Communicating Everyday Experiences

Preetha Appan Hari Sundaram David Birchfield
Arts Media and Engineering Program
Arizona State University
e-mail: {preetha.appan, hari.sundaram, david.birchfield}@asu.edu

ABSTRACT

In this paper, we present our approach to the problem of communicating everyday experiences. This is a challenging problem, since media from everyday events are unstructured, and often poorly annotated. We first attempt to communicate everyday experiences using a dramatic framework, by categorizing media and by introducing causal relations. Based on our experience of the dramatic framework for the everyday media, we introduce an event based framework as well as a viewpoint centric visualization that allows the viewer to have agency, in a highly interactive, non-linear manner. Our approach focuses on structured interaction for consumption of everyday experiences, in contrast to non-interactive consumption of structured communication. Our results indicate that dramatic structures do not work well with everyday media, and novel interactions / visualizations are needed. Experimental results indicate that the viewpoint centric visualization works well. We are in the process of creating a large event database of everyday events, and we are creating the necessary recording and annotation tools.

Categories and Subject descriptors

H.5.1 **[Multimedia Information Systems]:** *Artificial, augmented, and virtual realities* H.5.4 **[Hypertext/Hypermedia]:** *Navigation* H.5.2 **[User Interfaces]:** *Theory and methods, User-centered design*

General Terms

Algorithms, Design, Human Factors

Keywords

Networked media, events, browser, storytelling

1 INTRODUCTION

In this paper, we describe our work in the creation of a tool that enables a network of people to create and share stories about their everyday experiences. The stories created in this tool emerge due to interaction, rather than dictated by a single author. The problem is important since with the ready availability of digital still and video cameras, it has become easy to archive events in our daily lives. The popularity of social networks such as Friendster [4], as well the formation of moblogs suggest that users are willing to share personal media experiences online.

The successful communication of experiences requires the user to have excellent aesthetic skills. It is easy to send pictures via e-mail to a group of friends, but very hard to communicate the context in which such photos are to be understood. There is a need for tools to enable users to create stories about everyday events with minimal authoring effort and a framework that allows them to share such narratives with members of their personal network.

There has been much prior work in traditional storytelling models [20,21,22] as well as computational narrative construction [9,23]. Both knowledge based and behavior based approaches have been applied to computational storytelling. In [9], knowledge based AI is found to be suitable only for a limited type of stories where domain knowledge helps in automatic construction. In [23], the authors describe the construction of an authoring tool for interactive non linear story-telling. Propp's morphological analysis were used as a basis for automatic construction of non linear narratives. Hence, this framework is more suitable for storytelling with epic or dramatic structure, rather than everyday events that lack such dramatic structures. The behavior based AI approach, is found to be successful for interactive stories, especially in the gaming domain. However, both these approaches make certain assumptions or create rules about what structure a story should have how the characters behave etc.

In [17,18], the authors use tangible interfaces to tell stories. There the focus is viewpoint centric, and each viewpoint is represented using pawns. The movement of the pawns across the surface gathers story fragments for that character, and the user is free to choose the segment of interest to move the story along. However, this prevents the user to having a clear understanding of the spatio-temporal *event* relationship, as the story is primarily character driven, not event driven.

There has been recent work on exploiting narrative templates [11] to create visual narratives. There, the user can use an existing narrative template library, along with specific shots that will fit into the syntagmatic structure of the visual narrative. However, this requires a large template library for it to work across diverse user needs, as well as expert knowledge in creating such templates. Secondly, the user needs to be able to plan for as well identify the specific shots needed by the template.

Tools like Windows Movie Maker, and work done in [16,19,26], do attempt to create user-friendly tools. However, there are several important improvements possible. While these methods do document everyday experiences using image samples, they do *not* take into account the specific, unstructured nature of everyday activities [13]. Instead, the solutions that they offer are

SRMC'04, October 15, 2004, New York, New York, USA.

generic, and will work with images from other domains as well. Secondly, they do not focus on narrative structures, crucial to communication of meaning. Finally, the tools do not enable a network of users to share images easily – the primary sharing mechanism is the web, usually using a static image storyboard ([5] is an exception).

