A New Advertisement Method of Displaying a Crowd

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***Abstract*—In this paper, using a new advertising method within a virtual space, we examine a method that portrays a crowd by showing multiple people in front of institutions and stores. This method is intended to promote advertising by utilizing the behavioral psychology of users who want to agree with what many other people support. We examine how the attractiveness of the store changes due to the presence or absence of crowds in a shopping mall within a virtual space. Although there were some subjects whose store ratings were not increased due to the negative image of crowds and the unnaturalness of the crowds, the proposed method generally increased the appeal of the store and the subjects' impression of the store.**

Keywords-Virtual Reality; Bandwagon Effect.

I. INTRODUCTION

In recent years, with the development of virtual reality technologies, there have been many attempts to represent actual facilities, services, stores, etc. in virtual spaces [1]-[3]. Attempts have been made to develop a virtual space as a social infrastructure and expand it as a place for people's activities [4]-[6]. As a result of such research, if virtual reality as a social infrastructure expands in the future and becomes the basis of human activities, users will be able to perform more free-of-charge activities in the virtual world than they can in the real world. Currently, while attempts are being made to communicate information to users via various forms of media [7], it is noteworthy that when advertising activities are conducted in a virtual society, this method of expression spreads information more than when using conventional methods. For example, while disseminating information throughout a shopping mall or department store is possible in a virtual world, methods of poster text, illustrations, and voice guidance must generally be used in the real world. On the other hand, objects existing in the virtual world can be converted and alternatively expressed by using information technologies, and a more flexible transmission method can be expected. In this paper, we propose a method of displaying crowds as a way to guide users. The purpose of the method is to portray a thriving situation by placing multiple virtual people in front of the store, event, or object that the system wants to advertise, as shown in Figure 1. It is hypothesized that this approach makes it possible to advertise in a way that is more suitable to the situation than is the traditional text-based guidance.

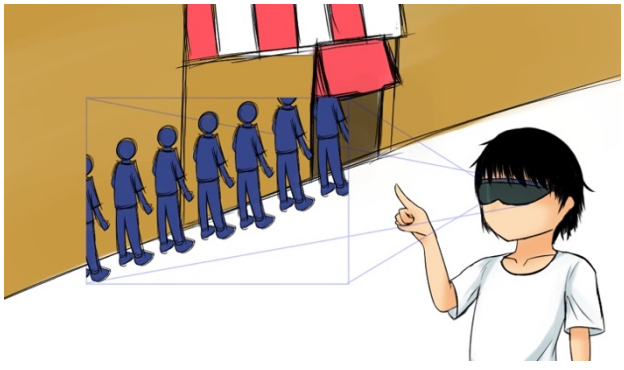

Figure 1. Displaying a Crowd.

The rest of the paper proceeds as follows: Section 2 describes the background of this study. In Section 3, we explain the concepts of new advertisement method of displaying a crowd and an experiment to verify the effect of displaying crowd. The result of this experiments is presented in Section 4. In Section 5, we discuss the obtained results after the experiment. Finally, Section 6 concludes this paper.

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II. BACKGROUND

This section introduces the background that led to the proposal of our advertising method.

A. Bandwagon Effect and Snob Effect

The concept behind this advertising effect approach is the bandwagon effect that exists in human behavioral psychology [8]. The bandwagon effect is a psychological phenomenon in which people think that something that many other people support is valuable. This effect is used in economic marketing and can be incorporated into advertising effects that sell products to customers [9][10]. Political studies have suggested a relationship with the voter rate of elections [11]-[14]. On the other hand, there is also a psychological phenomenon where people want to keep their perception of scarcity and do not want to own what many people support. This is called the snob effect or the underdog effect. These effects are not contradictory but rooted in human behavioral psychology [15][16].

B. Introducing the Bandwagon Effect based on IoT Technologies

Research is being conducted to investigate the impact of introducing this bandwagon effect to IoT-based systems. In the study of [17], a recommended system incorporating the bandwagon effect is considered from the user's selection history. In recent years, a system that the user operates digitally and without thinking has become popular. This experiment is one example of the research that is related to persuasion without attracting the user's attention [18]. In addition, by adopting the method of giving only the necessary information to the user of a digital device, the user can select their level of necessary information according to the environment of their future society in which the amount of information increases enormously [19]. In the study of [20], the authors proposed solutions to public institution bottlenecks by providing information about the surrounding environment and presenting it to the user. As described above, such research has been conducted to enrich people's lives by providing information on the everyday world in which people live.

