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### SIGN PLANNING BY SMART DEVICE INSTALLED WITH IMAGE INTEGRATED APPLICATION

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#### *Abstract*

Signs have meanings and roles such as guidance and alerting, and contribute to safe and secure community formation. On the other hand, there is also a risk that landscapes will be disturbed by duplication of information. The local fieldwork is an effective method in sign planning, because the regulation differs from the historical background and the will of the people in each local government. Therefore, the authors created an image integrated application which integrates pictograms with the background photos taken so that people living in their own area can take part in sign planning. Fieldwork was conducted for the educational area of Kyoto City using a tablet computer with the application installed. As a result, the landscape simulation using the application can be sufficiently performed, and it is clarified that the effectiveness of the application in the field works of the sign planning. Furthermore, this paper describes an improved application based on the problems in the field work so far. Here, in order to be able to operate the application more accurately without feeling stress, the application was re-created it, so that it could be handled using a smartphone application as a familiar device. Hence, by adding the map function to the smartphone application, integrated images are appeared on the map and route to the subjected place is shown on a display. Finally, the people can plan a sign in their own town using the application that can integrated the pictures and show a route to their favourite places.

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**Keywords:** Sign planning, smart device, field work, application, pictogram.



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## **1. Introduction**

There are many signs such as pictograms in a space of town. It seems that signs have a risk to deterioration of the landscape by a duplication of the information or a jumble of the signs. For this reason, many local governments in each prefecture are regulating a control on the signs so that visibility and recognisability do not deteriorate. In such a sign planning, the size and colour of the sign have a large influence on the surroundings, so some local governments may control the hue and the saturation and the brightness of colour and the size and the height of the sign to conserve the landscape. These regulations vary from local governments according to the historical and cultural background of the area. Therefore, a landscape simulation in the target area is one of the effective methods.

## **2. Problem Statement**

There is a study on planning new sign system which consolidate and install signs in model area (Yamamoto & Nishikawa, 2013). Oi (2003) has examined whether people's consciousness was obstructive to the impression of the signs in a walking space where various signs are standing. Hihara conducted an experiment to determine whether pictograms showing disaster information in the home can be identified correctly and early for elderly people. Furthermore, Mei (2008) has evaluated the recognition of existing signs, evaluation of the proposed pictogram, and evaluation using a video image assuming placement on school routes for elementary school children. These studies are not evaluation on fieldwork in actual space because they are all evaluation experiments different from above landscape simulation. Furthermore, some studies on map ability and user interface using smartphone are engaged (Hatano, Nishino, Kagawa, & Utsumiya, 2011; Ichimura, & Kamada, 2012).

## **3. Research Questions**

The research question is examination of following points whether fieldwork using a tablet PC is really effective in sign planning.

- Whether it is able to simulation on the actual space while walking the area.
- Whether the application is a tool for consensus building.
- Whether it is easy to operate the application.

## **4. Purpose of the Study**

In this study, the subjects walked in the target area, and they performed field work so that they could do landscape simulation using the image integrated application by looking at the site directly. Here, we examined whether it is possible to perform landscape simulation using a tablet PC in a real social environment. Finally, smartphone application added a function of map was developed so that users can operate it without feeling stress.

## 5. Research Methods

### 5.1. Fieldwork study

The purpose of the fieldwork is to walk through the target area and discuss the design and location of pictograms. First, some teams composed by several people walk around looking at the map of target area and understand the area. At the walking, the members discuss that design, location, and colour in the signs are needed to be corrected or not.

Specifically, using an image integrated application, the location to be background is photographed, and it is integrated with pictograms. While the creation of the image, team members will discuss about an appropriate place, an examination of the design, and an appropriate position for the pictogram.

In this paper, fieldwork was carried out at Tetsugaku-no-michi (Philosopher's Walk) passing the residential area in Kyoto City, where the development of landscape is in progress. The fieldwork was done by students of Kyoto Institute of Technology (KIT) and National Institute of Technology, Oita College (ONCT).