In this paper we detail our approach to the problem. We first attempted to solve the problem of communication of everyday experience through the use of dramatic structures, motivated by [9,17]. We built a simple narrative model based on the work in [9] – we used a subset of the elements that Brooks uses in his work, primarily as the goals of the two projects differ. One of the authors created narratives based on this model, by specifying relations on media from her personal collection. She additionally annotated the media with *who, where, when and what*. An informal user study of the resulting narratives yielded negative results. The narratives appeared disjointed, and force-fitting the narrative model (and the narrative relations of conflict-resolution etc.) did not seem to increase the comprehensibility of the media.

These experiments made us rethink the process of consuming everyday experiences. We found that personal experience narratives do not fit well, into any predefined structural models. Secondly we wanted to address the issue that most user *do not* want to spend time authoring stories. We addressed this issue by creating an interactive, viewpoint centric navigation of the events that occur in a social network. This is a change from authoring *structured communication* with passive consumption, to an interactive framework where the *structured interaction* is central to the consumption of the narrative. The users have complete agency in narrating events through the media and text they upload, without having to worry about specifying structure. *The story emerges through the interaction.*

Our framework makes sense when users are attempting to communicate everyday experiences that are largely unstructured. Moreover, there is no single person's ownership of the story; instead there is a sense of sharing experiences and collective ownership. Our framework seems to be validated by pilot user studies. Our results also indicate that much needs to be done regarding data collection, the appropriate tools for recording and annotation.

The rest of the paper is organized as follows. In the next section, we document our attempts to communicate everyday experiences using dramatic structures. In section 3, we present our event based framework. In section 4, we present our viewpoint centric visualization. In section 5, we discuss our current approaches to creating a large event base. In section 6, we discuss future work, and finally in section 7, we present our conclusions.

2 DRAMA IN REAL LIFE

We shall now describe our work involving the use of dramatic storytelling structures, for communicating everyday experiences. We begin by first describing our interpretation of everyday experiences.

2.1 The everyday experience

An experience is commonly understood as follows:

> ***ex·pe·ri·ence:*** *the fact or state of having been affected by or gained knowledge through direct observation or participation [1].*

Central to our understanding is the idea that experiences are due to embodied interactions with the world, that meaning emerges through this interaction [13]. As in [12], we acknowledge that experiences are remediated through data samples (images / audio / text etc.) whose active interpretation creates *another experience* in the recipient. In prior work [10,24,25], we have attempted to create *experiential systems* – they are real-time, context-aware, user-centric and multi-modal. They cause a variation in the knowledge in the observer, due to direct interaction with the computer mediated environment.

The devices (forms / structures) that effectively mediate the authors experiences using the data samples, are aesthetic choices. Hence we began our investigation on how everyday experiences could be communicated, by looking at work on computational [9] and situated forms of storytelling [18]

We were motivated by the work in [9], an authoring tool for non-linear forms. Brooks in his work used three components of storytelling – the structure of the narrative, the collection and organization of story fragments with representation of their meaning and a navigational strategy through that collection to create *AgentStories* [9], an authoring tool for non linear storytelling. He provided the well established Branigan's schema [8] for modern cinematic style narratives as building blocks for the authors to use while constructing their "meta-linear" narratives. Authors could create casual chains, to relate all the fragments of their story. Then, story agents would automatically construct a linear story, based on rules governing its behavior. For example, one agent would always leave conflicts unresolved, while another would always follow a strict debate like point-counterpoint structure in the story constructed by it. Thus different types of linear narratives would follow from the same story structure created by the authors.

