Prototyping and Evaluation of a Web Application Supporting Tourists in Trouble and Emergency

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Abstract: In this study, we have developed a Web application for tourists to easily obtain necessary information on their smartphones in case of trouble and emergency so that they can enjoy sightseeing in unfamiliar lands without worry. Many tourists visit the area with its historical townscape. The old-fashioned townscape sometimes makes it difficult for unfamiliar tourists to know what to do when they are in trouble. To solve this problem, our application has functions to display the current location, shelters, AEDs, contact information when they need help and some tidbits for disaster countermeasures. We conducted a demonstration experiment in the Hizen Hamashuku district of Kashima City, Saga Prefecture, Japan where we have been researching as a model district. As a result, we were able to evaluate the provision of information that would be useful in trouble and emergency for tourists and clarify future issues.

Keywords: Web application, for tourists, trouble-solving information, information for emergencies

1. Introduction

Various efforts related to safety and security have been carried out (ICTDSE2021 in ICCE2021, 2021; Mitsuhara, H., 2018). Most of them are for the area where they live. In unfamiliar lands such as travel destinations, it is necessary to prepare for other problems as well as disaster prevention in the area. Information provision and research have been conducted to enjoy a trip safely (Japan Tourism Agency,2022; Heum, P., 2017).

Old-fashioned streets are popular tourist destination (Japan Guide.com, 2012). Practical efforts are also being made for disaster prevention and mitigation in these historical cities and towns (Srinurak,N et al, 2021). Besides natural disasters, however, such areas have the following problems due to the old-fashioned streets. They are (1) less information display, (2) experience might not be helpful and (3) less people to help. In order for tourists to enjoy sightseeing with peace of mind without feeling such anxiety, we examined countermeasures, developed an application that supports tourists' peace of mind, and conducted a demonstration experiment focusing on troubleshooting during normal sightseeing, not during disasters. We considered providing information for that purpose and developed an application that supports tourists in trouble and emergency.

We conducted a demonstration experiment of the application to clarify its effect and challenges of information provision that would be useful in trouble and emergency for tourists unfamiliar with the area. The target area is Hizen Hamashuku district of Kashima City, Saga

Prefecture, which is working to revitalize the town by utilizing its historical townscape and good old local culture (Agency for Cultural Affairs, 2017; Saga Trip Genius, 2014).

We have been collaborating with the voluntary disaster prevention organizations in this area to carry out activities for disaster prevention in the area and create a regional safety map(Okazaki, Y. et al., 2020). In this research, instead of providing tourists with such danger information of natural disasters, we consider providing information that will lead to the peace of mind of tourists.

2. Consideration of information to be provided through Discussion Meeting

2.1 Outline of Meeting

We held a discussion meeting with people involved in local tourism about the information to be provided to tourists. It was held for about two hours from 10:00 am on November 2, 2021. Participants are a total of eight people, including two of us(Saga University), three members of the district town revitalization group (Hizen Hamashuku Mizu to Machinami no Kai), and three staff members of the Kashima City Tourism Division and the Tourism Association. Based on the draft plan we prepared in advance, we examined the content of information to be provided to tourists and the method of providing it.

2.2 Basic Policy for providing Information

It is essential for tourists to enjoy sightseeing with safe, secure and peace of mind. Initially, we were thinking of providing tourists with the local danger information we had collected so far. This is because we thought that detailed regional danger information that was not presented on a hazard map for a wide area would be useful for travelers as well. From the perspective of disaster prevention and risk reduction, that is certainly the case. On the other hand, from the standpoint of tourism, there was concern that providing information about disasters would cause anxiety. The dangers in this area are low and there is little danger information that requires daily attention. Reiterating the dangers of disasters that travelers rarely encounter, such as heavy rains and earthquakes, only gives travelers anxiety and has a negative impact on tourism. Based on these considerations, we decided to provide information that would help travelers in case of troubles and problems during their stay, rather than disaster information.

