An interface for promoting daily photography

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Abstract

In this research, we propose a system that aims to stimulate everyday photography. Photographs are an effectual trigger for memory recollection. Above all, everyday pictures of the house we live in, the road to our school etc. are particularly effective for evoking memories. However, we found that most people's photographs tend to be photographs of events such as travel. Therefore this system estimates the user's sphere of daily activities, and then notifies photography timing to the user when the user is in range of their daily work. In addition, this research proposes an interface to promote photography, by a method in which the system displays existing photographs on the basis of the Goal-Gradient Hypothesis.

1 Introduction

People accumulate and recall memories constantly as they live their lives. However, recalling a memory that has not been recalled for a long time is difficult. Triggers are required for evoking memories that have become difficult to recall. These triggers can be photographs, a diary, talking with others, etc. Above all, photographs are an effective trigger because they contain a large amount of information. Accordingly, photographs have been used as triggers in a form of psychological therapy called life review, and in information systems that apply life review. Therefore, photography is a very important trigger for recalling memory.

In recent years, everyone has the opportunity to take photographs every day. However, many people's pictures are photographs of special events such as travel and festivals. There are few casual everyday photographs such as the houses people live in, the schools they attend for many years, or the roads that they use for commuting (see the following section). However, everyday photographs can be a trigger for the recollection of many memories.

Accordingly, this study proposes an information system to encourage photography of the user's daily landscape as a trigger to recall memories. The system notifies the timing of photography to the user in order to motivate them to photograph their daily life. Furthermore, the system displays photos, based on the Goal-Gradient Hypothesis, to improve the user's motivation for photography.

2 Survey into recording status of daily photography

We investigated the number of photographs of daily surroundings, as a preliminary survey in this study. The survey subjects were 13 people, and all subjects were males in their early twenties. A total

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of 9,243 photographs were recorded on the 13 subjects' cellphones, which had been used for an average of one year and five months. We classified these 9,243 photographs into the following three categories:

A) Daily photograph: A photograph that was taken at a place visited by the subject more than once a week (e.g. school route, inside their house, etc.)

B) Event photograph: A photograph that was taken at a place visited by the subject less than once a week (e.g. travel, sport competition, etc.)

C) Other photograph: A photograph other than A and B (e.g. image received from others, etc.)

As a result of this classification, the number of daily photographs was 728 (7.9% of total). In addition, there were 6,473 photographs of events (70.0%) and 2,042 other photographs (22.1%). Furthermore, the proportion of daily photographs in nine of the cellphones was less than 10%. Therefore, our preliminary survey demonstrated that the number of daily photographs is significantly fewer than event photographs and other photographs.

3 Research Trends

Microsoft Research has developed a wearable-type digital camera, SenseCam [1]. SenseCam records the user's day with automatic photography at a speed of one photograph every 30 seconds. In an experiment using SenseCam, a memory-impaired woman was successfully able to recall 90% of the relevant memories by reviewing the automatically taken photographs.

On the other hand, Misaki proposed a method to support memory recall and memory searching activities by digitizing a wide range of items in the home, and browsing such digitized information in a home equipped with multiple built-in displays [2].An experiment was conducted on the lifestyle of living in this "Remembrance Home". It was found that a higher interest was demonstrated in daily memories than non-daily memories as a result of living in the Remembrance Home.

The life log research described above indicates that recording and viewing daily life has a significant influence on memory recall. However, although one's daily life can be easily recorded when photographed automatically, as in the study by Microsoft Research, the amount of data generated by such a method is colossal. It can be said that data overload is one of the problems of life log research. As a result, similar photographs of daily landscape, repeated every day, are stored in vast numbers. When using photographs of daily landscape for the purpose of memory recall, a small number of photographs for each scene is sufficient. Also, memories should be recorded as an individual person's episodes; a problem of the method of recording photographs automatically is that the contents of the photographs are objective and do not reflect the user's intentions.

4 System Proposal

In this research, our aim is to construct an information system that promotes photography of daily landscape to the user within their daily life. Accordingly, this system is constructed to be used on mobile devices, which many people carry with them on a daily basis. When the user is active in their daily activity area, the system promotes photography by notifying the user of photography timing several times per day. However, if using only this method, we can consider that the user's reaction to their daily environment will be minimal due to acclimatization, and the desire to take photographs will not be stimulated. Therefore, the system presents the photographs taken by the user as a representation of the user's average daily pattern. We propose an interface whereby a sense of detail in the contents of the user's day - and the feeling that some parts that are lacking - due to the act of taking photographs will lead to improved motivation for photography.