III. A PROPOSED APPROACH AND ITS EXPERIMENT DESIGN

As an approach to inducing people, it is effective to examine human psychology, and such methods are currently being studied [21]. In this paper, we propose an advertising method of portraying a shop as being one that many people support as a way to guide the target shops. Specifically, a crowd is displayed in front of a store as an expression that it is supported by many people in a virtual space, as shown in Figures 2-4. By using the projection method that places virtual people in stores within a virtual shopping mall, the natural guidance that makes users feel as comfortable as possible is realized. In this case, the method may be effective for users who are strongly oriented to joining bandwagons, as it emphasizes the support of the majority. In addition, it is necessary to consider how to respond when the same approach is attempted on user who is highly snob-effect oriented.

In the remaining section, we show how the experiment investigating the effectiveness of our approach is designed.

A. Preliminary Survey

Before starting the experiments, we examine the psychological tendencies of subjects in their daily life. This is because the results will vary greatly depending on whether their human behavioral psychological intention to follow a large number of opinions (bandwagonism) or their desire to retain one's rarity (snobbish) is stronger. In the preliminary survey as shown in TABLE I, several questions regarding the subject's bandwagonism are prepared in the form of a 6-point Likert score. We classify people who responded positively to a large number of opinion-based answers with an average score of 3.5 or higher as a “Bandwagoner”, and those who scored less than that value are classified as a “Snob”.

TABLE I. THE CONTENTS OF PRELIMINARY SURVEYS

No	Question
Q1	*Do you decide your actions by looking at the people around you?*
Q2	*Would you like to go to a store recommended on TV or the web?*
Q3	*Would you like to go to a shop that has gained a reputation from word of mouth?*
Q4	*What kind of shop do you care about when you find thriving shops on the street?*
Q5	*Are you interested in shops that are said to be in line with other people?*

B. Patrolling in the Virtual Mall

After the preliminary survey is completed, the subject conducts a patrol through the virtual shopping mall with the headset attached as shown in Figure 5. Three clothing stores in the mall are set as destinations, the presence or absence of a crowd is compared among the stores, and how the attraction level of the store changes depending on the crowd is evaluated on a 6-point Likert scale.

C. Post-Experimental Survey and Interview

After the patrol of the mall, we ask the subjects about the crowd conditions. Specifically, we ask, "*At what crowd level do you feel the charm of the store?*" and "*At what crowd level do you want to enter the store?*" The responses to these questions can either be “*Quiet*”, “*Congested*”, or “*Very Congested*”. Furthermore, the model that expresses the crowd itself, the location where the crowd is generated, and whether the behavior of the model feels uncomfortable are all evaluated in 6 stages.

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Not Crowded

Crowded

Figure 2. First Situation in a Virtual Mall.

Not Crowded

Crowded

Figure 3. Second Situation in a Virtual Mall.

Not Crowded

Crowded

Figure 4. Third Situation in a Virtual Mall.

Figure 5. A Scene of Patrolling in a Virtual Mall.

TABLE II. DETAIL OF POST-EXPERIMENTAL INTERVIEWS

No	Question
Q1	Evaluation of Crowds as Advertisement
Q2	Discomfort with Human Models and Crowds
Q3	Facilities that May be Judged from Crowds

After all the experiments were completed, the subjects are interviewed from three viewpoints, as shown in TABLE II, to obtain their impressions and opinions on the crowd-controlled advertising.

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IV. Results from the Experiment

The experiment described in Section 4 was conducted on 8 men and 1 woman. Based on the preliminary survey, those are were classified as a bandwagoner are expressed as B1, B2, …, and those who were classified as a snob are expressed as S1, S2, ….

A. Reactions from Patrolling the Virtual Mall

From the mall patrol experiment, it can be seen that although there is a difference in degree, the main intention is whether the person enters the store or not. Figure 6 shows the difference of score of stores' attractiveness by displaying crowd or not. Furthermore, the distributions of answers to the question related to displaying crowd are shown in Figure 7, 8.

