Toward personal experience management in a socially networked world

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ABSTRACT

The digital traces of our daily experiences are stored on diverse sources such as the Web, sensors, and mobile devices. Effectively organizing and sharing these logs enables us to re-experience the past.

Conventional personal information management mainly focuses on preventing individuals from forgetting anything. This position paper describes possibilities for personal experience management and sharing in a socially networked world. The potential for sharing experiences is an augmentation of individual memory.

Categories and Subject Descriptors

H.1.2 [**Information Systems**]: User/Machine Systems—*Human information processing*

General Terms

Human Factors

Keywords

personal experience, activity, lifelogs, memory augmentation

1. INTRODUCTION

We interact with other people and objects and have various experiences throughout our daily life. We accumulate such experiences, which make up the history of our lives. In a pervasive environment, logs left by those experiences are stored in distributed sources. Moreover, various sensors monitor our experiences directly or indirectly. Aggregating these digital traces will help users remember their experiences and create innovative services.

Recently, the fusion of the virtual and real worlds, such as cyber-physical systems, internet of things, and lifelogs, has become a popular research topic. Within this research, lifelogs has been focused on to capture personal logs and personal data archives [1, 6, 10]. Since such logs are heterogeneous, they are difficult to organize. We have studied the organization and exploration of personal logs from diverse information sources [12, 13].

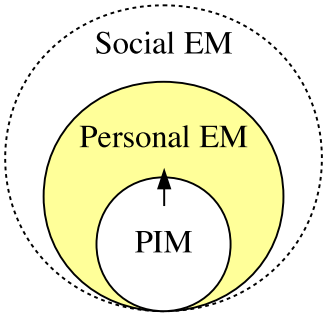

Figure 1: Personal experience management

Personal Information Management (PIM) research studies activities including finding, re-finding, keeping, and maintaining personal information [7] and mainly focuses on preventing individuals from forgetting anything. On the other hand, our research mainly focuses on experience rather than information and helps episodic memory, such as reminiscing about past experiences and events [12, 13]. We also described some ideas about how to share personal logs [11]. Users were able to find new facts or reminisce about past experiences by seeing other people's personal logs. From these studies, we have concluded that PIM should be expanded first to create personal experience management (PEM) and then social experience management (SEM) as shown in figure 1.

This paper describes possibilities for PEM. First, levels of traces of experience are introduced. Second, types of experience sharing and activity networks are presented. Finally, an early prototype is introduced, followed by discussions and conclusions.

2. EXPERIENCE MANAGEMENT

2.1 Levels of trace of experience

According to Wikipedia, 'experience' is a collection of events and/or activities from which an individual or group may gather knowledge, opinions, and skills [15]. Most research confuses activities with logs, data, information, lifelogs, actions, behaviors, and experiences. We define levels of trace of experience as shown in figure 2.

Logs are raw data that are captured and stored on information sources. Most digital traces are log level data.

PIM 2012 Seattle, WA USA

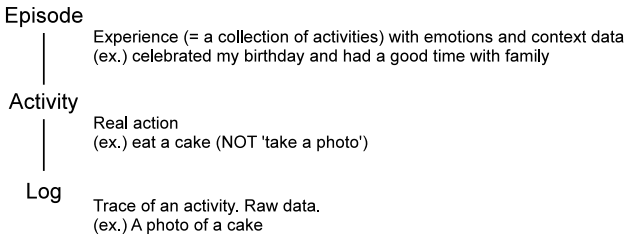

Figure 2: Levels of trace of experience

An activity shows a real action. Of course, it is difficult to deduce a user's real action only from log level data. For example, a digital photograph is stored with some attributes including a taken date, size, and format. However, although the real action may be 'eating a cake', the recorded action is 'taking a photograph' with regard to log. Most lifelog research mainly considers log level data. Therefore, we have to distinguish between real actions and recorded actions because they are not always correspond with each other.

An episode consists of a collection of activities (i.e., equal to experience), emotions, and context information. Episodic memory is the memory of events that contains times, places, associated emotions, and other context information [14]. Most digital traces are scattered logs about experiences. Usually a user has to recall his/her memory by reconstructing those scattered traces of logs.

