Experimental Verification of Sightseeing Information as a Weak Trigger to Affect Tourist Behavior

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Abstract. In this research, we verify information of sightseeing spots as a weak trigger which gives strolling tourists a chance to change their behaviors but does not specify the spot in a recommendation system. In a general recommendation system, the system provides complete piece of information about recommended spots. However, the provided information may deprive users of opportunities to discover interesting something by themselves. On the other hand, if no information is recommended to tourists, they may stroll in a restricted area because they have no hints of unfamiliar area. To reveal an appropriate information solving the above problems, we focus on the amount of information provided to users. Information about sightseeing spots is classified into the position and the feature information of a spot. For each information, we define the four categories of information according to the amount of information. We conducted the experiment with some subjects, and analyzed the impact on the information of these categories.

Keywords: User interface · Nudge · Suggestive methods
Sightseeing support system · Recommendation system

1 Introduction

1.1 Background and Motivation

Tourism trend is changing due to the development of information technology, especially the development of Social Networking Services (SNS) and mobile devices. In the previous tourism trends, tourists participated in a tour where all of destinations, routes to there, and time to spend there were predetermined by a tourism provider. In recent years, tourists plan their trips by their own will. That is, they decide their destinations and routes as they like. Such autonomous sightseeing has attracted attention and has been becoming a mainstream of tourism trend [1].

One of the reasons for this tendency is the expansion of SNS use. SNS users are able to share their own information about things they had and their experience of their sightseeing. Another user is easily able to obtain information about his/her interesting

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sightseeing spots in advance from the shared information on the SNS. That is, the services such as SNS make planning of sightseeing easy.

There many proposals of supporting sightseeing systems using sharing information on the SNS. One of the examples is a recommendation system. In [2], the system recommends sightseeing routes based on information sharing on photo-sharing sites. It is very convenient for tourists who visit an unfamiliar sightseeing area because they can know a suitable plan of their sightseeing in advance. However, these systems place importance on the efficiency of sightseeing, and then tourists who use one of the systems tend to follow the proposed plan. That is, it is possible that these systems limit free activities of tourists seeking autonomous sightseeing, and as a result, they may reduce opportunities which tourists encounter with accidental and interesting experience.

It is supposed that if tourists walk freely without any supporting system in a sightseeing area then they discover their favorite spots by themselves. Such experience may remain in tourists' memories more strongly than one which they visited recommended spots. On the other hand, if tourists have no information as a trigger to change their behavior, they may stroll in a restricted area. That is, no information proposed by a system may give free activity to tourists, but it may also restrict the various of their spontaneous actions.

1.2 Our Contribution

Accordingly, our goal in this research is to verify information of sightseeing spots as a weak trigger in a recommendation system. As a user, we consider tourists who enjoy strolling in a certain sightseeing area. The weak trigger means that it just gives tourists a chance to change their behaviors, and that it does not force them the changes. We assume that a detailed information about recommended spots may force tourists to visit there, and may deprive tourists of opportunities to discover interesting something by themselves. So, to give just a chance to discover interesting spots by themselves, a system does not show a recommended spot to them obviously. We consider the least amount of information about spots as a good trigger. For example, as for positions of spots, we set the four categories of information, a point, a direction, an area and no information. In our proposal, only a suggestive information about recommended spots according to one of the four categories are shown, e.g., an area in which the spots exist roughly. Such abstract information will trigger users to change their behaviors, but does not specify a spot.

A brief outline of this paper is as follows. In Sect. 2, we introduce other research related this study. Sections 3 describes classification of spot information. Section 4 describes the evaluation and consideration. Finally, we state our conclusions in Sect. 5.

2 Related Works

2.1 Sightseeing Support System Based on Inconvenient Benefit

In the research area about navigation systems, there are some studies that try to give tourists chances to change their behaviors by restricting provided information. This idea is based on the theory of the "FUrther BENEfit of a Kind of Inconvenience"

(FUBEN-EKI) proposed by Kawakami, which suggests that inconvenient things bring benefit in some cases [3, 4]. With advances in information technology, the notion of "anytime, anywhere" is taken for granted in modern society. However, there are benefits that has been overlooked because of too much emphasis on convenience and efficiency. What is important for supporting "inconvenient benefit" is not to create an inconvenient situation. It is to find an inconvenient mechanism in order to discover benefits that cannot be found by convenient tools.

