GAZO GAZO KUN: Photo-Sharing System Using an Anthropomorphic Photo Frame for Communication Support

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Abstract. Many photo-sharing websites do not actively promote communication among users of the website. We believe that a website that promotes viewing and commenting on shared photographs will better support communication and relationships between people who do not know each other. Therefore, we have developed a photo-sharing system, named GAZO GAZO KUN. This system has an anthropomorphic photo function (a photo agent), which actively supports communication among users. Our experiments compare GAZO GAZO KUN and a photo-sharing website in Japan, similar to Flickr. We found that the effect of promoting viewing and commenting on photographs in GAZO GAZO KUN is higher than that of the photo-sharing website.

Keywords: Communication support, photo sharing, agent.

1 Introduction

Digital cameras are becoming more and more common around the world. As a result, people have a large amount of photographic data, which has led to an increase in the use of photo-sharing websites. An Internet-related association reported that fewer people use photo-sharing websites than other Internet services[1]. There are users and photographs that gather a following, and consequently, a high number of comments, but an enormous proportion of photographs are never seen on the photo-sharing websites. According to the research of the famous photo-sharing website Flickr[2], a great many users and photographs are never seen or commented on [1].

We found that there are a small number of active exchanges between users in existing photo-sharing websites. However, these websites do not actively promote communication between users. If the website were to promote viewing and commenting on shared photographs, it would better support communication between people who do not know each other. In answer to this need, we have developed a photo-sharing system, named GAZO GAZO KUN.

The purpose of this research is to verify the efficiency of our system in motivating users to view and comment on other users' photographs. This system has an

[1] CNET Japan (Japanese): http://japan.cnet.com/marketing/20366392/
[2] Flickr: http://www.flickr.com/

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anthropomorphic photo function (a photo agent), which actively supports communication among users.

2 Related Work

There are user-friendly photo-sharing websites. These sites have been designed to make it as easy as possible to comment on photographs, upload photographs, and make users aware of other website users. For instance, a photo-sharing website called JussPress [2] allows one to easily upload a photograph by dragging and dropping the picture. Then, the user is automatically notified if someone else comments on the photograph. Another photo-sharing website makes it possible to easily upload and comment on a photograph using a portable device [3]. Another example is a photo-sharing system, PhotoChat, that enables users to write comments directly on the photograph [4]. PhotoChat is a photo-sharing system that promotes communication between users by facilitating the sharing of photographs and comments.

Our study aims to promote communication between users in the same way, although our photo agent does so in a different way to those described above.

3 GAZO GAZO KUN

We have developed a photo-sharing system, named GAZO GAZO KUN[3]. This system has an anthropomorphic photo function (the photo agent), which actively supports communication among users of the system. The communication support in our photo-sharing system aims to increase the number of times users are viewed and the number of times people comment on photographs.

3.1 Design Policy

1. A photograph to an agent

There is one agent per photograph. We call the agent the "photo agent." As a result, the system is able to support communication relating to the photograph using the photo agent. For instance, we can give compatibility relationships between the appearances of photographs for each photo agent.

2. Promoting communication using the agent

We give the interest and affection to users' agents by the agent's behavior. For example, each agent talks to the user in a friendly fashion. Moreover, each agent moves blithely. We believe that the agent's behavior makes the communications support function more effective.

[3] The origin of the name GAZO GAZO KUN is Japanese. "GAZO" is a Japanese word that means "image" in English. We repeat the word twice in the name to produce a rhythmic sound. The word "KUN" implies that we hold the person or object in the preceding word in high esteem.

3.2 System Configuration of GAZO GAZO KUN

Figure 1 shows the configuration of GAZO GAZO KUN. The server manages all data in the system, namely the user list, the image list, and the comment list. The user uses a web browser to access the system. We have developed the system using PHP and Flash with ActionScript.

GAZO GAZO KUN consists of the following pages.

- My Page: the user's own photo agents and links to other users' photo agents.
- Photo Square Page: a display of photo agents.