Nardi introduced Activity Theory and hierarchical levels of activities [8]. An activity consists of actions or chains of action, which in turn consist of operations. For example, in a software project, an activity is 'completing a software project'. Actions are 'programming a module' and 'arranging a meeting'. In addition, operations are 'using OS commands' and 'selecting appropriate programming language constructs' [8]. However, as Nardi explained in her book, it is impossible to make a general classification of what an activity is and what an action is, because the definition is totally dependent on what the subject or object in a real situation is.

Since it is not easy to deduce an activity from log-level data, we started to study organization of personal logs in order to manage experiences.

2.2 Memory aid with personal experiences

One potential application using personal experiences is a memory aid. Memory problems can be divided into three general classes: (1) retrospective memory problems, (2) prospective memory problems, and (3) action slips [3, 4]. Retrospective memory problems are forgetting past events or information acquired in the past. Prospective memory problems are failures to remember to do something. Moreover, action slips are concerned with very short-term memory failures that cause problems for actions currently being carried out [3].

From the above classification, the following types of memory aid are thought to exist.

- Memory ticklers
  - To prevent retrospective memory loss.
  - Key feature is information retrieval.
- Reminders
  - To prevent prospective memory loss.
  - Key feature is a notification.
- Diaries
  - To help episodic memory, such as reminiscing about past experiences and events.
  - Key feature is exploration of data.

PIM research mostly helps reminders and memory ticklers. Lifelog research mainly makes databases for memory ticklers and diaries. Our previous research mainly focuses on 'personal' diaries and the serendipitous discovery of related information [12, 13]. Here, we study that episodic memory could be augmented by sharing experiences.

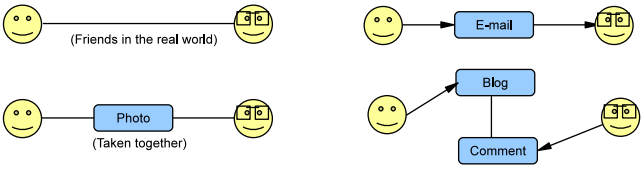

Figure 3: Direct relationships

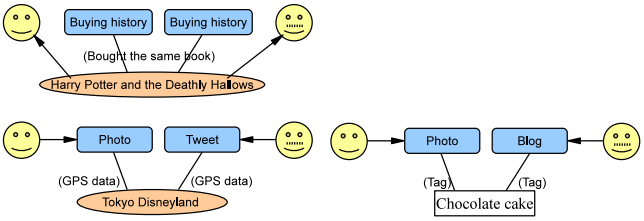

Figure 4: Indirect relationships

2.3 Types of sharing experiences

From a viewpoint of sharing experience, the following several patterns are considered.

- Sharing experiences with the public
- Sharing experiences through direct relationships
- Sharing experiences through indirect relationships

Open blogs, tweets, and photographs are shared with the public. Figure 3 shows direct relationships among people. These relationships are easily detected by logs, such as e-mail and telephone call histories. Experiences are usually shared on the basis of direct relationships among people, like on most social networking services.

Figure 4 shows indirect relationships among people. The relationship shown in the top left can be easily found on shopping sites. A product recommendation usually uses this kind of the relationship, often in the form of 'people who bought this product also bought these products'. The others show examples of activity sharing. An activity usually has some attributes with respect to 5W1H (i.e., who, when, where, what, why, and how). Therefore, they can be connected to each other with some of these attributes.