2.2 Our Implementation

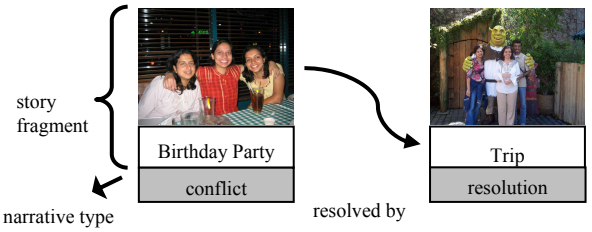

Figure 1: An example of an authored conflict-resolution relation between media . The first story fragment is from a party and the second from a trip. The author has specified the former to be the resolution of the conflict in the latter.

We applied a simplified version of the work described above as a starting point towards our goal of creating a tool to enable users to construct stories about every day events. We began by defining a simple narrative model. The elements in our model were a subset of elements from Brooks' work, namely *introduction, diversion, conflict, resolution and ending*. We used a simple subset because the goals of the two projects are different. In [9], the author wants to create a meta-linear narrative construction tool, primarily for fictional material. In our work we want a minimal authoring tool for everyday

experiences, that additionally place a minimal authoring burden on the user.

In order to enable users to connect story fragments together, we provided the following relationships – *precedes, succeed, support and conflict-resolution*. We used a simple data model, where story fragments could be images, plain text or a combination of both.

One of the authors labeled pictures and text (i.e. story fragments) from her personal media collection, with structural identifications that are mentioned in the previous paragraph, and also specified relationships from the list provided above. Note that, the author would take relationships between story-fragments into account, while labeling them. For example, while specifying one fragment to be the conflict of another, the author will ensure that at least one person (i.e. the *who* property) is associated with both. Hence, we did not use image meta-data directly here –i.e. *who, when, what and where*.

We then built a software program that would parse these labels and construct a sequence of clips (i.e. pictures and text), based on rules similar to those used by the story agents in [9] . We assumed a simple narrative structure, in which a story would have an introduction, followed by one or more conflicts, which are resolved (if the author has created resolutions), and then concluded. The program is described in the following steps:

- The program begins by first organizing story fragments according to character point of views.
- It then chooses and orders story fragments, based on the narrative structure given above, along with simple rules, two examples are given below.
    - If *diversion* fragments are created, they would be included before the resolution of any conflicts. By *diversion*, we mean a clip added between conflict and its resolution, to provide a deviation from the plot, similar to comic relief scenes in films.
    - If more than one *resolution* exists for the same *conflict*, one of them would be chosen at random).
- The program terminates with its output as an ordered set of story fragments, once the termination conditions are met , i.e. either an ending has been found, or the conflict(s) could not be resolved any further.
- The chosen fragments would then be presented as a slideshow to the user.

We decided to use the multimedia slideshow format to present the story, since we presumed that users would be comfortable with passively consuming media. They are already familiar with such consumption mechanisms when watching films / television. We now present the results of our original experiment

2.3 Results

We conducted informal user studies with fellow graduate students. The feedback was that the narratives created using computational approaches seemed disjoint and not very meaningful. These results were fairly compelling for us to conjecture that a formal user study would only reinforce the feedback we received with the informal evaluation.

We now present several reasons why traditional narrative construction mechanisms did not work for our problem of communicating everyday experiences.

First, it is very hard to assign labels (such as conflict, introduction, resolution etc.) to pictures/writings from every day events. For example, let us assume that there were a set of pictures from a party, where everyone was having a good time. A user could write an anecdote about each picture, but is unable to fit them into any sort of narrative category such as "resolution" or "conflict." One way would be to greatly increase the number of rules to construct the narrative. However, the narrative type, and its interpretation is very user-context dependent, and a fixed set of labels would cause a mismatch between the label and the user's perception of the media content.

Second, constructing causal relationships like supporting events, opposing events, while easily done in fictional narratives is very hard to do with photographs and text that sample the everyday experience. Importantly, there are spatial and temporal relationships amongst everyday events. For example, a graduation ceremony could be followed by a dinner celebration (temporal relationship), or the place where one participant works is near the place another participant lives (spatial relationship). We also observed that causal explanations for everyday events can emerge through following these spatial and temporal relationships. (For example, a person can be present only at one location during an instance of time.)