Nakatani et al. [5] proposed a sightseeing navigation system based on handwritten routes. In this system, a user writes a sightseeing plan, such as destination and routes, by hand before his/her sightseeing, and then uses it as a reference during his/her sightseeing. Since the handwritten routes have many distortions, the user cannot know the exact routes on site. Tanaka et al. [6] proposed a navigation system which hides the map of area within a radius of 100 m around the user in accordance with the users' movement. Moreover, Takagi et al. [7] developed a system that navigates users only using information on direction and landmarks that are scattered throughout the tourist destination, without any detailed map information. These systems restrict map information given to tourists in order to promote actions of users such that they confirm their surrounding roads and buildings.

In these navigation systems, they focus on the information about map (i.e., route), not the information about recommended destination spots. For spots, these systems show detailed information, such as their locations, photos, or introductory sentences.

2.2 Recommendation System of Tourist Information

As for systems dealing with information about spots, recommendation systems have been studied actively. There are many studies about recommendation systems considering various conditions of spots or tourists. Oku et al. [8] proposed the methods to recommend spots based on posted information (e.g., tweets in Twitter, or photos taken in the spots) on the Internet. Misu et al. [9] evaluated the effect of the sightseeing application which provides spots in Kyoto based on the current feelings of tourists and the feature of sightseeing spots.

However, these studies focus on which spots should be recommended to users at the time, and they do not mention how to provide the information about the recommended spots. In the most of previous studies about recommendation systems, the detailed information about the recommended spots, such as their names, locations and photos are given to users.

2.3 Nudge and Suggestive Interface

Our goal is to provide suggestive information as a weak trigger to change tourists' behaviors, rather than the detailed information about the recommended spots. Such triggers or gimmicks are studied as a Shikakeology [10], which is the design method of suggestive triggers change people's behaviors or consciousness. Nudge is such the weakest triggers [11]. These triggers encourage them to a desired configuration, but do not prevent free behavior of users. Our proposal is the same concept of Nudge.

Kurata [12] proposed a sightseeing support system using a suggestive information. This system provides "Potential-of-Interest Maps", which have the similar characteristic to our purpose. The system visualizes the degree of attraction of spots which is calculated from the vast amounts of information that have been posted on photo-sharing sites. That is, the area where more photos are posted to the site are illustrated by deeper red. Users can know that the area has attracted attention of others, but cannot know what spots is in the area. However, in this research, the evaluation for only the one output design method was performed, and there is no comparative evaluation in terms of information provided to users.

3 Classification and Output Design of Information

3.1 Classification of Spot Information

As a user in this study, we consider tourists who enjoys strolling in a certain area and has no predefined destination. Our goal is to verify information of sightseeing spots as a weak trigger which gives strolling tourists a chance to change their behaviors but does not specify the spot in a recommendation system.

As information about sightseeing spots, there is research by Izumi et al. [13]. They categorized tourist information given to users into the location information of sightseeing spots and the characteristic information which introduce the summary of spots, and classified each information into four categories. However, in this previous work, some expression methods of these information is not able to properly express information on sightseeing spots. Furthermore, their evaluation experiments focused only on whether or not the subjects visited to the recommended spots, and no analysis about what category of information effect on the behaviors of the subjects. Therefore, in this research, we redefine the classification of spot information and show a suitable display design for the classification.

Information about sightseeing spots is divided to information about what and where the spot is. The first one is called the feature information and the other is called the position information of the spot. To verify information as a weak and a good trigger, we focus on the amount of information. We classify the position information and the feature information into the four categories.

First, we consider the feature information of spots. In a general guide book about sightseeing, information about the spots consists of category (e.g., restaurants, historical architectures), detailed introductory sentences, and photos of them. Among these information, photos have the largest amount of information and it gives tourists practical visual images of spots. Introductory sentences have the second largest amount of information, and categories have the least amount of information about spots. Therefore, we set the following four categories of the feature information about recommended spots:

- "None": There is no information about the feature information of a spot.
- "Category": A category of a spot is shown.
- "Text": Introductory sentences about a spot are shown.
- "Photo": A photograph of a spot is shown.