### 5.2. Operation of the application

The operation of the application is described and interface is shown in Figure 1. First, background image is taken with camera of tablet PC or open the picture file of background. Next, pictogram for inserting to background image is selected. After selection, a red square frame is displayed in the centre of the background image. And, the red frame is deformed by dragging to fit the elements in the background image. Furthermore, the colour of pictogram is changed by clicking from the colour wheel. Finally, the deformed pictogram and background image are integrated and the integrated image is saved.



Figure 01. Interface of image integrated application

## 6. Findings

### 6.1. Result of simulation

On the Tetsugaku-no-michi, there are many T-junction, and even while taking a walk, many cars went through with high speed. From this, a pictogram was placed to show the alert to pedestrians and drivers. Many signs prohibiting smoking on the street were seen by the regulations of Kyoto City, but it was discussed that whether it might be disturbing the landscape because signs are too much. Colour scheme in created image was seen to be close to the colours of the surroundings and background. A position and size of pictogram were discussed. For example, one of pictograms was placed on the ground for pedestrian was proposed on large and high place so that people can see it from a distance. As the location and design of some existing sign were unclear, a proposal for a new alternative design such as toilets and parking were made through discussion.

### 6.2. Result of questionnaire

The questionnaire shown in Table 1 was answered by participants after the fieldwork. In this study, each item of questionnaire was evaluated in 5 levels. The half of participants evaluated in 4 or 5 level about an Impression of fieldwork as shown in Figure 2 (a). About an Interest in the signs, more than 70% persons of the participants evaluated in 4 or 5 level as shown in Figure 2 (b). Some of them had comments of "it is easier to transmit of information by pictogram than words" and "It is difficult to realize that how much pictogram could transmit the intention". About using a tablet PC, almost of them answered in 4 or 5 level as shown in Figure 2 (c).

As a result of questionnaire, it was clarified that there is room for improvement in method of fieldwork, although landscape simulation at the actual space is effective for the sign planning, because interest in the sign increased and the device was usable fully.

**Table 01.** Questionnaire lists

Question	Scale
Q1. How did you have your impression on this fieldwork?	(boring) 1 2 3 4 5 (interesting)
Q2. Did your interest in sign like a pictogram become bigger through this fieldwork?	(not at all) 1 2 3 4 5 (so much)
Q3. How much could you use your tablet in this fieldwork?	(not at all) 1 2 3 4 5 (so much)

