ACTION-ORIENTED WEBLOG TO SUPPORT ACADEMIC CONFERENCE PARTICIPANTS

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ABSTRACT

In this paper, we propose a system called *ActionLog* which supports authoring and sharing Weblog contents for the purposes of reviewing support and communication support on Academic Conferences. ActionLog collects users' actions from other information systems placed at a conference site, and automatically generates drafts of Weblog contents based on the action contexts. Users can edit and publish entries according to their will. We implemented and applied the system on an actual academic conference as a field test. The result shows that the system was used both for reviewing their activities and for communicating other participants.

KEYWORDS

Academic Conference Support, Weblog, Action Records, Reviewing Support, Communication Support

1. INTRODUCTION

Finding people with similar interests is an important activity in event spaces such as academic conferences. Presenting information related to participants is helpful for this purpose. However, because of limitation of time and effort, it is almost impossible to look through all information. It is also difficult to write and publish own information for sharing them with other participants. Through this research, we intend to assist participants to review their activities at conference site and to enhance communication among participants.

Our approach to enhance communication is to share experiences, i.e., users' actions/interactions with their surroundings that include information systems and other people. Sharing experiences enhances greater understanding of people and objects. Before sharing others' experiences, however, we must understand our own experiences. For that reason, communication support based on shared experiences should include support for reviewing of individuals' experiences.

Personal experiences consist not only of the objective observed histories from sensors/systems but also their related thoughts and impressions. Therefore we include the subjective authoring process to procedures of sharing personal experiences.

This paper presents an action-oriented Weblog generation and aggregation method to activate communities. The next section describes our strategy to examine actions for community support specifically and proposes an action-oriented Weblog system, and we apply its application for an academic conference in section 3. Field-test results are shown in section 4 and features of our method are discussed in comparison with related works in section 5. Section 6 concludes our paper.

2. ACTIONLOG CONFERENCE

2.1 Basic Idea

Weblog has been widely spread all over the world. Many people use Weblog as a record of their daily life, much like a personal dairy. Our system supports such authoring by adding context.

We model users' behaviors as actions with real world contexts. Action means what they do and the real world context is a set of information for the environment in which they do so. The real world context includes some physical situations like time and place, subjective situations like intentional objects, and social situations like people nearby.

The system manages to capture actions and contexts by using sensors and cooperating with other systems. Some contexts, like time and place can be obtained directly from sensors, but others should be inferred from sensor information. For example, we can obtain nearby people by integrating locational information of multiple users.

Then the system generates an entry for each action with sentences indicating the context of the action as a draft. Furthermore, the system shows related information, e.g., entries by other people with the same or similar contexts. This is achieved by integrating and calculating contexts.

We call this system concept as *ActionLog*, and we implemented and applied it to support academic conferences. We call this version of the system as *ActionLog Conference* later on.

2.2 Sharing Users' Opinions: Action-oriented Approach

The purpose of ActionLog Conference is not only to support participants in composing their record of experiences but also to share experiences among participants. Sharing opinions or impressions among participants for an event serves an important role in characterizing the event and in communicating about it with other participants. We propose a way to share participants' experiences using ActionLog Conference to achieve casual sharing of opinions among participants.

To involve user's subjective thoughts to the contents, personal experience should be described by the user. For example, we cannot tell what Mr. A is doing when we find the situation where he is in a restaurant, eating some food, and talking about something with Ms. B. Mr. A might say he was having dinner, having an important discussion, or just socializing with Ms. B. Therefore, we employ Weblogs as an infrastructure for contents sharing. People can easily express their thoughts or opinions with Weblog. In addition, Weblog offers an infrastructural aid to manage and share machine-readable contents (Karger 2004).

The generated and published contents are aggregated according to their context. For example, extracting and listing the contents about a certain presentation achieves a topic-centric view (Avesani 2005) on the presentation.

In this research, we assume an experience consists of an objectively observed action and her/his subjective thought at that time. To achieve experience sharing using information systems, we propose a method to capture user's actions, to generate contents from these actions, and sharing the contents among participants. Based on this method, the system helps the user to communicate with other participants.

2.3 Criteria to Design Communication

To design communication by sharing action-based contents, the following points should be considered.

What kinds of actions are shared? We especially address event participants' interactions with information systems because they seem to be active and spontaneous actions for the system user. These interactions are efficiently collectable by the system and are easily understandable for participants.

