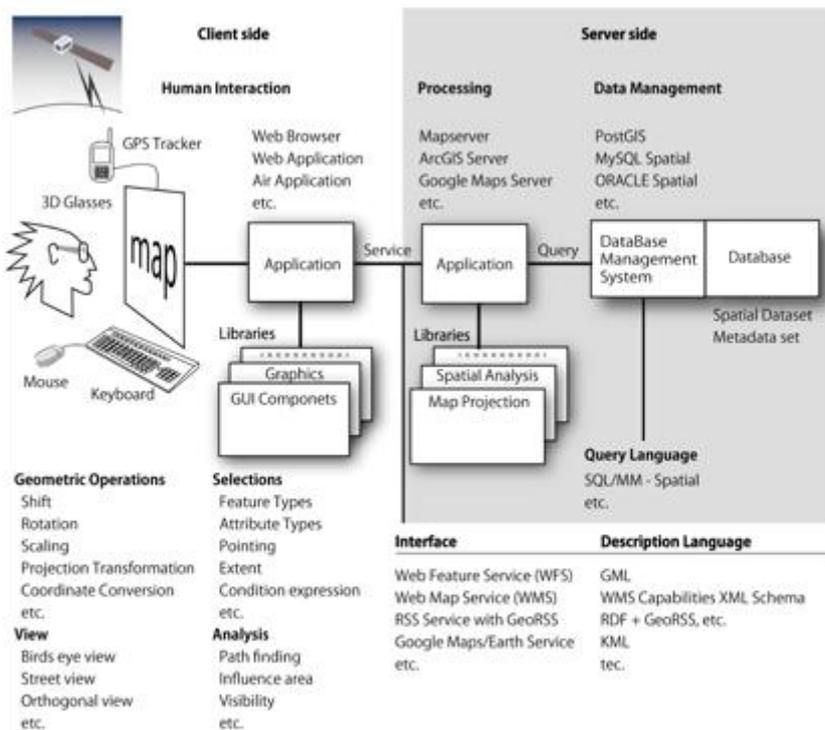


Figure 2. Modern mapping architecture

3. A MAP AS GRAPHIC USER INTERFACE TO GET INFORMATION

Traditional GISs represent geographic object as a pair of figure and attribute. Attributes are displayed by pushing figure on the map using pointing device. Modern geographic information standards provided by international organizations such as ISO/TC211 and OGC adopted object oriented modeling describing geographic features. However, in the most of Web Mapping Services, base map is an image provided by suppliers, and information on the map-image associated with a simple geometry (Point Of Interest (POI)) are uploaded by users. As a result, a map showing the center part of the city become difficult to read because bunch of makers stand on the map. Thus, users sometimes cannot find useful information from overlapping POIs.

To avoid such a situation, geometric attributes in a feature as an element of geographic database provided by the supplier should be used for the association to the information given by users. They can feel that the information is hidden behind of the geometric feature having different color. This is called informed feature, and it affords the sign of information to users [3]. Technically, it is not so difficult because the figures are geometric attribute of geographic features, and features may have additional thematic attributes. However, it could be necessary that the service provider represent information using the Web Feature Service, not the Web Map Service. Service provider should also think about the reliability. Geographic information should be linked with metadata that describes data source and responsibility.

4. PROTOTYPE APPLICATION

We produced the prototype Web Application to simulate the recommendation. Feature instances are implemented in compliance with schemas for feature type, feature instance, and portrayal, designed for this system. The procedure to get information is as follows (Figure 3).



Figure 3. Step-by-step display process

(1) User views the initial base map that affords which features are informed.

(2) Title of information is presented by putting cursor over the informed feature.

(3) Metadata window is presented by pushing the cursor. Then, pushing a button for “more info” in the metadata window shows detail information.

5. CONCLUSIONS

A modern digital map should be an interface between people and SDI. Meanwhile, POIs put on the map decrease the map readability. Consequently, the author recommends three points to improve current situation.

1. Makers should not be used, so as to ensure the readability of base maps.

2. Information submitted by the user should be associated with geometry of related geographic feature.

3. Geographic information should be linked with metadata that describes data source and responsibility.

REFERENCES

[1] Google, Google Maps API Family, <http://code.google.com/apis/maps/index.html>

[2] William Cartwright, Engineered Serendipity: Thoughts on the Design of Conglomerate GIS and Geographical New Media Artifacts, *Transactions in GIS*, 2004, 8(1): 1-12.

[3] Donald A. Norman, *The Psychology of Everyday Things*, Basic Books, 1988.