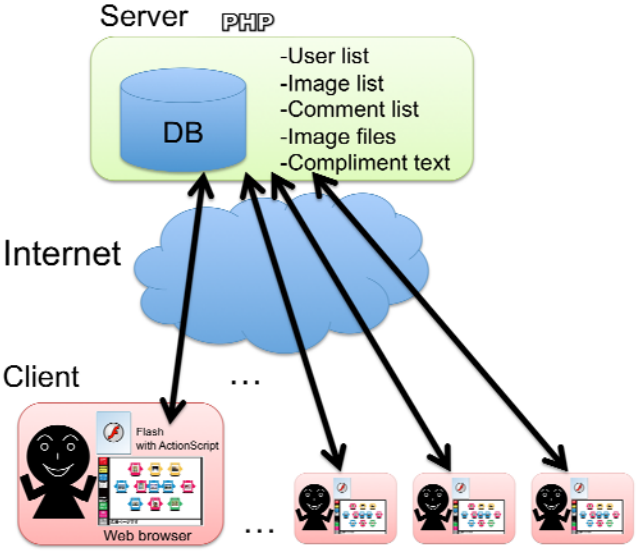


Fig. 1. The system configuration of GAZO ZAGO KUN

3.3 Photo Square Page

Figure 2 shows a screenshot of the Photo Square Page. The page shows one photo agent belonging to the logged in user. The page also shows nine photo agents belonging to other users. The nine photo agents are photographs that the number of browsing are little. The photo agent can have one of five possible faces, each with a different color (red, blue, green, yellow, or purple). The choice of color is made based on the composition color of each photograph. This color is used by the compatibility check function.

3.4 Special Functions for a Photo Agent

We developed special functions for a photo agent, which we describe in Table 1. From the results of our experiments in Chapter 4 of this paper, two of the functions were particularly effective. These were the comment request function and the stroking function. We explain each of these two functions in more detail below Table 1.

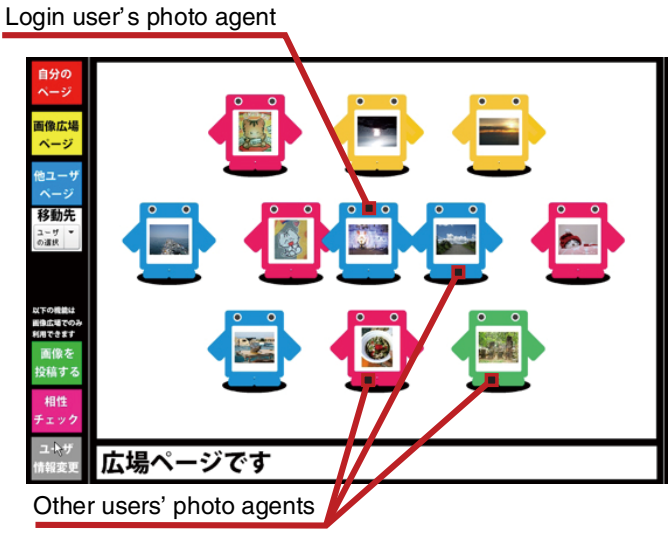


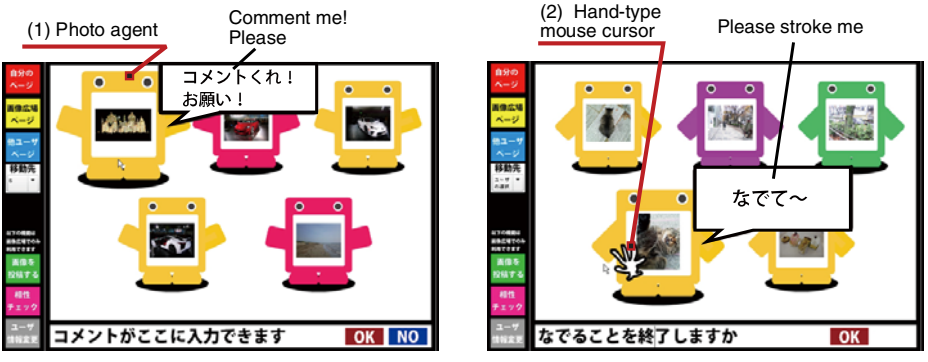
Fig. 2. Screenshot of the Photo Square Page

Table 1. Function list for photo agents

Functions	**Explanation**
(1) Photo praise function	The system praises the uploaded photo automatically.
(2) Comment request function	A photo agent (not the user) requests the comment.
(3) Comment report function	A photo agent that receives a comment from another user reports this to the owner of the photo.
(4) Stroked report function	A photo agent that is stroked by other user reports this to the owner of the photo.
(5) Random movement function	A photo agent randomly selects and opens another user's page.
(6) Compatibility check function	A photo agent moves to another user's page, based on the compatibility of the photo agents.
(7) Stroking function	The photo is evaluated by the photo agent when a user performs the stroking operation on the photo agent using a mouse.
(8) Self-praise function	A photo agent praises itself (I'm a good photo!).
(9) User inviting function	The photo agent invites the user to view other users' photos.
(10) Other users' photo agent display function	Other users' photos are displayed on My Page.
(11) Few viewed photo display function	Photos that have not been viewed very often are displayed on the Photo Square Page.