When actions are shared? Meeting the other participants is one of the most important activities in an event space. Action-based contents should be ready for sharing immediately after the actions occurred to support participants in finding participants with identical or similar interests. Previous works for sharing experiential contents do not process the experience in real time. PEPYS (Newman 1991) and ComicDiary (Sumi 2002) are also automatic content generation systems, but they generate diary-style contents day-by-day.

How actions are shared? It is important to reduce users' costs of capturing actions, creating contents, and sharing contents. Wearable computers can record all things the user sees and hears (Gemmell 2002). Video and audio recordings help users to review their actions and share those experiences; nevertheless, using such large-scale equipment engenders high costs and is difficult to casually achieve. Sharing videos is also a difficult task for watchers of the contents. Text-based and/or other easily understandable expressions of experiences are needed.

With whom actions are shared? Sharing actions engenders privacy problems. There are some solutions for location-based systems, such as an anonymizing approach (Gruteser 2003) or an obfuscation approach (Duckham 2005). However, in event spaces where participants wish to meet people, disclosure of the location and/or actions does not matter. It is sufficient for the user to select to publish or hide each action using a one-click operation.

3. IMPLEMENTATIONS

3.1 Overall

We implement ActionLog system for an academic conference called JSAI2005. In the conference, we provide several support services and ActionLog is also provided as a conference service. ActionLog collects participants' use of the other systems provided at the conference site and represents these use records integratively.

Figure 1 depicts the architecture of the ActionLog system. The left-hand side of the figure indicates the action collection part of ActionLog. The system captures the user's action from the other information systems placed at conference sites and on the Web. The center part indicates the content generation part. In this part, the system generates the Weblog content associated with the action based on the captured context information of the action. The user's action records are generated automatically through interactions with other systems and other people in the event space and on the Web. In the right-hand side of the figure, the user interacts with the system as Weblog system. The user authorizes the generated contents. They are published on the Weblog and are shared among participants. Exchanging contents among users can enhance communication. Aggregating the contents based on their context facilitates context-based access to the contents; responding to others' contents engenders topic-based discussion.

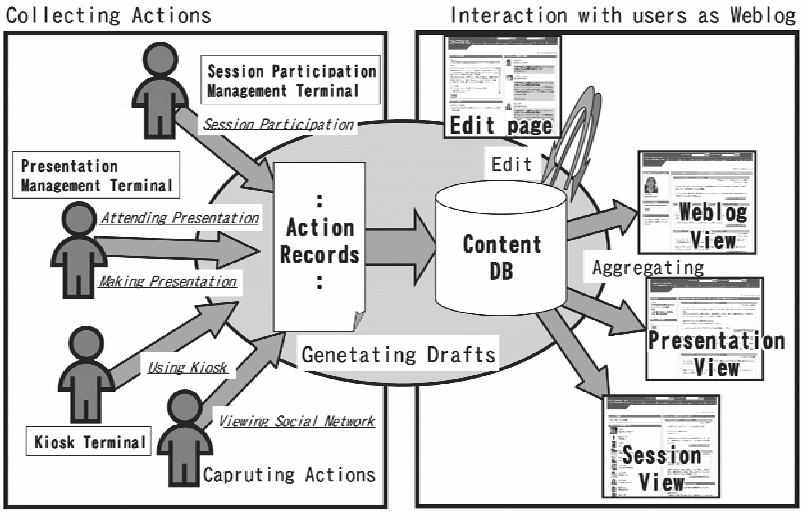

Figure 1. System architecture of the ActionLog system

3.2 Designing Users' Actions

ActionLog collects the users' activities and the users' information from the following services/systems, which were provided as conference services at JSAI2005:

- Web-based systems (*Polyphonet Conference*)
  - Researchers' social network system (Matsuo 2003)
  - Scheduling support system (Hamasaki 2004)
- Onsite systems
  - Name cards with RFID tags
  - Session participation management terminals
  - Presentation management terminals
  - Kiosk terminals using RFID card for user authentication

Figure 2 shows the installation of a session participation management terminal and an RFID card.