2.3 Summary of information in Collaboration with the Local Community

We discussed what kind of information should be provided so that tourists can enjoy sightseeing with peace of mind. At the meeting, various opinions were given from the perspectives of disaster prevention and tourism. They are summarized in the following four.

1.Where are the tourists in the area now? What's around it?
We conclude that these can be solved by providing a map similar to the tourist map distributed on paper at the tourist information center and showing the current location. We have decided to list information on toilets, bus stops, parking lots, major tourist destinations, restaurants and accommodations with the same symbols as the paper tourist map.

2. Where should tourists consult in case of trouble?
We conclude that this could be solved by providing two tourist information centers that support tourists and a police box in the district. In addition to the location, we decided to place a phone number button so that they could contact immediately.

3.What are the disaster prevention measures in this area?
Old-fashioned street districts are often vulnerable to disasters. Assuming tourists with such anxiety, we decided to provide evacuation site information (location and phone number) and some tidbits to introduce the disaster countermeasures in this area.

4.Where is the AED?
An automated external defibrillator (AED) is a device used in emergency medical situations. We have also decided to list all AED location in the district as important equipment used in case of life-threatening cardiac arrhythmias.

2.4 How to provide information

In response to the results of the examination, we decided to provide this information as a Web application. By using this app, we aim that tourists can get the information they need on their smartphone and easily solve it, and enjoy sightseeing with peace of mind even in unfamiliar lands.
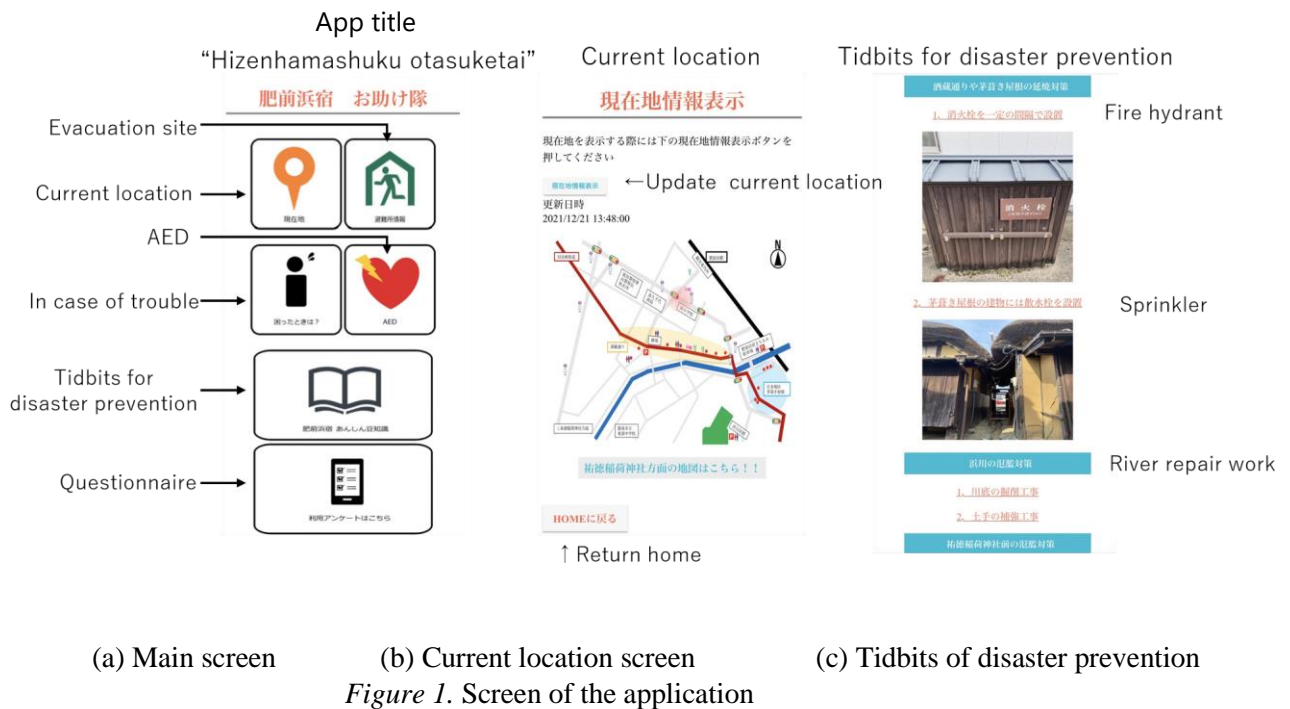