Regarding the position information of a spot, we also set the four categories depending on the dimension of the information expressing the position. That is, the exact position of a spot, called "pin" (i.e., a point), has the largest amount of information as its position. The one dimensional information corresponds to the "direction" to a spot, and the two dimensional information corresponds to the "area" in which a spot exists. The higher dimensional information has less information about location. Therefore, we set the following four categories of the position information about recommended spots:

- "None": There is no information about the position of a spot.
- "Area": An area in which a spot exists is shown roughly.
- "Direction": A direction to a spot from the current location is shown.
- "Pin": A pin is displayed at the exact location of a spot.

3.2 Output Design of Information

This section shows how to present the information described in the previous section on an actual system screens. The left figure in Fig. 1 shows the examples of the output for each pattern of information.

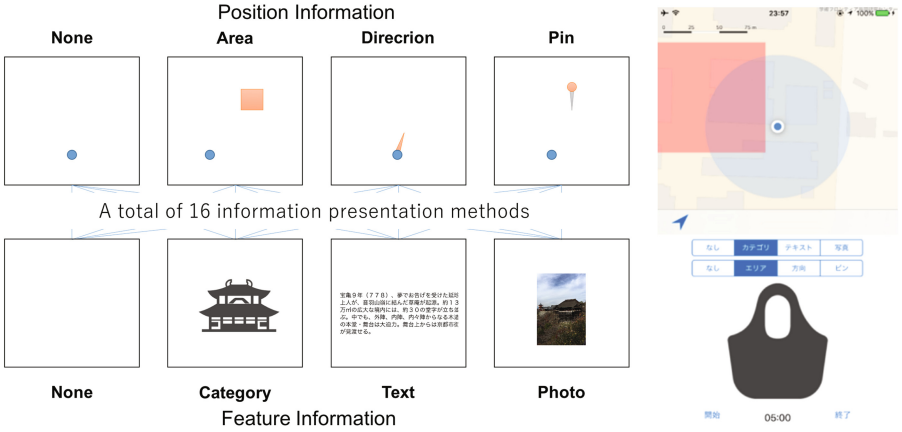


Fig. 1. Classification of provided information about spots (left) and an example of system screen (right). For the position information, the blue circle shows a current location of a user. The orange diagram shows the position information of a recommended spot. (Color figure online)

Each pattern of the feature information is shown in the following way (See Fig. 1):

- "None": The screen is blank.
- "Category": A category of a recommended spot is shown by using a corresponding pictogram. The categories of spots are determined based on the commercial guide books about a sightseeing area. Pictograms are generally used to present an intuitive image of a target. In some guide books, the pictograms are used to improve their

readability. In this study, we decide the design of the pictograms based on some guide books, and use the pictograms which are released free on the Web. Table 1 shows the pictograms for the categories we applied.

Table 1. The pictograms representing the category.

Pictograms	Categories
	Café
	Store or Souvenir shop
	Restaurant
	Temple or Shrine
	Strolling area
	Historical building

- "Text": The introductory sentences of a spot we got from the guide books are shown on the screen.
- "Photo": We took a photograph at each spot actually. The photograph is shown on a display.

The position information of a spot is provided on the electronic map with the current location of a user. On the map, the blue circle indicates the current position of a user, and the orange diagram (e.g., square, triangle) shows the position of a recommended spot (See Fig. 1). Each pattern of the position information is shown in the following way:

- "None": There is no information about position of a spot. Only the current position of a user is displayed on the map.
- "Area": A rough area in which a recommended spot exists is shown by a square. More precisely, a point in a square shape with the side 50 m whose center is a

location of a recommended spot is randomly selected. Then, a square shape with the side 100 m whose center is the selected point is shown on the map. By randomly setting the center of the displayed area, a user becomes difficult to estimate the position of a recommended spot.

- "Direction": An arrow represented by a triangle is displayed at the user's current position.
- "Pin": A pin is displayed at the exact location of a recommended spot.

On the screen, the position and the feature information are shown at a time. The right figure in Fig. 1 shows an example of the system screens. On the screen, the position information is shown in the upper half of the screen, and the feature information is shown in the lower half of the screen. As you see, we have the sixteen patterns of provided information about a recommended spot by the combination of the feature information and the position information.