Another key problem lies in the presentation of stories. Traditional presentation schemes like a movie or slideshow work well for fictional narratives, because of the clear presence of narrative structure in those stories. The lack of such narrative structure in stories about everyday experiences, led us to the conjuncture that a movie like linear presentation would not be useful. We believe that understanding everyday experiences requires active participation by the user, and the structure emerges from the user's *interaction*, rather than from the structure in the presentation. Hence, we concluded that, a dynamic presentation environment that allowed viewers of the story control over what they wanted to see would be more appropriate.

We concluded that storytelling everyday events with personal media required a new framework that was interactive, user friendly as well as exploratory. We realized that we needed to shift away from the paradigms of cinematic style narrative and passive consumption. Note that this effectively shifts the problem of *authoring structure* in the presentation, to structured interaction, thus leading to greater understanding of the media. In the following section, we describe our novel approach towards these goals.

3 EVENT BASED INTERACTION

In this section, we propose a novel framework for interactive storytelling of personal experiences. Our solution to creating this story telling tool for everyday experiences involves (a) Defining an event model, (b) Creating an easy to use web based interface to upload everyday personal media and (c) Creating the multi viewpoint visualization interface. We begin by specifying our design goals in section 3.1, followed by describing our event model and story visualization framework.

3.1 Design goals

We want to create an interactive framework that addresses the issue of lack of "drama" in everyday experiences. We now present our design goals:

1. The framework should be interactive, and preferably web-based. This would require new visualizations that differ from current computational storytelling mechanisms.
2. The authoring environment should place minimal burden on the user – we do not expect the users to create long structured narratives per everyday, mundane event.
3. It should be easy for a set of friends to explore each other's experiences, in an non-linear manner.
4. The users should be able to explore simultaneously, both space and time dimensions of a set of events.
5. There should be enough context to understand the existence of an event – i.e. the circumstances that lead to this event

3.2 The event model

In this section we formally define our event model. In the following section we discuss the following: (a) event definition, (b) media associated with an event, (c) viewpoints associated with events (d) friends associated with user.

There has been much prior work in event definition (e.g. [7,15]). Events have been defined formally as a change in state of a system [15]. However, this is a very general definition. The event model in [5], describes an event as "availability of multimedia content that covers something of importance in a given domain that happens at or during a certain time at a certain place." Events have properties such as name, meta-data, creation date, expiration date, run of validity, location, topics amongst others.

We use the dictionary [1] definition of an event: *something that happens*. Our event model is a subset of the event model described in [5]. In our framework, events have the following properties associated with them: name, location, time, media elements (set of images, sounds, text), as well as participants. Our model of an event follows from the fact that every member of a digital personal media collection has relevance to a real-life user activity – *who, when, where, what* to some user. General definitions of events (e.g. [5]) while important, are not needed in our application.

In our framework, while an event can be associated with many media elements, we make the simplifying assumption that media elements can be only associated with one event. The effect is that the user cannot author event hierarchies. Note, however that the different participants can create different event representation sequences, from the same set of events. For example Alice can create events such as "lunch" , "bob's party" whereas peter may lump all those events into one as "new york trip." A key issue with event hierarchies is that the different users will have different number of levels, and interpretations, thus making viewpoint centric navigation difficult.

Given a set of images uploaded by the user, an image is associated with an event if the media element was captured at the same time and place. The location and time can come from a GPS enabled digital camera. Images also have same meta-data fields as an event, except that they are associated with a single location and time.

Given a network of users, we assume that each user provides a list of friends, i.e. people in whose experiences she is interested. When such information is not available, we define the set of friends of a user as fellow users who have participated with this user in at least one event.

Each event can have a number of viewpoints associated with them. By viewpoint, we mean the set of media (images, text, and sound) associated with an event, that each user submits to the system. Note that there is a distinction between the number of participants in an event, and the number of viewpoints. For instance not all participants might have a viewpoint about the event. With this basic event and viewpoint framework in place, we now describe how we designed the story visualization tool.