(a) Main screen   (b) Current location screen   (c) Tidbits of disaster prevention
Figure 1. Screen of the application

Figure. 1(a) shows the main screen of this application. From this screen, user can access the current location information (Figure. 1(b)), evacuation shelter location information, emergency contact location, AED installation location, and tidbits to introduce the disaster countermeasures (Figure. 1 (c)).

The same schematic map as the map distributed by the tourist information center is used to provide the current location information. On the map, toilets, bus stops, parking lots, major tourist spots, restaurants, and accommodations are marked with the same symbol. Therefore, it is easy to correspond the map of the application with the map on paper. On the other hand, accurate position display by GPS is difficult. Therefore, we divide the map into 25 blocks, determine which block users are in from GPS information, and give approximate location information near the representative point of that block (Light red location in Figure 1. (b)). locations and contact information for all designated evacuation centers (three locations) in the

area are provided on the map. This allows the user to know which shelter is nearby and to contact the location as needed.

For emergency contact in case of trouble, in addition to the two information centers and police boxes in the area, a telephone call button is available. Users can make a call immediately with a tap.

In the provision of AED installation locations, all AED installation locations (5 locations) in the region are shown on the map, Phone numbers are also provided so that users can contact those facilities.

Due to its age, the historical townscape area is worried about disaster prevention. By introducing local efforts for such disaster prevention, we believe that it will be possible to raise tourists' awareness of disaster prevention and reduce anxiety. It introduces a simple fire hydrant that can be used by one person to protect valuable historical buildings such as thatched roofs, and a sprinkler that is set as a measure against the spread of fire in thatched roof buildings. In addition, as a countermeasure against flood damage in the past, information on river improvement of the Hama River flowing through this area is introduced.

3. Evaluation Experiment

3.1 Experimental Method

Table.1 shows the outline of the experiment. With the cooperation of the tourist information center, we asked tourists who visit the area to try our application in their sightseeing and evaluate it. The period was about one month. We asked for cooperation in the experiment by attaching a leaflet with a QR code. In order to encourage participation, those who tried our application and answered the questionnaire were given a gift of Saga seaweed, which is one of the local specialties.

Table 1. *Outline of Evaluation Experiment*

Period	December 21, 2021 to January 31, 2022
Implementation Area	Hizen Hamashuku, Kashima City, Saga Prefecture, Japan (Visitors can enjoy walking and viewing the townscape from the Edo period.)
Leaflets Posting Locations	5 places (inside Hama Station, in front of Hama Station, next to Hama Elementary School, Machinami Parking Lot, Nakamachi Public Hall)
Number of Responses	18

Tourists who found a leaflet and wanted to use accesses the Web application by reading the QR code. And had them walk around the area freely. Table 2 shows the questions and answer options.

Table 2. *Questionnaire Item List*

| Q1	Age group	Under 30s/ 40s to 60s/ 70s and above
Q2	Gender	Male/ Female/ Other
Q3	Number of Visits	First time/ 2nd time/ 3rd time or more
Q4	Contain the information required in an emergency?	Yes / Probably yes / Probably no / No
Q5	Feel relieved to have an app?	Yes / Probably yes / Probably no / No
Q6	Want to use?	Yes / Probably yes / Probably no / No

Q7	Easy-to-read screen?	Yes / Probably yes / Probably no / No
Q8	Easy to operate?	Yes / Probably yes / Probably no / No
Q9	Free description of desired information and functions	

3.2 Experimental Result

Figure 2. shows the experimental results. From the answers by age group(Q1) and gender(Q2), it can be said that there is no significant bias in age and gender among the participants in this experiment. According to the number of visits(Q3), more than two-thirds were three or more visitors, and the rest were first-time visitors. Most of the responses to the validity of the information(Q4) were positive. In response to the relieved feeling that is the purpose of the app(Q5), half said they think so. All of them have positive opinions. So we can say that they appreciate the peace of mind by our app.