4 Overview of Experiment

4.1 Recommendation Algorithm and Devices

For the experiment, we developed the prototype system on iOS terminal of Apple Inc. [14] and used it. The right figure in Fig. 1 shows the actual screen of the prototype system. In the figure, the screen shows the area of the position information and the category of the feature information of a spot.

To recommend a spot, we adopt the recommendation method by collaborative filtering [15] using NMF (Nonnegative Matrix Factorization). In the preliminary experiment, we required some subjects to answer their evaluation values for the target sightseeing spots, and prepared the base evaluation data for the recommendation. The results of the recommendation for a subject were outputted in a ranking order of spots. In the evaluation, the prototype system recommended a sightseeing spot with the first rank among spots which were not visited by the subject in the evaluation.

4.2 Experimental Procedure

We conducted this experiment with the cooperation of 24 college students (20 males and 4 females). In order to enjoy sightseeing having a conversation with a friend, we set up the pairs of the subjects so that the paired subjects are familiar with each other. So, there is no difficulty of their communication during their sightseeing. In the experiment, we got 12 pairs totally.

The experiment site was set to the sightseeing area in Shijo/Kawaramachi, Gion, and Kiyomizu Temple area in Kyoto city. In the area, there are many streets suitable for casual stroll on foot, and there are many sightseeing spots for every category, including historical architectures, shops for goods and souvenirs, restaurants, and strolling areas. The experiment site was divided to the four areas totally in order to have the pairs of the subjects used the four output patterns of information. The sizes of the areas and the numbers of sightseeing spots in the areas were set so that there were few difference between them.

Each pair of the subjects strolled freely by using the prototype system which outputted the information based on one of the sixteen patterns. Each pairs strolled four times in the four different areas totally, and used prototype systems with the different four output patterns with the same category in terms of the feature or the position information. Table 2 shows the patterns of the outputted information were applied to each pair. For example, the pair B saw the information about the area as the position and no feature information in the area 1. In the area 2, the pair B got the category information as the feature information, but the position information for the pair B was not changed, i.e., area. As shown in Table 2, each pattern was applied to three pairs totally. The day of the experiment was different for each pair, but each pair strolled four times on the same day.

Table 2. The pattern each pair of the subject used.

Pair	Area1	Area2	Area3	Area4
A, I	**None** None	**None** Category	**None** Text	**None** Photo
B, J	**Area** None	**Area** Category	**Area** Text	**Area** Photo
C, K	**Direction** None	**Direction** Category	**Direction** Text	**Direction** Photo
D, L	**Pin** None	**Pin** Category	**Pin** Text	**Pin** Photo
E	None **None**	Area **None**	Direction **None**	Pin **None**
F	None **Category**	Area **Category**	Direction **Category**	Pin **Category**
G	None **Text**	Area **Text**	Direction **Text**	Pin **Text**
F	None **Photo**	Area **Photo**	Direction **Photo**	Pin **Photo**

In the experiment, first, in order to recommend suitable sightseeing spots for each pair of the subjects, we asked them to answer their interests in a 5 scale for each spots of the 80 target spots before the experiment. On the experiment site, we explained how to use the prototype system and the purpose of the experiment. All of the pair strolled in the order of area 1, 2, 3, and 4. The subjects strolled in each area for 45 min. In each area, the system recommended three spots to the subjects. The three recommended spots were outputted from the prototype system at 5, 20, and 35 min after starting the experiment in each area. An observer walked together the subjects taking a distance. After the strolling in each area, we conducted a questionnaire about the applied pattern of the information in the area.

In this experiment, we focused on the following two points for the evaluation of each proposed information:

1. Does the provided information give the subjects chances to change their behaviors?
2. Does not the provided information make the subject notice the recommended spots?

To evaluate the points above, we recorded the positions of the subjects. In addition, the observer took the video data to get the situations of the subjects. In the questionnaire, we asked the questions about the degree of attentions of the subjects to the output from the system. The reason of this is that our goal is to verify the information as a weak trigger to change the behaviors of users, not to force the change of the behaviors. In the questionnaire, we set the four degrees of the attentions, such as, awareness of the output, watching the screen, seeing the contents, and decision based on the contents. Specifically, we set the following four questions in the questionnaire:

1. Were you aware of the output from the system?
2. Did you watch the screen of the system?
3. Did you see the contents provided by the system?
4. Did you decide your next actions based on the outputs from the system?