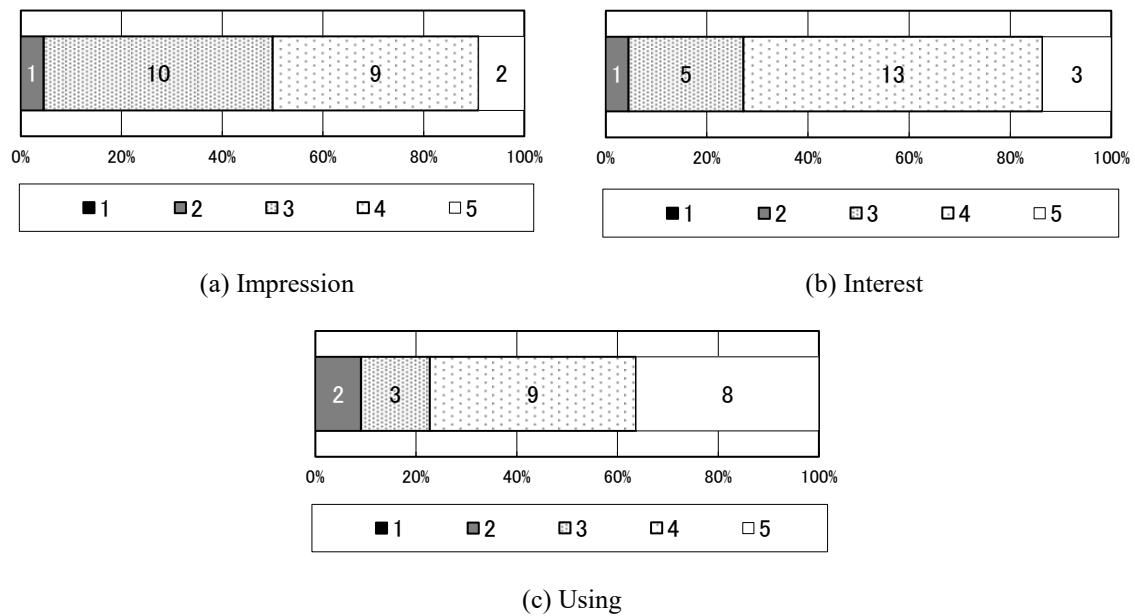
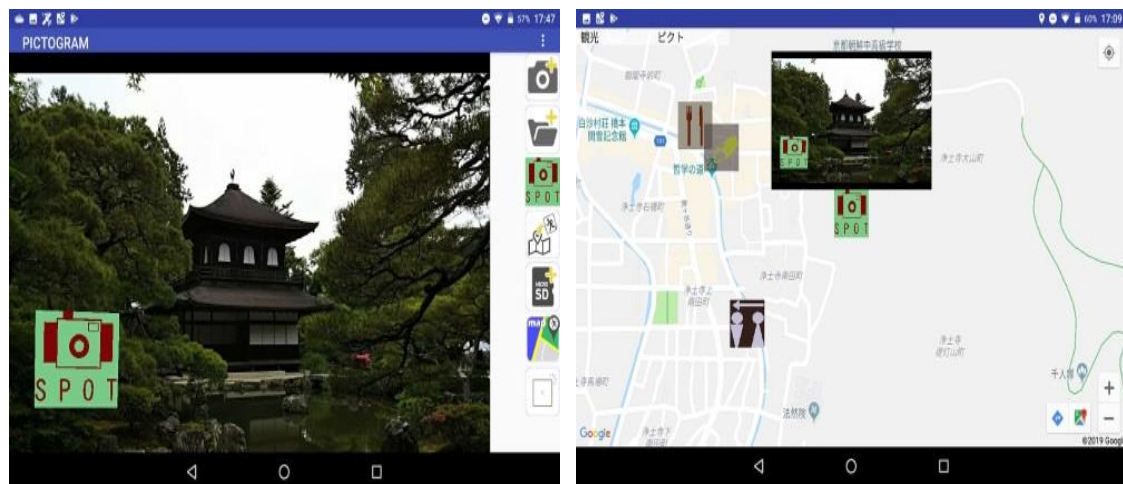


Figure 02. Result of questionnaire

### 6.3. Development of smartphone application

In the field work carrying a tablet PC, there are still some rooms for improvements such as the weight of device and performance limitations such as graphics. So, in this study, application was created for smartphone again so that user could operate without feeling stress with weight reduction and use the map function.

The interface of smartphone after image integration is shown in Figure 3 (a), which a pictogram showing a photographing point is integrated with Ginkakuji of background. On the map function, integrated image is changed to display or not display, and the icon on the display is switched to pictogram or balloon as shown in Figure 3 (b) and (c). Furthermore, by attaching tags such as "evacuation" and "guidance" to the image, kinds of pictograms what user want to see are displayed. Also, it is possible to obtain the route to the point where the pictogram and balloon are placed by setting the departure point such as the current location as shown in Figure 3 (d).



(a) Interface

(b) Pictogram on map



(c) Balloon on map

(d) Route to Ginkakuji

Figure 03. Application on smartphone

## 7. Conclusion

In this study, there are many participants who are interested in the sign planning and feel that they have been able to use a tablet PC. So, in forming a townscape, simulation of the landscape in the actual space using a tablet PC can be expected as one of the methods of sign planning.

Furthermore, in this study, the fieldwork implemented is reviewed so far, and it is aimed to reduce the weight of the device and improve the application. It seems that the weight reduction of device has been made enough by installing on a smartphone, but the improvement of the application is unknown. In the future, it is planned to evaluate the created application and to investigate the possibility of using maps.

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