4.1 Notification of Photography Timing

In order to encourage the user to take a variety of daily photographs, it is necessary to recognize when the user is conducting daily activities, and to send out notifications of photography recommendation at various places and times. In this system, we use GPS location information from the mobile device to fulfill these requirements. It was demonstrated in research by Oku et al. that obtaining location information enables recognition of the user's daily activity area [3]. Furthermore, in this system it is necessary that the photographs taken by the user are distributed at a variety of locations and times during the day, so that a representation of the user's average daily pattern will be formed to some extent from the initial stage of using the system. Therefore, we make recommendations at times and places that have not yet been photographed based on the locations and times of the photographs already recorded. Additionally, the number of notifications from the system is limited in order to reduce the burden on the user.

4.2 Photograph Display Method

We use a display method that utilizes gamification and the Goal-Gradient Hypothesis to display the notifications described in the previous paragraph and the saved photographs taken willingly by the user.

Gamification refers to the use of game design technology and mechanisms in order to solve problems. McGonigal observes that games have the following four common characteristics [4]:
(A) Goal(s) (objectives that must be achieved). (B) Rule(s) (restrictions pertaining to achieving such goals) (C) Feedback system (informing the player how close they are to the goal). (D) Voluntary participation (participating in the game with understanding of A~C)

In games, it is important to clearly define these characteristics and present them to the user. The goal in this research is to take and collect photographs, and the rule is that photography may only be conducted within the user's sphere of daily activities. Furthermore, the feedback system is the photograph display screen. On the display screen, the photographs are presented as a representation of the user's average daily pattern by arranging the photographs taken at each time period. At this point, the system presents the photograph collection status for each time period based on the Goal-Gradient Hypothesis, showing the user how close they are to the goal. The Goal-Gradient Hypothesis was proposed by Hull (1934), and postulates that behavior is accelerated the closer one comes to a reward. Based on this hypothesis, Kivetz et al. demonstrated results of research in which purchase interval became progressively shorter as subjects came closer to rewards such as free coupons in a point service [5].

5 System Configuration

If daily records are made using a specialized device, there will be a burden on the user to carry such a specialized device. In consideration of this point, we constructed this system for use on smartphones, specifically the iPhone by Apple Inc.

5.1 Photography Timing Notification Function

For the photography timing notification function, we defined the sphere of daily activities in accordance with research by Oku et al. [3]. If the user is active within this defined daily sphere, and the number of photographs they take in each time period - divided into two-hour slots - is below the average, a notification to encourage photography is sent to the user (Fig. 1 (Left)). During such times, the interval between notifications is set to be at least five hours, so as not to overburden the user.

5.2 Display Function for Taken Photographs

When the user takes a photograph, the system simultaneously acquires time information. The taken photographs are displayed on the system screen categorized into time periods, divided into two-hour slots (Fig. 1 (Right)). At this stage, in order to display the photograph collection status for each time period, the display screen shows “0%” if there are no taken photographs, and the percentage rises for each added photograph. The display screen shows “100%” to the user when four photographs (one photograph per 30 minutes) have been taken.

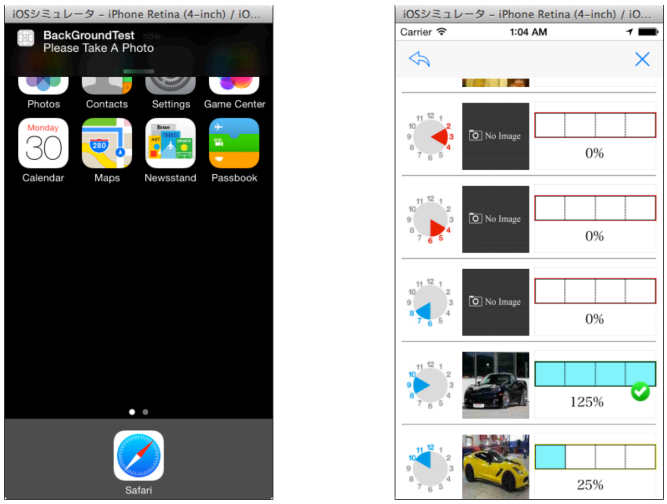

Fig. 1 System screen of notification function (Left) and display function (Right)

6 Conclusion

In this paper, we investigated the recording status of daily photographs, which can act as memory recall triggers, estimated the sphere of daily activities, and proposed an interface to promote photography of daily landscape. In future, we will complete the system, and perform evaluation experiments to verify the system’s effectiveness.

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