Figure 2. Participation management terminal and RFID card

The types of action captured by the ActionLog system and the users' information sent from the other systems are as follows. Session participation management terminals detect users' entrance to conference rooms (1). Conference participants touch the card reader connected to the terminal placed at the entrance of each room with their RFID cards. This signal tells information on the participation action, i.e., "when", "who", "which session", and "where" to the ActionLog system. Presentation management terminals capture two types of action, i.e., making presentation (2) and attending presentation (3). When making a presentation, the presenter places her RFID card on the card reader connected to the terminal. This signal directly tells information on the presentation, i.e., "when", "who", and "where". Referring the conference timetable stored in the database of Polyphonet Conference, the ActionLog system infers which presentation is made at this time. At the same time, attending actions to the presentation are inserted to all participants who are in the same room. Uses of kiosk terminals (4) are also captured and sent to the ActionLog system. By touching with her RFID card, a user can log in to Polyphonet Conference and manage her schedule or view the social network around her. When two users placed their cards on the reader, the kiosk terminal shows the network between two. This action, viewing social network (5), is also detected. Table 1 shows these five types of action and the captured/inferred contexts.

Table 1. Captured action types and contexts

Action	Terminal	Captured context information	Inferred context information
(1) Participating session	Session participation management terminal	User ID, Time, Place	Session ID, List of acknowledgements who participate the same session
(2) Making presentation	Presentation management terminal	User ID, Time, Place	Presentation ID, List of acknowledgements who attend the presentation
(3) Attending presentation	Presentation management terminal	User ID, Time, Place	Presentation ID, List of acknowledgements who attend the same presentation
(4) Using kiosk	Kiosk terminal	User ID, Time	
(5) Viewing social network	Kiosk terminal	User ID, Time, User who views the network with	

3.3 Collecting Users' Actions, Generating and Publishing Weblog Contents

Users' actions are sent by the terminals for the ActionLog system via HTTP POST requests. A terminal sends a request that includes queries, such as `UserID`, `Place`, `ActionType`, `ContextInformation`. `ContextInformation` depends on its `ActionType`, which is pre-registered to the ActionLog system. ActionLog interprets the `ContextInformation` based on its `ActionType`, and then it generates the contents.

The ActionLog system generates a Weblog entry for each action sent from a terminal, interpreting the context information of the actions. Interpretation of the context information differs according to the types of actions. Take a session participation action for example. A participation action is sent from the session participation management terminal and its directly captured context information is `UserID`, `Time`, and `Place`. The ActionLog generates a Weblog entry using the following steps:

1. Fetch the ID of the session (`SessionID`), which is held at the `Time` in the `Place`.
2. Fetch the session title associated to the `SessionID`.
3. Get a list of users who participated the session.
4. Get a list of user's acquaintances from the social network system of Polyphonet Conference.
5. Make an intersection of these two lists.
6. Apply the template and generate the content.

An example of the output is shown in figure 3. These procedures, the content templates, and the type definition of the context information are also pre-registered to the ActionLog system.

> Participated the session "Session Title" at Place. Friend Name1, Friend Name2, and Friend Name3, who are my acquaintances, also participated this session.

Figure 3. Example of generated content

Generated contents are inserted to the user's Weblog. The context information, e.g., the presentation that was attended, the place this action occurred, and so on, is attached to the contents. A user can edit the contents on the editor page (Figure 4). She can remove or modify the generated sentences, or add new sentences.

Figure 5 shows a snapshot of the ActionLog system menu page. On the menu page, the captured actions, i.e., the generated contents, are listed in the box. The user can edit and publish the generated contents. Figure 6 shows the Weblog-style view, which lists the user's published contents in chronological order.

3.4 Aggregating and Sharing Context

Efficient sharing of published contents is achieved through content aggregation. We provide a context-based aggregation view of contents.

Kaenampornpan et al. (2004) proposed the context model for context-aware systems based on an Activity Theory (Engestrom 1999). According to the model, contexts are classified to seven elements: *User*, *Tools and their availability*, *Rules*, *Community*, *Division of Labour*, *Object*, and *Time*.

In explanation of our proposed system, *User* is the user herself and the place she is. *Tools* represent each terminal. *Rules* are the norms and the social rules of the conference, and *Community* includes the people around the user. *Division of Labour* is the role in the action, such as presenter or attendee. *Object* is the target of the action, such as the presentation that the user attended. *Time* is the time at which the action occurred.