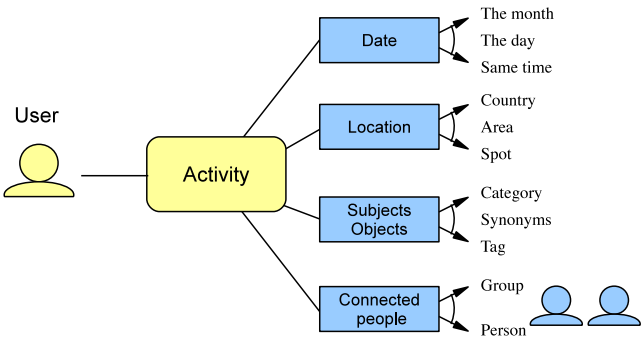

Figure 5: Pseudo activity node and users

2.4 Pseudo activity nodes and users

To use these relationships, personal logs could be explored through related attributes: date, location, subjects (ex. tags), and connected people. Figure 5 shows a pseudo activity node that represents a personal log with the attributes. Related activities could be collected by traversing networks that nodes, and users are connected to each other. In other words, users are connected to each other through their activities. However, each attribute of a node has a range of scale, such as a geographical region. Therefore, linkages between activities and users depend on an implementation. One possible implementation is described in the next section.

3. EARLY PROTOTYPE

We have studied the organization and exploration of personal logs including the following [12, 13].

- Photographs, e-mails, tweets on Twitter, schedules, bookmarks from Web services
- SMS text messages, telephone call history, GPS history on smart phones
- Number of steps walked using a pedometer
- Body weight measured using a scale and home energy cost and use.

A prototype application was implemented on iPad and iPhone. We expand the previous prototype to explore sharing activities by using pseudo activity nodes. Activities and related information include the following.

- Public data
  - news on that date, etc.
- Activities based on direct relationships
  - mutual activities, such as exchanged e-mails, short messages, and telephone call histories.
  - other activities of a connected person, such as his/her photographs and tweets that are open to the public.
- Activities based on indirect relationships
  - photographs with the same tags, etc.

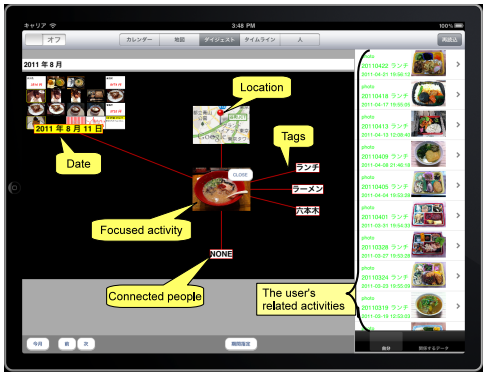

Figure 6: Example of exploration by tags

Figure 7: Another example of exploration by tags

In this prototype, subjects are considered as tags, connected people are considered as senders/receivers of e-mails and telephone calls. With respect to a location, a range of area can be changed on a map on the application.

Figure 6 and 7 show examples of exploration by tags of activities. In figure 6, when the user clicks a tag, the user's activities related to the tag are displayed on the right side of the view. In contrast, in figure 7, when the user changes a condition by using the tab menu, other people's activities related to the tag are displayed.

4. DISCUSSIONS

Two types of social relationship have been studied. The first is people-centric [9]. The second is object-centric, called 'object-centered social networks' [2]. The Open Graph on Facebook is also included in this type of network [5]. Usually these social networks focus on relationships among people. On the other hand, our networks are 'activity-centric'. They focus on not only relationships among people but also relationships among activities. In addition, an activity usually has some 5W1H attributes. Therefore, we can explore our activities through those attributes on activity networks.

Moreover, we will be able to relive experiences if special content can be created by fusing a variety of widely shared activities. For example, you could think back to how a parade at Disneyland looked from the other side of the route.

Conventional social networks and PIM use data mostly from Web services and sometimes from logs on mobile phones. Our research uses logs from not only Web services but also

mobile devices and sensors.

Of course, several search functions, such as temporal, geographical, keyword, and spatio-temporal searches should be applied. Also, some options for user interfaces should be studied to interact with activities other than conventional PIM interfaces including calendar style interfaces.

5. CONCLUSIONS

This paper described possibilities of personal experience management and sharing. We introduced levels of trace of experience and types of experience sharing. In addition, we explained pseudo activity nodes while considering those types of sharing. An early prototype was also introduced for exploring shared activities. Since activity-centric networks focus on not only conventional social relationships but also relationships among activities, there is huge potential for users to find new information and serendipitously discover information through other people's activities. In summary, we proposed expanding PIM to PEM from two perspectives: (1) experience instead of information and (2) social sharing instead of personal management.

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