An empirical analysis of the patterns and variations in map use based on a web survey: Focusing on the use of web maps

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The dissemination of digital maps and the Internet has promoted use of maps on the web (viz., web map), changing people's manner of map use. While previous studies were mainly concerned with the conceptual or technical aspects of web maps, few empirical studies were conducted on how ordinary people use maps on the web. The aim of this paper is to clarify the variation of map usage among ordinary people and factors affecting it by focusing on the maps on the web. Data were collected through a web survey to 635 people in Tokyo Metropolitan Area on the frequency and purpose of the usage of various maps. The factor analysis applied to the data on the frequency of the map use revealed that the maps can be classified into three groups: web map, guide map, and multipurpose map. Then the relationship between use of these maps and the attributes of the respondent were statistically tested. Results indicate that guide maps were used more by women, while multipurpose maps were used more by men. The use of multipurpose maps is closely related to the respondents' experience and spatial thinking skills. The use of guide maps is also related to one's interest in maps/geography and information technology skills. However, the use of web maps has almost no relationship with the attributes of the respondents. This implies that since using web maps requires few skills, variation in their use is minimal. Hence, web maps can be a useful tool for disseminating participatory mapping/GIS involving various entities.

Keywords: map use, Internet, web map, web survey, geospatial information

A Proposal of Mobile Mapping Tools Supporting Old Maps for Fieldworks in Historical Landscape Researches

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Maps are useful data sources and tools in historical landscapes researches. Especially, old maps, including historical maps, old city plan maps, old tourist maps and so on, are important references when investigating the influences of landscape changes. However, such maps are not fully used in outdoor fieldworks. The researchers may spend much energy on locating their current positions and various targets manually on different maps on analog media. Furthermore, they may spend more energy on corresponding the data and materials gathered in the fieldworks to the correct locations on the maps in the indoor tasks afterwards.

Current mobile Geographic Information Systems (GIS) can provide useful functions, including data collection and processes with awareness of users' current locations and context, on basis of the well-surveyed and up-to-date digital map data. However, the old maps cannot be well supported, because they usually contain large and irregular distortions.

As a result, a new mobile mapping platform is needed to integrate old maps with location-aware mobile devices, in order to provide new toolkits to collect, process and visualize data on various maps with portability and usability for the fieldworks. A fundamental function is positioning on various analog maps that were not well surveyed.

In collaborating with historical landscape researchers, we have investigated the existing and potential requirements of mobile mapping in their fieldworks. The expected usage of the mobile mapping toolkits can be divided into the following three stages.

(1) Pre-field Stage is conducted indoor, together with the preparation of the fieldwork. Investigators will convert analog maps to the mapping application, and register georeferences (e.g. reference points) to the maps to make them geo-enabled for positioning. The maps should be organized by temporal and geographic arranges.

(2) Fieldwork Stage is conducted outdoor, when investigators will use the mobile mapping application running on their handsets, such as smartphones and tablet computers. The mapping tools can provide positioning on maps of different types and periods in the history, and compare with the latest maps and the real situation for references. The mobile application can also be used to collect and input field data, for example, photos, text memos, audio records of interviews, and so on. The collected data can also be able to visualized and retrieved on various maps. The application should also support group works, by which investigators can share their locations and collected data on the mappings.

(3) Post- field Stage is conducted indoor, which will organize the collected data, and export them for further analyses. The archived data and results can be accessed and visualized from the mobile mapping toolkits in the future fieldworks.

In our previous researches, we have established a framework of Human-centered Mobile Mapping (HCMM), and developed applications to integrate illustrated walking route maps into mobile mappings for tourists. In this research, we create an initial prototype by extending the existing applications to append basic functions for the Pre-field and Fieldwork Stage. Especially, functions for dynamically inputting and visualizing location-related data and real-time sharing of locations on HCMM are newly developed. The development also considers the easiness of operation by non-GIS specialists.

The prototype will be tested and evaluated in the investigations in the historical districts in Suzhou, China, on the spatial distribution of the residents' daily activities and their attitudes towards the changes of environment and landscapes. Suzhou is a historical city, whose location has changed little after its establishment. The rich resources of Suzhou's old maps are very suitable for the experiment.

With the data gathered in the experiment, the Post-field Stage will be focused to support the complete workflow of a fieldwork with efficiency.