For these questions, the answer format were 5 scales, in which 1 corresponds to strongly disagree and 5 corresponds to strongly agree.

In the questionnaire, we also asked the following questions and the free opinions from the subjects for our interests:

5. Did you enjoy your strolls in this experiment?
6. Do you feel that your strolls using the system was more fun compared with your usual stroll?

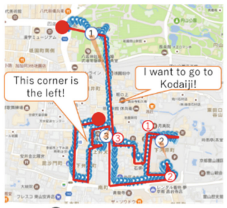
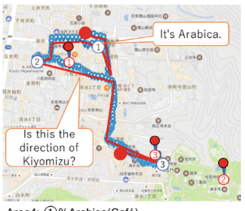
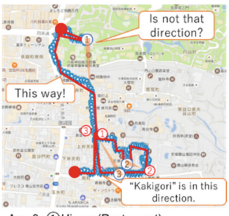
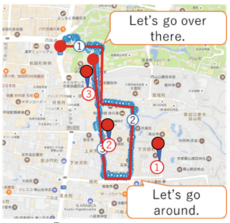
4.3 Experimental Results

We explain the results using the logs of the subjects' positions and the voice or the video data of the subjects in this section. For each pattern of the provided information, while we got the data of the three pairs, we show one of them in the paper due to the limitation of space. Note that the shown one result has a similar characteristics or tendency as the other two results in every pattern.

In the most cases that no position information is provided to the subjects (i.e., "none"), there was few changes of the movements of the subjects. The reason of this is that the subjects had no idea which direction to go in order to visit the recommended spots even if the feature information was provided. In the paper, we show the results of all the cases excepting the case of no position information.

Table 3 shows the results in each case. Each map shows one of the results for the combination pattern of the corresponding row feature information and the corresponding column position information. That is, the top-left map is the result for the pattern of "none" and "area. On the maps, the voice data are mapped at the locations where the subjects acted of saying the words. The blue circled numbers indicate the

Table 3. The results of the movement history and the voice.

Feature Information	Position Information: Area	Position Information: Direction	Position Information: Pin
None	 Area2: ①Wabiyakorekido (Store or souvenir shop) ②Yasuikonpiragu(Shrine) ③Rakuraku(Café)	 Area3: ①Nenenomichi(Strolling area) ②SLOWJETCOFFEE(Café) ③Hisago(Restaurant)	 Area4: ①%Arabica(Café) ②Jisyu-jinja(Shrine) ③Ma-ruburansyu (Store or souvenir shop)
Category	 Area2: ①Kenninji(Temple) ②Tsujiri(Café) ③Yasuikonpiragu(Shrine)	 Area2: ①Kenninzi(Temple) ②Tsujiri(Café) ③Yasuikonpiragu(Shrine)	 Area2: ①Kenninji(Temple) ②Yasuikonpiragu(Shrine) ③Tsujiri(Café)
Text	 Area2: ①Kenninzi(Temple) ②Gyarusonkure-pu(Café) ③Yasuikonpiragu(Shrine)	 Area3: ①Hisago(Restaurant) ②SLOWJETCOFFEE(Café) ③Pageone(Café)	 Area3: ①SLOWJETCOFFEE(Café) ②Hisago(Restaurant) ③Jouvencelle(Café)
Photo	 Area4: ①Jisyu-jinja(Shrine) ②%Arabica(Café) ③Akoyachaya(Restaurant)	 Area4: ①%Arabica(Café) ②Akoyachaya(Restaurant) ③Ma-ruburansyu (Store or souvenir shop)	 Area4: ①Akoyachaya(Restaurant) ②Jisyu-jinja(Shrine) ③Ma-ruburansyu (Store or souvenir shop)

locations of the subjects where the system outputted the information about the recommended spots. In the lower part of each map, the recommended spot at each location is shown. The red numbers indicate the locations of the recommended spots of the corresponding number.

The effect of the "area" as the position information: Regardless of the patterns of the feature information, the subjects moved to the direction to the recommended spots. The subjects decided their directions based on the outputted area on the corners. However, in the case that "none", "category", or "text" of the feature information, the subjects could not visit the recommended spots even though they went to the area near the recommendation. It seems that they could not detect the spots.