The Weblog-style view is a person-based view of the contents in chronological order. It includes *User*, *Community*, and *Time* items. *Tools*, *Division of Labour* and *Object* items are closely related to the type of action. We provide aggregation views on the types and targets of actions. We do not target *Rules* in this system.

The basic idea of aggregation is filtering according to context. The system extracts and lists contents related to the same presentation or the same type of action. The user can look through all contents related to the context that the user specifies. Figure 7 shows a snapshot of the aggregated view of a certain presentation. This type of aggregation treats *Object* contexts. The system also aggregates by type of action. In this case,

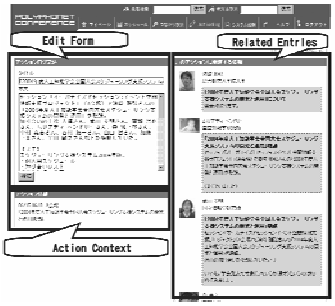

Figure 4. Editor page of ActionLog

Figure 5. Menu page of ActionLog

Figure 6. Weblog-style view of ActionLog

Figure 7. Presentation-based aggregated view of ActionLog

Tools and *Division of Labour* are considered. As we previously mentioned, the personal Weblog-style view includes *User* and *Community* based aggregation. The user can look through all the contents related to the context that the user specifies.

4. USAGE ANALYSES AND EVALUATIONS

4.1 Basic Data and Usage Status Data

We tested our system at the 19th annual conference of the Japan Society for Artificial Intelligence (JSAI2005), which held on 15th-17th, June 2005 in Kitakyushu. In this conference, there were 290 presentations in six parallel sessions and 609 authors (including co-authors). About 400 or 500 participants joined the conference.

The number of participants who use any terminal at the conference site, i.e., the number of users whose actions were captured at the site, is 332. Finally 10848 draft entries were generated and 381 entries were edited and published by 35 users.

4.2 Analyses of Published Entries

To reveal the forms of system usages, we analyzed the published entries in two ways.

4.2.1 Relation between Action Type and Content

Firstly, we checked what was described in the edited and published entries. We read through all published entries and marked them with five characteristics, i.e., (1) **memorandum**, (2) **diary**, (3) **opinion**, (4) **message**, and (5) note about the **system**. One entry can be marked with multiple characteristics. Table 2 shows the relation between content characteristics and action type. Points where more than half entries are

marked with the same characteristic are underlined. For example, most of content authors took memorandum and described their opinions in attending presentation actions. This result shows that capturing variety of users' actions promotes properly use for the purpose, such as reviewing or communicating.

Table 2. Rate of characterized entries for each action

	Memorandum	**Diary**	**Opinion**	**Message**	**System**
Participating session	28.6%	64.3%	37.5%	10.7%	5.4%
Making presentation	18.2%	63.6%	81.8%	36.4%	9.1%
Attending presentation	55.5%	19.5%	78.9%	32.0%	1.6%
Using kiosk	8.7%	69.6%	30.4%	8.7%	13.0%
Viewing social network	4.2%	52.1%	56.3%	12.5%	16.7%

4.2.2 Human Relation between Entry Authors and Target Presentation Authors

Next, we analyzed the relation between entry authors and presentation authors, to investigate whom entries are published for. We compared the rates of related authors in generated drafts and published entries for presentation attending action. In this analysis, we use the relations managed in Polyphonet Conference. In draft entries, 23.9% of entries are generated by related authors' actions. On the other hand, 57.1% are published by related authors. This means that the ActionLog system could support communications among acknowledgements.

4.3 User Evaluations

We requested the system users to evaluate the system on Web-based questionnaire after JSAI2005. Answers from 45.7% of users who edited and published entries were obtained. The selected questions, which are especially related to the subject of this paper, are following:

Q1. Were draft entries generated from your action records helpful?
Q2. Was information about presentation/session attached to actions helpful?
Q3. Was ActionLog helpful for reviewing?
Q4. Was ActionLog helpful for knowing about other participants?

All questions were answered by selecting one option from "5: very helpful", "4: helpful", "3: OK", "2: not very helpful", and "1: useless". The average points for each question are: Q1 – 4.00, Q2 – 4.38, Q3 – 4.13, and Q4 – 3.88. From these results, we believe that expected effects are accomplished.