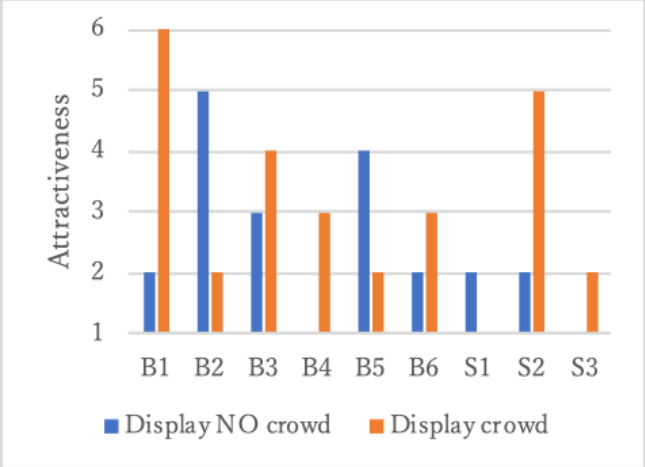

Figure 6. The Score of Store Impressions

Figure 7. The Distribution of Answers to the question of how crowded

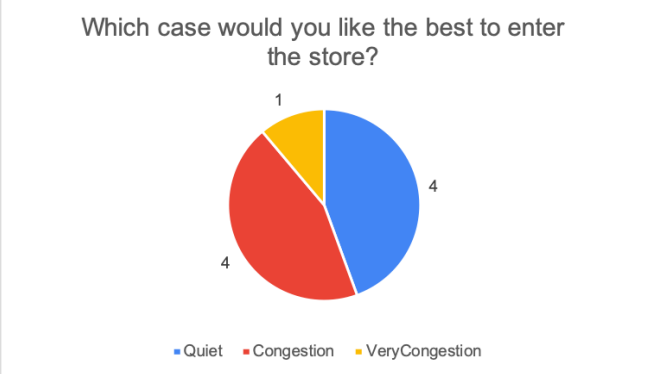

Figure 8. The Score of Stores Impression

B. Discomfort with Crowded Displays

Evaluating discomfort with crowded display methods shows that most users say that they feel uncomfortable with the projection, as shown in Figure 9.

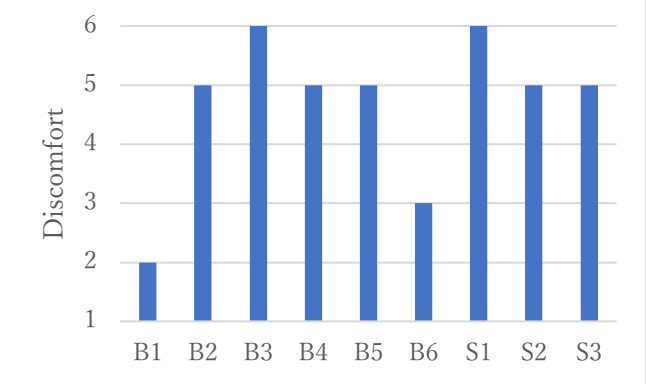

Figure 9. The Score of Discomfort of Human Models

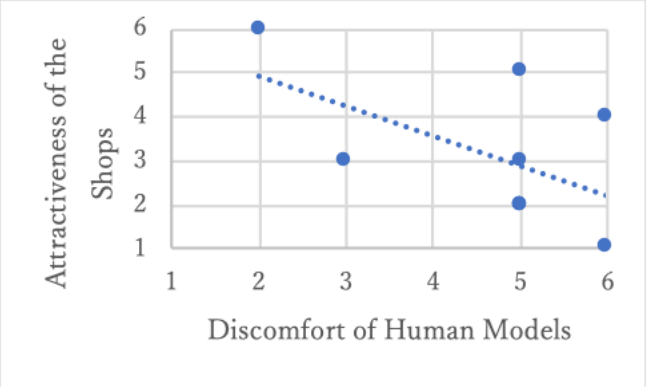

Figure 10. The Score of Store Impressions

Furthermore, as a result of calculating the correlation between the evaluation of an uncomfortable feeling with respect to the crowd and the evaluation of the crowd display from the scatter diagram of Figure 10, the correlation coefficient was calculated to be approximately −0.57.

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V. DISCUSSIONS

In this section, we examine whether our proposed method has the potential to be used as an advertising technique based on the results of the experiments.

A. Feasibility of the Bandwagon Approach

First, the experiments and surveys suggested that the presence of people in a store was a factor in the overall appeal of the store itself and that this tendency existed regardless of whether the shopper was a bandwagoner or a snob. It can be considered that a sense of security was obtained when people were shown that the store was supported by way of the presence of a crowd in the store. In addition, the subjects answered in the interview that "*I want to go to this store when it is available* (S2)" or "*I want to check out this store when I return* (B3)".