The effect of the "direction" as the position information: The results of the cases of the "direction" have the same tendency that of the "area" information. The subjects changed their direction of the movement based on the "direction" information of the recommended spots. In addition, they could not visit the recommended spots for the many cases of "none" and "category" information. However, in the case of "text" and "photo", the subjects detected the recommended spots, and moved there changing their direction exactly.

The effect of the "pin" as the position information: In all of the patterns, the subjects detected the recommended spots. That is, it is said that the exact position information of spots makes the guess of spots easy. Especially, by giving the exact position information on the map, the subjects could know the distance to the spots. Such knowledge has effect on the decision of changes the direction of the movement.

The effect of the "none" as the feature information: Even if no feature information was given to the subjects, they detected the recommended spots based on the position information. However, except the case of "pin" information, they did not notice the recommended spots.

The effect of the "category" as the feature information: By the effect of the position information, the movement to the direction to the recommended spots were caused. The observer saw the behavior of the subjects such that they looked for the spots based on their category information. Since they had the hints of the spots as their categories (i.e., temple, café), they could explore to find them, but they could not detect them.

The effect of the "text" as the feature information: In some texts, there were keywords for the recommended spots. See the result of the patterns of "text" and "direction". The subjects noticed the keywords "Kakigori" (it is Japanese shaved ice) of the recommended spot, and looked for the spots corresponding "Kakigori". In the experiments of the other pairs, there were many cases where the recommended spots were specified.

The effect of the "photo" as the feature information: The information of photo had a strong effect to the detection of the spots. The voice data from the subjects included the shop name or the keywords of the spots. The subjects saw their surrounding environment to take a matching to the given photo. Based on the visual image of the spots, some subjects understood them.

We will summarize the results for the position information. From the results, it is said that if no position information of the spots were given, few subjects moved toward them unless detailed feature information were given. Given the position information of "area", "direction", "pin", the subjects changed their direction of movement to the given spot in many cases. Especially in the case of "direction" or "pin", the subjects often grasped the position of the spots accurately. The exact position information also gave the relative position of the recommended spots.

For the feature information, even in the case of "none" and "category", we were able to confirm the actions of moving towards the spots based on the position information. However, in these cases, it was found that the recommended spot cannot be specified. When the feature information was presented by "text" or "photo", the recommended spots were sometimes specified. This is because the spots were easy to guess when the keywords in the texts or photos deeply related to the spots.

4.4 Questionnaire Results

Table 4 shows the results for the questionnaires about the degree of the attentions of the subjects to the output from the system. The results are shown in the average scores for the question in each combination of the information. The values of "Average" are the averages of the scores in the same row or column.

The results for the question about the awareness of the output shows that for the position information, the average values for "area", "direction", "pin" are over 3.00. Especially, the scores are high for "area" and "pin". For the feature information, the cases of "text" and "photo" have high scores of about 4.00. In particular, the combination of "area" and "text" has 4.50, and the combination of "pin" and "photo" has 4.67 score. Also, even if nothing is displayed about the position information, the subjects were aware the output from the system because they got the information of "text" or "photo" as the feature information.

The results for the question about the watching the output from the system show that in the cases that the position information is "direction" or "pin", the scores are high regardless of the feature information. There are no differences between the feature information. We can see this tendency in the results for the third question. The scores are high regardless the feature information when the position information is provided by "area", "direction", or "pin". From these results, it is said that the subjects would confirm the information whenever the system output. Especially, if the direction to a spot or the exact position of a spot is provided, this tendency becomes strong. For the feature information, if the information has some content, "category", text", or "photo", must of the subjects saw it.

The results for the last question show that for the position information, the scores are high values in the case of "area", "direction" or "pin". For the feature information, the case of "category" has a higher value than the others. In particular, the pattern of "direction" and "category" has the high average score 4.50.

From the results above, we summarize the results of the questionnaire. First, we consider the position information. In the case with no position information, the outputs from the system tended to be less noticed, and then, the subjects did not act based on the output. Furthermore, when the position information was given as "area",

Table 4. The results of the questionnaire.