5. RELATED WORKS

Several conference support systems have been proposed. IntelliBadge (Cox 2003) is an RFID-based academic conference support system that traces users' positions and provides location search services for users. It enhances communication at conference sites, but does not support post-conference communication.

Another system, C-MAP (Sumi 1998), is a personal mobile assistance system for exhibition tours. It is intended as a location-aware support by sharing experiences and knowledge using mobile terminals like PDAs. It provides total support in an event space, but does not target integrative support of independent subsystems in the real world or on the Web.

LifeLog research, like MyLifeBits (Gemmell 2002), is a salient approach to sharing experiences by recording everything users see and hear. However, our approach is to share users' subjective experiences rather than objective records.

SPECTER (Kröner 2004) is a personal journal generation system that generates content based on the users' action records. This approach closely resembles our approach, but it is specifically intended to model users' behaviors and does not target supporting communications or sharing experiences.

6. CONCLUSION

This paper proposes the ActionLog system, which supports authoring and sharing Weblog contents for the purposes of reviewing support and communication support on Academic Conferences. ActionLog collects users' actions from other information systems placed at a conference site, and automatically generates drafts of the Weblog contents based on the action contexts.

We implemented and applied the system on an actual academic conference as a field test. The result shows that the system was used both for reviewing their activities and for communicating other participants.

The action-oriented integration is easily extensible. New subsystems are pluggable through "action." This means that our approach can be applied in various situations. Future work includes designing a system with more proactive supports. The tested implementation is a limited service in terms of time and place. When we utilize the system in an open environment, the information that will become available will be enormous so that a user cannot manage them.

REFERENCES

Avesani, P. et al, 2005. Learning contextualised Weblog topics. *Proceedings of WWW2005 2nd WS on the Weblogging Ecosystem: Aggregation, Analysis and Dynamics*.

Cox, D. et al, 2003. IntelliBadge: Towards providing location-aware value-added services at academic conferences. *Proceedings of the 5th International Conference on Ubiquitous Computing (UbiComp2003)*.

Duckham, M. and Kulik, L., 2005. A formal model of obfuscation and negotiation for location privacy. *Proceedings of the 3rd International Conference on Pervasive Computing (Pervasive2005)*.

Engestrom, Y., 1999. Activity theory and individual and social transformation. Y. Engestrom, R. Miettinen and R. Punamaki (eds.), *Perspectives on Activity Theory*, Cambridge University Press.

Gemmell, J. et al, 2002. MyLifeBits: fulfilling the Memex vision. *Proceedings of the 10th ACM International Conference on Multimedia*.

Gruteser, M. and Grunwald, D., 2003. Anonymous usage of location-based services through spatial and temporal cloaking. *Proceedings of the 1st International Conference on Mobile Systems, Applications and Services (MobiSys'03)*.

Hamsaki, M. et al, 2004. Scheduling support system for academic conferences based on interpersonal networks. *Poster Proceedings of the 15th ACM Conf. on Hypertext and Hypermedia (HyperText2004)*.

Kaenampornpan, M. and O'Neill, E., 2004. Modelling Context: An activity theory approach. *Proceedings of the 2nd European Symposium on Ambient Intelligence (EUSAI2004)*.

Karger, D. and Quan, D., 2004. What would it mean to blog on the Semantic Web?. *Proceedings of the 3rd International Semantic Web Conference (ISWC2004)*.

Kröner, A. et al, 2004. Using an extended episodic memory within a mobile companion. *Proceedings of Pervasive 2004 WS on Memory and Sharing of Experience (MSE2004)*.

Matsuo, Y. et al, 2003. Mining social network of conference participants from the Web. *Proceedings of 2003 IEEE/WIC International Conference on Web Intelligence (WI2003)*.

Newman, W. et al, 1991. PEPYS: Generating autobiographies by automatic tracking. *Proceedings of the 2nd European Conference on Computer-Supported Cooperative-Work (ECSCW'91)*.

Sumi, Y. et al, 1998. C-MAP: Building a context-aware mobile assistant for exhibition tours. Toru Ishida (Ed.), *Community Computing and Support Systems: Social Interaction in Networked Communities, Lecture Notes in Computer Science 1519*, Springer.

Sumi, Y. et al, 2002. ComicDiary: Representing individual experiences in a comics style. *Proceedings of the 4th International Conference on Ubiquitous Computing (UbiComp2002)*.