Even if there was no immediate effect of crowding as a form of advertisement, it can be considered that this approach does leave an impression on the user. In addition, there was an opinion that the approach of displaying crowds is reliable and interesting because it suggests a guarantee that the store is popular at that moment compared to Internet reviews and conventional advertisements (S2). On the other hand, there were both bandwagoner and snob subjects who replied that the appeal of the store decreased with respect to the crowd display (B2, B5, S1). It was noted that the evaluation values change depending on the negative impression of the crowd itself and the type of store that advertises using a crowd. Furthermore, the display of a crowd may interfere with the appearance of the store. In such cases, the store may not be able to showcase the information that it truly wants to show to customers, such as store design, recommended products, discount advertisements, etc.

B. Current Problems of the Proposed Method

A couple of subjects expressed the opinion that there were problems with the proposed method (B2, B4). In addition, it was mentioned that the model as adverse effects, such as imparting too much stress on the user and making it difficult to enter the store because too many people were standing in the entrance (B4, B6, S1). Therefore, it is thought that the size of the crowd must be adjusted within a range that does not disturb the scenery of the store.

The most prevalent opinion expressed in this experiment was that the subject felt uncomfortable in the situation where people were crowded in front of the store (B1, B2, B4, B5, B6, S1, S3). In reality, the situation in which people are crowded in front of the store is unnatural; therefore, some subjects said they felt anxiety that an incident had occurred in the store (B6) or it was a problematic store (S1).

Furthermore, the appropriateness of the store displaying a crowd is related to the uncomfortable feeling produced by such a crowd. In this situation, the subject was supposed to go to a clothing store, but at the clothing store, the subject said that congestion at the store was not preferable for reasons, such as wanting to talk to a store clerk or try on clothing (B2).

Therefore, it is desirable that the facilities and stores that display crowds guarantee their value due to the presence of additional people, e.g., restaurants that require up-to-date evaluations (B6, S2), movie theaters in which the state of the facilities cannot be seen from outside (B4), live events that are increased by crowds (S1), and station congestion information disseminated through the display of crowds (S3). As shown in Figure 10, the uncomfortable feeling related to crowding has a negative correlation with the attractiveness of the store; therefore, reducing the uncomfortable feeling of crowding will be a future challenge.

C. Concern About Using the System in the Real World

In this paper, we proposed a method to display crowds as a form of advertisement. It is thought that the advertising effect of displaying crowds can be expected to some extent in the virtual world, but there are various concerns about using this method in the real world.

The first concern is that it must be possible to distinguish the objects that are projected to the user while also harmonizing with the existing objects (B4). This is because if the user cannot actually distinguish between displayed and real objects when walking around the city or facilities, there will be problems, such as collision with surrounding people and forcing the user to perform useless actions, such as avoiding the projected objects. However, as described above, there is the problem of the advertising effect being slim unless the user can be guided without a sense of incongruity. To implement this advertising method in reality, it is necessary to consider a good projection method that resolves these conflicts. In interviews with the subjects, model methods were suggested that both avoid the user (B4) and that display the crowd only at a distance and disappear when the user moves close to the crowd (S2). It is necessary to further verify how the advertising effect will change by introducing these methods.

The second concern is that the approach could be used for so-called stealth marketing, in which the store intentionally manipulates the crowd to enforce the store's advertisements without notice to the user, and thus the user cannot make the correct choice (B6). We must be careful of the social problems caused by malicious stealth marketing [22]

VI. CONCLUSION AND FUTURE WORK

The possibility of a new advertising method in the virtual world was considered through the current experiment. This method cannot be applied to every facility or store, but it can be used to relate the prosperity and reputation of a store at a glance and to attract people's attention. This approach can be used for a facility that is directly related to popularity, such as a restaurant, or an event that gathers people with the same purpose, such as a live performance.

In the next step of our research, we will verify whether it is possible to reduce the user's uncomfortable feeling toward the crowd displayed in the shopping mall by changing the location, the viewing location, the number of people, and the

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behavior of the crowd. We will also evaluate how the attractiveness of the store changes as the feeling of discomfort decreases. In addition, it is considered necessary to verify how the user's impression of the store changes by changing the type of store that displays crowds in front of them.

Furthermore, through interviews, we will evaluate whether the risk of actually using the system in reality can be reduced by introducing a method to lower the risk of using the technique. It is thought that it is necessary to verify and evaluate how discomfort with the crowd changes by introducing this method and whether the projection has an advertising effect.

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