Comment request function. Figure 3 (a) shows the screenshot of a comment request function. A photo agent asks other users to comment on the agent, not the owner. The purpose of this function is to encourage users to view photographs and contribute comments. After receiving a comment, the photo agent reports this to the owner of the photograph.

Stroking function. Figure 3 (b) shows the screenshot of a stroking function for evaluation. When stroking a photo agent, the shape of the mouse cursor changes to a hand-shaped mouse cursor. After stroking, the stroked photo agent reports this to the owner.



(a) Comment request function (b) Stroking function for evaluation

Fig. 3. Screenshots of comment request function and stroking function for evaluation in GAZO GAZO KUN

4 Comparative Experiments between GAZO GAZO KUN and an Existing Photo-Sharing Website

4.1 Procedure of the Experiments

We conducted experiments in order to compare GAZO GAZO KUN and an existing photo-sharing website. The purpose of the experiment is to verify whether GAZO GAZO KUN effectively promotes communication between the users of the system. The subjects are 20 students at Wakayama University. We used livedoorPICS[4] as the existing photo-sharing website in Japan. The livedoorPICS is functionally similar to Flickr, a very popular photo-sharing website. We chose livedoorPICS rather than Flickr because the display language of livedoorPICS is Japanese. In the experiment, we divided the 20 subjects into two equal groups, Group A and Group B.

- Group A: use livedoorPICS in the first week, and use GAZO GAZO KUN in the second week.
- Group B: use GAZO GAZO KUN in the first week, and use livedoorPICS in the second week.

We ensured that the subjects in each group did not know each other prior to the experiment. We did this in order to imitate the communication between people using photo-sharing in a real-world environment. We asked each subject to perform the following tasks in both experiments:

[4] livedoorPICS: `http://pics.livedoor.com/`

- Upload five photographs.
- Log on to the system once every day.
- Upload one or more photographs every day.

After the experiment, each subject answered a questionnaire on each system.

4.2 Result of the Experiments and Discussion

We show each user's log data and questionnaire. We used the Wilcoxon signed-rank test, with a significance level of 5%.

Log data. Table 2 shows the users' operation status in both GAZO GAZO KUN and livedoorPICS. The average time they spent on GAZO GAZO KUN is 100.8 minutes, and 84.2 minutes on livedoorPICS. The significance probability is 0.22, which indicates that there is no significant difference between the amount of time spent on GAZO GAZO KUN and livedoorPICS.

There was also no significant difference in the number of photographs uploaded, the number of visits on My Page, and the number of visits to other users' pages. In addition, we found that there was no significant difference in the users' operation status between GAZO GAZO KUN and livedoorPICS.

Table 3 shows the number of viewed photographs on GAZO GAZO KUN and livedoorPICS. We found the number of viewed photographs in GAZO GAZO KUN to be more than that of livedoorPICS in both groups. However, the standard deviation of both groups is large. Therefore, we need to encourage inactive users to view more photographs.

Table 4 shows the number of photographs commented on in both GAZO GAZO KUN and livedoorPICS. We found the number of comments in GAZO GAZO KUN to be more than that in livedoorPICS. However, once again, the standard deviation of both groups is large.

Table 2. The users' operation status in GAZO GAZO KUN and livedoorPICS

	GAZO GAZO KUN		livedoorPICS		Significance probability
	Average	Standard deviation	Average	Standard deviation	
(1) Time spent	100.8	50.5	84.2	43.8	0.220
(2) Number of uploaded photo	15.1	5.9	15.8	6.2	0.938
(3) Number of moving My Page	24.9	14.9	26.1	23.2	0.990
(4) Number of moving other users' pages	29.6	29.7	24.5	27.1	0.076

Table 3. Number of viewed photographs on GAZO GAZO KUN and livedoorPICS

Group A

	GAZO GAZO KUN	**livedoorPICS**
Average	49.2	12.1
Standard deviation	18.9	9.3
Significance probability	0.005	

Group B

	GAZO GAZO KUN	**livedoorPICS**
Average	190.8	21.8
Standard deviation	70.7	9.9
Significance probability	0.005	