4 INTERACTIVE FRAMEWORKS

In this section we present our visualization scheme that allows for viewpoint based exploration of an event sequence.

4.1 Viewpoint centric interaction

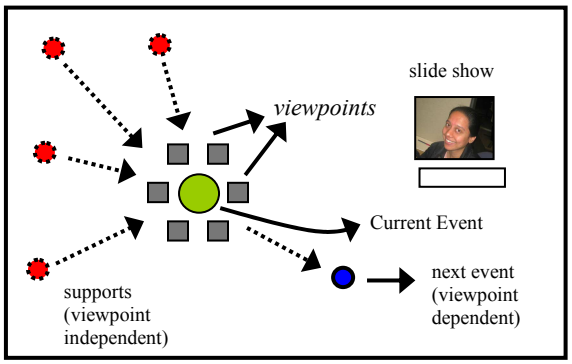

Figure 2: Viewpoint based exploration: Every event has a set of supporting events and one succeeding event, according to the currently selected viewpoint. The user can dynamically change the viewpoint, thus changing the slideshow associated with the viewpoint, as well as the succeeding event.

The idea behind this visualization is that users desire *agency* [9] – users proactively interact with the system to control the flow of story, is incorporated in this visualization. Prior work in [17,18], discussed the idea of multiple authorship as well as tangible interfaces with multiple viewpoints as a storytelling mechanism. Our work combines creation and visualization of everyday stories into a unified web – based framework. Our interaction is event based and uses time and space as visual cues to make the viewer understand how the events took place.

We provide an exploratory environment that provides users with different ways to navigate through the same event space. As discussed in section 3.2 , every event has a set of viewpoints associated with it Users are presented with a dynamic visualization that lets them explore events based on the viewpoints associated with them. Initially, media associated with the selected user's events (according to the time range chosen by the user) appear on locations in a map. This map is dynamically created from online geographical data available in XML format [2]. Events are indicated by colored circles, with

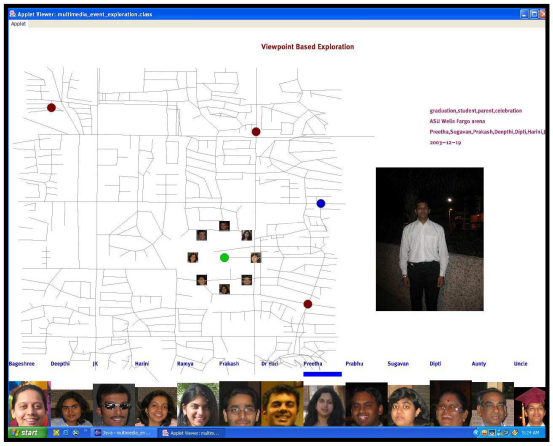

Figure 3: Snapshot of a viewpoint based exploration

red representing past, green representing current and blue representing succeeding events respectively. During creation, users can specify relationships between events, i.e. they can specify how one event can support another. If this information is not specified, time is used to order and present events. Note that this doesn't force the user to see events in order of their occurrence. The interface allows them to navigate across time. Figure 2 illustrates this visualization. Figure 3 is the actual snapshot of the system.

As seen in the illustration in Figure 2, the viewpoints associated with an event, are displayed around it. Also the set of supporting events (immediate past) for the current event and one succeeding event (i.e. for the currently selected viewpoint) are shown. The set of supporting events for each event are calculated as the union of all events that support each of the *k* viewpoints of the event.

Now users can select view points around the current event, to see a slideshow of media associated with the event (and the selected viewpoint). Also supporting events and succeeding events for each event, changes according to the chosen viewpoint. The user can change the current event at any time, by simply clicking on any event (supporting as well as future event). Then, the system creates the supports and succeeding events for this new current event. Note that the viewpoints associated with this new current event will be different. Users can move backwards and forwards in time by choosing past or future events respectively. Thus this is a very dynamic environment that allows users to explore events/viewpoints in a non linear manner.