Average scores for the questions						
Question: Were you aware of the output from the system?						
		Feature information				
		None	Category	Text	Photo	Average
Position information	None	1.83	2.50	3.67	3.33	2.83
	Area	3.33	3.17	4.50	3.83	3.71
	Direction	3.00	3.00	3.67	4.00	3.42
	Pin	3.33	3.00	4.17	4.67	3.79
	Average	2.88	2.92	4.00	3.96	
Question: Did you watch the screen of the system?						
		Feature information				
		None	Category	Text	Photo	Average
Position information	None	2.83	3.00	3.33	3.83	3.25
	Area	3.83	3.50	3.83	3.67	3.71
	Direction	4.50	4.33	4.33	4.33	4.38
	Pin	5.00	4.67	4.83	4.50	4.75
	Average	4.24	3.88	4.08	4.08	
Question: Did you see the contents provided by the system?						
		Feature information				
		None	Category	Text	Photo	Average
Position information	None	2.50	3.50	4.00	3.67	3.42
	Area	4.17	4.33	4.33	4.33	4.29
	Direction	4.00	4.67	4.33	4.33	4.33
	Pin	4.83	4.83	4.67	4.67	4.75
	Average	3.88	4.33	4.33	4.25	
Question: Did you decide your next actions based on the outputs from the system?						
		Feature information				
		None	Category	Text	Photo	Average
Position information	None	1.50	3.00	2.83	3.00	2.58
	Area	4.00	4.17	3.33	3.83	3.83
	Direction	3.83	4.50	4.44	3.67	4.00
	Pin	3.67	4.17	4.00	4.00	3.96
	Average	3.25	3.96	3.54	3.63	

(5 scales; 1 is strongly disagree, 5 is strongly agree)

"direction", or "pin", the subjects tended to be aware the information. In particular, the information of "direction" or "pin" attracted the attention of the subjects strongly.

For the feature information, if the output had some information then the subjects tended to be attracted their attention to the information regardless of the content of the feature information. The differences in the feature information are small. Even in the

cases of “none” or “category”, the subjects were aware the information. The case of “category” has the higher score for the last question than the others. The observer confirmed that the subjects looked for somethings related to the given categories. That is, since the feature information of the recommended spots were not explicitly given, it is thought that the subjects freely guessed the recommended spots and walked looking for them. As a result, it is thought that scores for the questions became the high values.

4.5 Consideration

First, we consider the effect of the position information. From the results of the position logs of the subjects, it is said that there is no chance to change their movement if no position information is given to them. On the other hand, if the position information is given as “area”, “direction”, or “pin”, it was seen that the subject moved to the direction to the given position. Especially, some subjects detected the exact location of the spots based on the information of “direction” or “pin”. From these facts, it is said that the subjects tended to change their behaviors if some information about the position was given. However, if the position information has some exactness, the subjects detected the recommended spots. In the case of “area” and “direction”, the detections of the recommended spots were depending on the feature information.

Next, for the feature information, if no feature information was given to the subjects, they could not detect the recommended spots. The information of “text” and “photo” noticed the subjects the characteristics of the spots. Especially, because the “text” gives the precise keywords of the spots, it leaded the subjects to detect the spots. The information of “category” did not give the precise image of the spots to the subjects, but it promotes the actions of looking for the recommended spots.

From the above consideration, we consider the information as a weak trigger which gives strolling tourists a chance to change their behaviors but does not specify the spot in a recommendation system. Regarding the first conditions, it is necessary to give a position information. Moreover, the “direction” or “area” information of position suit to the second condition. Also, from the questionnaire results, it is said that the “direction” of information is attracted attention more strongly than “area”. The exact information of position (i.e., “pin”) make specifying the spots easy. For the feature information, the “text” or “photograph” of information gives a strong image of a spot, which does not satisfy the second condition. In the case of the “category” information, the subjects saw the output from the system, but could not find the recommended spots. In the experiment site, there were many spots corresponding to a category. So, the subjects could freely guess the recommended spots, and looked for them. From these results, it is said that the information of “area” and “category” of the spots is the desired weak trigger.

5 Conclusion

This paper considered the information of sightseeing spots as a weak trigger which gives strolling tourists a chance to change their behaviors but does not specify the spot in a recommendation system. We classified the information about spots into the position and the feature information, and then set the four categories of information for

each. We conducted the experiment with some subjects. As a result of the experiment, it was indicated that the combination of area information as the position of a spot and category information as the feature of the spot is an appropriate trigger with a good balance. Our future works is to verify an interface to output the information, and moreover, to propose an interaction mechanism between the system and tourists during their sightseeing.

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