Regarding the use of the app, more than 40% answered that they wanted to use it(Q6), and three-quarters had a positive opinion. More than 80% answered the information is easy to see(Q7), and everyone is positive about the ease of operation(Q8). From these things, it can be said that the usability of the application is highly evaluated.
Regarding free description(Q9), there are opinions such as "The current location in the direction of Yutoku Shrine was difficult to understand", "I want more tourist information in connection with sightseeing tours", and "I think it is better to post it in more places"
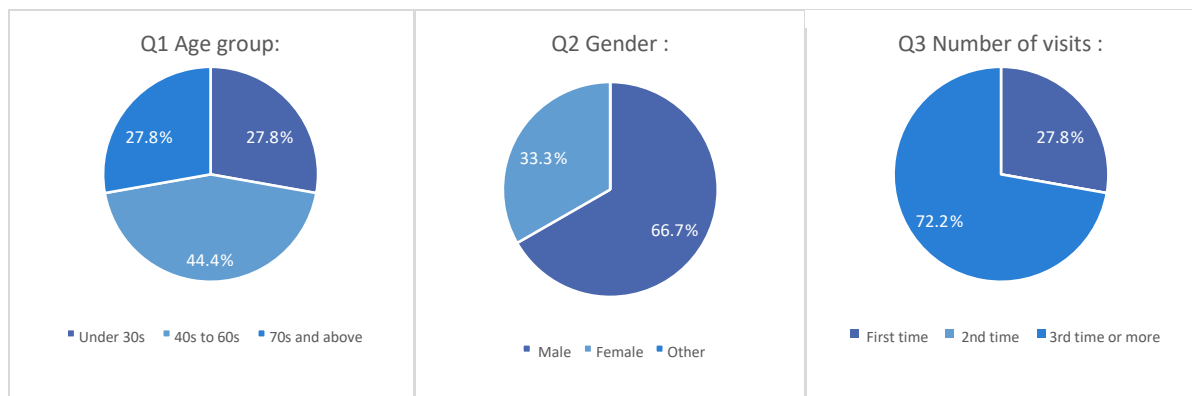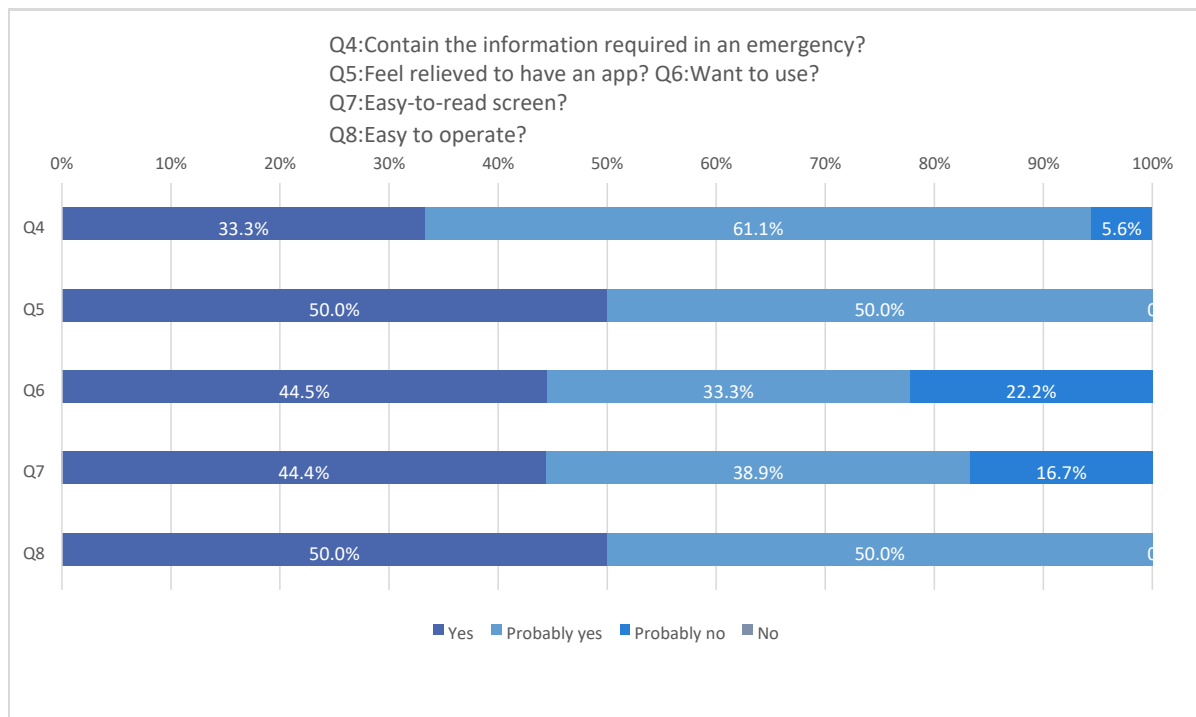
Figure 2. Questionnaire response results