MTT42-P03 Room:Convention Hall Time:May 26 18:15-19:30

Transition around Kodaira City detected by using geospatial information

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The author is planning to lecture titled "Transition around Kodaira City detected by old maps and old aerial photos" as a citizen lecture of the College of Land, Infrastructure, Transport and Tourism in March of this year. The change of land use and land cover around the College of Land, Infrastructure, Transport and Tourism will be introduced in this citizen lecture using the time series geospatial information such as Jinsoku-sokuzu, old edition topographical maps by Japanese Army and old aerial photos taken by U.S. Army. It will be also introduced about disaster risk in this area from landform evolution and the existence of shallow valley in upland using Land Condition Maps and Digital Three-Dimensional Maps.

In this presentation, the author will show these geospatial data in poster and would like to introduce how these data could be utilizes for geographical education, historical education and disaster prevention education to local residents.

Keywords: land use change, landform, geospatial information, Kodaira City

Relationship Between Development Of Transportation Or Industry And Geographical Features Or Waters In France

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The navigable waters in France is the longest at Europe.
Transportation by water is decreasing due to development of a railway and motorization.
Canals are going along to topography. But railways and road routes are not. They are going to destination in a straight line.
Vineyard was developd along to topography, too.

Keywords: canal, transport, topography.

Geo-visualization of Endemic Malaria and Irrigation and Drainage Project in Miyako Island

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For the geographical environmental reconstruction of endemic malaria in Miyako Island, this study combines high resolution DEM (5m or 10m) with topographical maps published in the early 20th century and make 2D and 3D maps from there. And I mapped irrigation and drainage project contents carried out after return to Japan of 1972.

The study area is Higashi-Nakasonesoe of the Miyako Island. The Island is almost covered by the elevated limestone, but the study area is covered in the soil of mudstone, and is affected by the cliff made of fault. Therefore, Higashi-Nakasonesoe was the worst endemic malarial area in the Island. After 1972, the modernization was carried out in this area by enforcement of the irrigation and drainage project.

Keywords: Endemic Malaria, Geographical Environment, Irrigation and Drainage Project, Geo-visualization, Miyako Island

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A Color-Shaded Relief Map created with Multiple Light Sources by three primary colors (CMY) synthesis

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In order to make full use of the high-precision DEM data, various terrain representation methods has been proposed. These methods are specialized for clarity fine unevenness that can't be expressed by the conventional Color Shaded Map, therefore often different from the natural colors.

Then, we have devised "A Color-Shaded Relief Map created with Multiple Light Sources" synthesized shaded-map from a few light sources and color relief map, as more extended terrain representation method.

For simplification of the method, we have set 3 directions of the light sources with a fixed depression and azimuth, and examined a method for synthesizing them. Assign three primary colors (Cyan, Magenta, Yellow) to these shade-maps and synthesize process, we could recognize getting the near impression of shaded-map from upper left light source.

"A Color-Shaded Relief Map created with Multiple Light Sources" is made by combination with color relief map to thus the shade-map. In comparison with conventional Color Shaded Map, we can notice small unevenness, and it is possible to suppress the emphasis in height direction, so we can express natural terrain representation on this map.

Keywords: Multiple Light Sources, Color-Shaded Relief Map, three primary colors

Analysis of the influence from the geometry of roads and other artificial structures to evacuation plans

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In future, the powerful natural external force (e.g. earthquakes, tsunamis, local heavy rain) will occur. The evacuation is important and effective to guard our lives against such natural external force, because the prevention structure may be destroyed by the force.

The local governments offer hazard map and disaster prevention map. The people plan the evacuation behavior and decide the evacuation route. And the validation and the safety of evacuation behaviors are checked by town walks and trainings. But, It is difficult to understand the distance to evacuation place from these maps. It is possible to plan more reasonable evacuation using the information due to such road plane structure and its clarification.

In this research, it is considered to analysis influence of road plane structure to evacuation areas using the distance and the place which the people can reach the evacuation place within one time.

Specifically, we try to examine the reachable places to evacuation site and a direct distance from the evacuation place to the farthest reachable place, and the difference of these at time intervals. If the direct distance is very shorter than evacuation distance, it seems to prevent to increase evacuation because of some physical environments (e.g. roads, railways and rivers). Furthermore, we try to visualize the reachable places to evacuation site at time intervals. It seems to be able to know clearly the complicated road structure and some facilities across the evacuation route using this visualization.