4.2 Other task driven interactions

There are other interesting visualizations that can be used to browse through a personal media collection. This section describes two other visualization schemes we developed. These are task based, i.e. they help viewers achieve certain goals. Although these visualizations aren't directly related to storytelling as of now, we are working on extending them to provide alternate story presentation mechanisms to complement our multiple view point visualization.

4.2.1 Spatio-Temporal Evolution

This visualization Figure 4(a) will address the task of *event conditioning*, i.e. finding out what happened before or after an event. We use maps as the background, on which events unfold over time and space. Media associated with events appear at different locations, ordered in ascending or descending temporal order (as chosen by the user). The interaction begins by the user selecting a friend. The system responds by showing the spatio-temporal events, over time and by location The temporal transitions between locations is indicated using arcs, and saturation of the arc color is used to indicate time (latest arc is the most saturated).

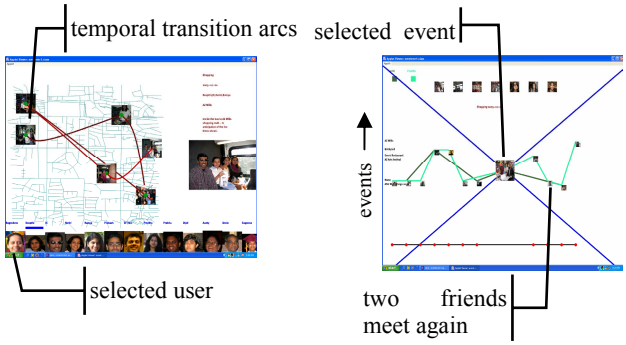

Figure 4: (a) Spatio-Temporal evolution of digital media in our system. (b) An event cone. This is a snapshot of all the events associated with the selected users.

This visualization also additionally solves the task of determining *interesting events*. When the user moves her mouse over a specific event location, then all the friends of the selected user are who *participated in the same event* are highlighted in green. The other friends of the selected user, who participated in *other events at the same location,* are highlighted in purple.

The user can click on each highlighted user – clicking on the friends highlighted in green, will result in spatio-temporal evolution for that person, starting with the current event.

4.2.2 Event Cone

In this section we present our solution to the task of *event support*. This visualization Figure 4(b) helps us to develop a proper understanding of event relationships.

We browse a photo collection in a non-linear manner (i.e. we do not follow temporal order). Pictures trigger memories – and we pose queries – "What happened to my friend Alice after that day?" or "What led to Alice and me meeting at that party?". Our visualization attempts to provide a summarized snapshot of time and space. We call such a summary – *event cone*.

When the user selects her event of interest in the spatio-temporal browser, an event cone of that event is shown, which shows how different friends of the selected user who participated in the event, came together at that point of time, and also what happened to them afterwards. Each user has a distinct path and is individually colored. When the paths intersect, they imply that the friends meet. These visualizations are explained in further detail in [6].

4.3 Experiments

We designed a pilot user study to test our storytelling visualization framework. The visualization interface was

implemented with processing [3]. We have conducted some preliminary experiments to evaluate our visualization. Five users were chosen, four graduate students and one working professional. Users were asked to evaluate each of the three visualization schemes – i.e. viewpoint based evolution, spatio-temporal evolution and event cones. They were asked to rank each of the three schemes, as well as rate the general usability of this system (from a scale of 1-7). We found that, our method of browsing everyday experiences was liked by users (Average score on the overall usability of the system was 6.2/7). Also, viewpoint based evolution was preferred by users, (with average rank of 1.4 / 3), over the task based schemes – i.e. spatio-temporal evolution and event cones. (See [6] for details of the experiments).

5 AN EVERYDAY EVENTBASE

Before delivering this work to a larger user group, the authors are currently engaged in a pilot study to record and annotate their everyday experiences. In particular, we are investigating appropriate tools and methods, and are primarily guided by pragmatic concerns to assure that our acquisition and annotation techniques are eventually practical and rewarding for a broad range of users.

