

Development of a hazard map creation support system with community participation type using positional information

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ABSTRACT

This paper describes development of a system that can create a hazard map by residents in order to prepare for disaster in daily life. This system make a hazard map by displaying the community-based disaster information on the map. Residents register information about the spot (a disaster type, a risk level, a photo, comments, positional information) that can be dangerous in case disaster. We think that residents can share information while having fun and increase disaster prevention consciousness by resident participation activities.

Keywords : disaster prevention, hazard map, historic local town, participation activity, positional information

1. Introduction

Japan has many natural disasters. Therefore, studies on these disasters have been made widely. After the Great East Japan Earthquake Disaster (March 11, 2011), efforts of disaster prevention and reduction have been further strengthened. While cities better prepared to cope with future disasters has been developing due to the upgrade of infrastructure, the historic local towns that exist in various parts of Japan suffers the problems specific to them [1]. Historic local towns have depopulation and aging. And in order to preserve the traditional landscape, the historic local towns cannot upgrade infrastructure as anti-disaster measures. It is necessary to think about person-centered disaster prevention.

In this paper, we develop a system that can create a hazard map by residents in order to prepare for disaster in daily life. It can collect local detailed information by local residents contributing information. Disaster prevention awareness of residents improves with resident participation activities. Disaster prevention awareness of residents improves by making hazard map with resident participation activities. In this study, we selected Hizen-Hamashuku in Kashima City of Saga Prefecture in Japan as a model areas of historic local towns.

2. Interview

2.1. Method

We conducted a questionnaire survey on natural disasters to local residents of this model district so as to understand the needs and efforts in the field related

to disaster prevention and reduction [2]. In this study, we conducted a survey by face-to-face interview at community center of Hizen-Hamashuku on August 18, 2014. We got the answer from 18 participants, who are district welfare officers or chiefs of wards. They play a leadership role in the region.

2.2. Results

- Existing efforts for disaster prevention and reduction
There are voluntary disaster prevention organizations. They implemented firefighting training once or twice a year. Although the voluntary disaster prevention organizations and the mutual assistance system are organized, specific roles and their cooperation are not clear.

- Anxiety and difficulty in the present efforts
They worried about lack of the disaster prevention awareness, the need of the training at the whole region and lack of the local information sharing. Another voice is that they need customized disaster manuals for various disaster cases which instructs them to action guideline.

- Information sharing for disaster prevention and reduction

For sharing of information, the following voice was heard. "Detailed hazard map corresponding to the actual situations of each local community is necessary" and "While individual tradition includes past disasters, these information is not integrated and not fully shared".

2.3. Findings



Figure1. Map screen



Figure2. Map screen by tapping screen



Figure3. Positional information registration



Figure4. Information registration screen

As we mentioned above, voluntary disaster prevention organizations and the mutual assistance system have already been organized and efforts for disaster prevention and reduction have been made. However, concrete actions on occasions of disaster are not fully examined and local residents have anxiety and feel difficulty about them if they have emergency faced with disaster.

3. System development

After we understood the present conditions and problem for disasters of local residents by a interview survey, we develop a hazard map creation support system with community participation type using the location information. Disaster prevention awareness of residents can be improved by participation activities. Local resident can collect detailed information. Making hazard map with resident participation activities can improve sharing local community information. The exchanges of the conventional information were conversations, telephones and letters.

This system is composed of three screens. They are a map screen, a positional information screen and information registration screen.

The map screen displays dangerous spots enrolled in a database and the present location of the user acquired by GPS(Figure1).The balloons point to the danger spots.And the photograph of the spot is included. Users can watch the information (a disaster type, a risk level, comments) of the spot by tapping the balloon(Figure2).

When users register information, at first they drag a pin with a positional information registration screen and appoint a dangerous spot(Figure3). Then the position data that the pin points at is handed to the next information registration screen.Then, they input a disaster case, risk level, comments and take the photograph of the spot with an information registration screen(Figure4). These data are stored in the internal database. The information is reflected by a map screen and makes a hazard map.

4. Conclusions and future works

In this study, we investigated the present conditions and problem for disasters of local residents by a interview survey, and develop a hazard map creation support with community participation type by using the location information. Disaster prevention awareness of residents improves with resident participation activities. It can collect local detailed information by local residents contributing information.

Future works includes moving data to information server, additional functions for information sharing and communication and improvement of interface for more convenient and user-friendly.

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