- Group A: the fist week: livedoorPICS, the second week: GAZO GAZO KUN
- Group B: the first week: GAZO GAZO KUN, the second week: livedoorPICS

Table 4. Number of contributed comments of photographs on GAZO GAZO KUN and livedoorPICS

Group A

	GAZO GAZO KUN	**livedoorPICS**
Average	4.4	2.0
Standard deviation	3.1	1.6
Significance probability	0.027	

Group B

	GAZO GAZO KUN	**livedoorPICS**
Average	15.3	7.6
Standard deviation	6.3	5.4
Significance probability	0.013	

- Group A: the fist week: livedoorPICS, the second week: GAZO GAZO KUN
- Group B: the first week: GAZO GAZO KUN, the second week: livedoorPICS

Results of the Questionnaire

Table 5 shows the evaluation reasons for "I thought that I want to browse photographs by the action of a photo agent." We found the photo agents to be effective as a way to browse photographs. Some users were more interested in the photographs than the photo agents. However, we consider this to be a positive tendency, rather than a problem.

Table 6 shows the evaluation reasons for "I thought that I want to comment to photographs by the action of a photo agent." We found that the photo agent aids the commenting process, but that there are some problems in encouraging users to continue to use this feature.

Table 7 shows the questionnaire results for encouraging browsing and commenting using the photo agent. The most effective aspect of the photo agent when encouraging browsing is "Other users' photo agent display function" (Table 7 (10)). The most effective aspect of the photo agent when encouraging users to comment is the "Comment request function" (Table 7 (2)). We also found that the "Stroked report function" to be effective (Table 7 (4)).

Table 5. Evaluation reasons for "I thought that I want to browse photographs by the action of a photo agent"

Positive reasons
- Because I was interested in the photo agent of other users who came to My Page.
- Because I become curious about the photograph chosen by the compatibility check.
- I browsed others' photograph by the function that moved to other user pages.
- Because the photo agent had said me, "User X seems to be lonely," I thought that I went to the user page.
Negative reasons
- I wanted to see the photograph simply. The movement of the photo agent is unrelated for me.
- I don't have a warm feeling for a photo agent.
- It was necessary to see the photograph in the agent clicking because it was small.
- I do not think that there was especially an action of the agent who motivates browsing.

Table 6. Evaluation reasons for "I thought that I want to contribute a comment to photographs by the action of a photo agent"

Positive reasons
- Because I felt that the agent is appealing keenly to me.
- Because the photo agent said, "Please comment", that tempted me to comment.
- Because I am glad when it is said by me that there was a comment in my photograph.
- Because I have a warm feeling for a photo agent.
Negative reasons
- I am not controlled whether to comment to the photograph by the action of the photo agent.
- I have not understood who other users are. Therefore, I feel uncomfortable to comment the photos.
- The agent's behavior becomes a chance. However, I commented by the content of a photograph.
- I commented because the action of the photo agent was unusual at first. Afterwards, I commented only to an interesting photograph.

5 Conclusion

We found that there are existing photo-sharing websites that provide a facility for active exchanges between users. We believe that a system that promotes viewing and commenting on photographs facilitates communication between people who do not know each other.

We have developed a photo-sharing system, named GAZO GAZO KUN. From the results of our experiments, which compare GAZO GAZO KUN and livedoorPICS (a photo-sharing website in Japan, similar to Flickr), we found the following:

1. The number of viewed photographs in GAZO GAZO KUN is higher than the photo-sharing website. We found that the effect of promoting the viewing of photographs in GAZO GAZO KUN is higher than in the photo-sharing website.

2. There were more comments in GAZO GAZO KUN than the photo-sharing website. We found that the effect of promoting comments in GAZO GAZO KUN to be higher than that in the photo-sharing website.
3. The function of the comment request function by a photo agent is more effective for encouraging users to contribute comments. Moreover, the function of stroking the photo agent was used as an evaluation function of other user's photographs by the user.

Table 7. Questionnaire results for encouraging browsing and commenting when using the photo agent

Functions	Stimulation of browsing	Stimulation of contributing comment
(1) Photo praise function	0	0
(2) Comment request function	2	11
(3) Comment report function	4	6
(4) Stroked report function	4	4
(5) Random movement function	2	0
(6) Compatibility check function	2	1
(7) Stroking function	0	0
(8) Self-praise function	1	1
(9) User inviting function	3	1
(10) Other users' photo agent display function	9	3
(11) Few viewed photo display function	6	0

- The total number of answers is 20.

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