5.1 What to record

There is extensive prior and current work in the documentation of daily experiences [14]. Many of these documentation systems are geared toward pervasive, 'always-on' multimedia recording that use idiosyncratic tools and methods.

In contrast, we view the recording and annotation of daily experience as a question of finding an appropriate sample rate that mitigates concerns of practicality and documentation. We are exploring a range of sample rates to determine what quantity of data is required in order to remediate and communicate everyday experiences. For example, can only three or four still images effectively communicate the experience of a day in one's life? Does this limited data rate allow one's subjective memory to inform the documented moments? Can one convey the experience of a summer evening in a rural setting with only one recorded ambient soundscape instead of with a narrated video? How might this change the way in which the user reflects on this experience?

Currently, the authors are documenting daily experiences by capturing several still images and audio events each day. We are not concerned with documenting only special or monumental events, rather, we are capturing ordinary and sometimes mundane daily events, to document what one sees and hears, and how one appears and sounds. Our captured media is a mix of self portraits, landscapes, pictures with friends, recordings of airports, snapshots out the window of a car, and the sound of friends' voices. Though the described capture techniques are not always on, the author/participants have found that these media collections do contain a wealth of information that convincingly documents a week or month of daily events. Furthermore, such a data collection can provide a rich palette that users can use to communicate, reflect on, and understand patterns and circumstances in their lives. Our initial work has demonstrated that this low sample rate provides advantages over 'always-on' recording techniques in terms of practicality, convenience, data management, and communication.

5.2 Recording Tools

Our application is geared toward a large group of motivated users who will carry tools for recording their everyday experiences. There are three primary criteria that must be met by our recording tools: (a) availability, (b) fidelity, and (c) convenience.

This paper describes a number of custom software tools for annotation and display of collected media (Sections 2.1, 5.3). In contrast, in order to allow for participation by a large number of users, we are limiting our recording tools to devices that are commercially available, and are not prohibitively expensive.

Our synthesis application requires relatively high fidelity recording. Currently we are using consumer grade digital cameras and have been satisfied with the results. For example, we are currently using an Olympus Camedia C-3000 model camera with 3.3 Megapixal resolution. Though cellphone cameras are extremely convenient and portable, current models do not provide sufficient quality to meet our needs. We are currently using MiniDisc recorders (Sony MZ-R700 or Sony MZ-NH1, with an external microphone such as Sony ECM-MS709) to record audio events and ambient soundscapes from our daily experiences. Though these recorders apply some compression, unlike DAT and CD recorders, we have been pleased with the sound quality for our purposes. Dictaphones and even the iPod offer convenient and portable solutions for audio recording, but most models are limited by a 8 or 11 kHz sampling rate that provides insufficient fidelity for capturing subtle audio events or ambient environments.

Our current pilot study demonstrates that recording tools must be lightweight and small if users are realistically expected to carry these tools to document everyday experience and not just special events. Many models of small digital cameras exist, but most standard high quality audio recording devices, such as DAT, CD, and solid-state recorders, are bulky and often weigh in excess of ten pounds. Users cannot be expected to carry such a large device, and this has informed our decision to use MiniDisc recorders with small external microphones for audio recording.

A second important concern with convenience is the transfer of data from the acquisition tool to the media database. In our initial work we have used standard commercial software to download pictures from a digital camera, and then batch uploaded these images to the database. Although this procedure has not proven prohibitive, we have found that any step toward convenience will greatly increase the success of true recording of daily events. We are in the process of developing our own tool that will download pictures, extract meta data, and populate the media database with this information in one seamless step. Data transfer of recorded audio poses more of a challenge. Currently, few portable audio recording devices provide non-realtime direct data transfer. The MiniDisc recorders require that the audio data is played back from the recorder, as it is written to the computer disc. Though this data transfer is not as convenient as we would hope, newer models promise to provide for direct data transfers, and we have developed software to normalize the audio data, extract fundamental features of the file (e.g. duration, format, spectral characteristics), and populate the media database with this information.