Keywords: natural disaster, evacuation area, evacuation route, road structure

Cognitive Features of Map Signboards for City Communications

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1. Background

As public facilities that indicate spatial relative information, map signboards play important role in city communication. Map signboards have advantages that can be shared by the public and can get in time update. However, some map signboards are not well designed and are easy to mislead people. This paper analyzed cognitive features of map signboards for evaluating and designing map signboards.

2. Cognitive Features of Signboard Maps

Map cognition is the essential process that connects map with real world when people reading a map. Four important cognition features of map signboards are as follows.

You Are Here (YAH) point. According to whether YAH point can indicate user's location, we divides YAH point into two categories. One is positional point, which is usually a round or square spot and only indicates the position of the map signboard. The other is position-directional point, which contains a short segment or an arrow that indicates both position and direction of a map signboard.

Alignment. Map signboards are fixed and cannot be rotated. To make it easy to read, map signboards should be well aligned to avoid people from rotating map images in their minds. Egocentric, exocentric, and allocentric are used for map signboards. Egocentric map signboards are drawn based on the direction of the map signboard. The up direction of the map corresponds to the facing direction when people reading the map. Egocentric map signboards are good at instructing the spatial relations between the map-reader and surrounding objects. Exocentric map signboards are north-upped, and are good at showing the spatial relations among different objects. Allocentric map signboards use main spatial objects, like main road, to build mapping coordinates. Allocentric map signboards are good at indicating the spatial relations between the main object and other objects.

Distortion. Based on map distortions, we classify map signboards into two categories: maps with regular distortions and maps with irregular distortions. Map signboards with regular distortions keep accurate topological, distance, and direction relations with mathematical formulas. The accuracy ensures the correctness in micro way navigating. Map signboards with irregular distortions just ensure topological relations among objects. Overall impressions of an area can be left by using irregular distortions.

Symbol. We classify two kinds of symbols for map signboards: abstract symbols and representational symbols. Abstract symbols use regular shaped symbols to refer to certain spatial objects. An abstract symbol can represent a kind of objects and usually map legends are needed to translate the abstract symbols. Representational symbols use vivid pictures to represent spatial objects. One representational symbol stands for one spatial object. Meanings of representational symbols are usually noted beside the symbols. The map signboards that use abstract symbols look more formal and reliable while those map signboards that use presentational symbols are more artistic and attractive.

3. Evaluating Map Signboards

Cognition features are used to evaluate map signboards with different functions.

Instructing maps are used when users have a clear destination, and the maps navigate people to the destination. Good instructing map signboards should be egocentric with regular distortions.

Showing maps are used when users' destination is not clear or unique. Showing maps show the distributions of facilities around and give candidates of answers. Good showing map signboards should use position-directional YAH point and regular distortions.

Evolving maps do not only show the spatial distribution of objects, but also arouse users emotions. Good evolving map signboards should use representational symbols.

Keywords: Map Signboard, Map Cognition, City Communication

Newly Development Thailand Mineral Information System Based on International Standard

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Department of Mineral Resources, Thailand (DMR), had developed and setup a centralized database since 2004 by company consultant and commercial software. This initial database aimed to gather all available and distributed data of the department for internal and public uses. Either the data entry system or the data query/display system was developed. A decade development revealed that only the data entry system was practically success. The query/display system, however, required technical improvement. So we have to plan to allocate budget for system maintenance and improvement every year.

In 2011-2012, Japanese government provided project assistance in both financial and technical support to develop ASEAN mineral resources database and information system. This system that is currently called AMDIS is operated by the Working Group on Mineral Information and Database (WGMID) of ASOMM. DMR has participated to the project as national representative and active working group. The participation leads to knowledge and technical implementation to DMR.

After this project DMR realizes that the commercial software is not the best solution for disseminate all spatial information because annual budget has to allocate for maintenance. Besides, DMR believes that this implementation is a sustainable principle to disseminate all spatial information to public via WMS/WFS/WPS compliant with OGC standard should be an incentive point for future development. Therefore all lesson learns on this case may provide example for decision making of other organization.

Keywords: Mineral Resources, OGC, WMS, WPS, Thailand, Database