3.3 Consideration
3.3.1 Usefulness

Consider whether they feel relief that is the purpose of our application. Of the five respondents who answered that they visited for the first time, three responded that they felt relief, and the remaining two responded that they felt rather. It can be said that it leads to the peace of mind of those who visit for the first time. Of the 13 respondents who said they had visited more than three times, about half of the six respondents said they felt relieved, and the remaining seven respondents said they would rather. From this, it was found that our application is effective not only for first-time tourists.

Next, we consider the usability of the app. Regarding whether they want to use it, three out of five people who answered that they visited for the first time, and five out of 13 people who answered that they visited three times or more answered that they would like to use it. On the other hand, the remaining two people who answered that they visited for the first time, and six out of three or more visits answered "I think it's rather", and two people answered "I don't think it's rather". In addition, more than 80% of the respondents answered affirmatively about the ease of viewing the app, and all responded positively about the operability, indicating that the app is evaluated as easy to use.

From these facts, it can be said that our application has been evaluated to a certain degree as an easy-to-use application that gives tourists a sense of relief. On the other hand, it was also suggested that some ingenuity was needed to get people to use it. As pointed out in the free description answer of Q9, this application is intended for troubles and does not include tourism purpose elements. The information that tourists want most is tourist information for visiting tourist spots. From the viewpoint of tourists' use, it is necessary to incorporate such a viewpoint of sightseeing tours.

3.3.2 Validity of Information

Regarding the validity of the information, out of the five people who answered that they visited for the first time, two people answered "I think" that they have the necessary information when they are in trouble, and the remaining three people think that it is rather. Of the 13 respondents who answered that they visited three or more times, four responded that they thought they had

the necessary information when they were in trouble, and the remaining nine responded that they thought they would rather.

From these facts, it is considered that the necessary information is generally provided. On the other hand, as mentioned in the previous section, from the sightseeing point of view, the names and explanations of sightseeing spots will be added. Improving the provision of information in combination with tourism tour information is an issue for the future.

4. Summary and Future Works

In this research, in order to help tourists to visit tourist spots with peace of mind even in unfamiliar lands, we developed a Web application that provides necessary information in case of emergency and conducted an evaluation experiment. The developed app has a function to display the location information of the current location, shelter, AED, a function to display places and contacts that can be relied on in an emergency, and a function to introduce tidbits such as disaster countermeasures.

We conducted a demonstration experiment in the Hizen Hamashuku district of Kashima City, Saga Prefecture, Japan which was selected as a model district, for about a month to get tourists to use the app. As a result, it was shown that information that leads to the peace of mind of tourists, not just first-time tourists, can be provided in an easy-to-understand manner.

It is a future task to improve the provision of information together with tourist information so that it can be used not only in case of trouble but also for visiting tourist spots.

Acknowledgements

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