5.3 Tools for Annotation

In our early work with annotation, we focused on pragmatic solutions for annotation. These tools were purely data driven and required extensive offline time to annotation media objects in a user's collection before these objects could be included in the described interactive frameworks. Though these annotation tools are straightforward and simple to use, we found that users were not motivated to routinely annotate. This result has led us to explore more experiential and incentive-based frameworks for annotation.

In our current pilot study, that includes data acquisition and transfer, we have found that the daily or weekly routine of simply working with data can be a rewarding experience that allows us to immediately reflect on our experiences and interactions. We are in the process of building methods and tools for annotation that draw on this direct interaction with collected media that will simultaneously present media object while providing mechanism for their annotation. For example, a slide show of new images that lack annotations can be presented to a user in context with related images. The missing connections that arise from lacking annotations of particular media objects will be immediately apparent to a user. In this scenario, the user is provided with a clear incentive for annotation (i.e.: users want to view the full experience represented by a set of media objects.) We have found that the fusion of presentation and annotation tasks provides a successful framework that elicits both reflection and annotation from users.

For allowing users to upload their media into the system, we created and are now refining an easy to use web based interface. Users can register themselves, and can set permissions to share their media with selected friends. Whenever digital photographs are uploaded, time information can be extracted automatically. A form is used to annotate the media they upload, i.e. with *who when, what* and *where.* We provide drop-down boxes that expand as more and more users add their information, so that the upload process is made faster. Users can also optionally specify relationships between events, which would then change the way events unfold in the multi-viewpoint interface. In our current pilot study, this tool has proven to be powerful and effective, and it will be further refined as more users are able to provide feedback.

6 FUTURE WORK

We now discuss some future directions of this work.

6.1 Events and Moments

We found that using events alone may not always be suitable for sharing experiences. We would like to introduce the idea of *moments* in our work. Our idea of moments is a snippet from someone's life that is too small to be called an event. Moments can be shared across events; an example would be the abstract idea of happiness. Suppose the writer labels a story fragment as a happy moment. It could occur in more than one event. Sharing moments across events causes the viewer to understand it better, because she has seen it happen before in some other event.

6.2 Analysis of user interaction

We also plan to analyze events with the annotation provided by the users, as well as analyze user interaction. It would be interesting to provide to the users a statistical analysis of their data, with meaningful interpretation of their activities. We would like to incorporate new semantic distance measures to discover interesting relationships between events and viewers' interaction.

6.3 Local narrative structures

In a completely interactive environment like our system, it is not possible to have a global narrative structure, which is a small price to pay for the advantage of complete viewer involvement. However, in order to introduce some coherence in the setting, we would like to introduce the idea of *local structure*. (For example, a dialog or phrase in a film is a local structure within the whole story). Similarly we plan to incorporate mechanisms such as simple rules or probabilistic frameworks, to ensure that at the micro level of each interaction, coherence is maintained.

7 CONCLUSIONS

In this paper, we have presented our attempts to find mechanisms to communicate everyday experiences. We showed how we first used a dramatic schema motivated by Kevin Brooks' work on AgentStories [9]. We allowed users to categorize media (introduction, conflict, resolution etc.), and additionally provide relationships between media. The resulting slideshows appeared disjoint for several reasons (a) assigning dramatic labels to everyday events is hard, (b) unlike stories, causal support assignment amongst events is not easy to do, and (c) a linear presentation of everyday events was not engaging.

We then presented several design guidelines for communicating everyday experiences. A key design goal was to give the viewer agency. We made the process of browsing an everyday experience interactive, and viewpoint centric. We additionally showed two task based browsing schemes of everyday experiences. Our pilot studies show that the users like a viewpoint centric interaction of everyday experience.

We discussed how we planned to create a large everyday event base. We presented our ideas to three aspects of everyday documentation (a) what to record, (b) the tools for recording and (c) the annotation tools. Recording and communicating everyday experiences, is a challenging processes. We plan to investigate hierarchical event structures, and statistical analysis of the collected events. We are also looking at how we can improve the coherence of the interaction by introducing local structure in the presentation.

8 REFERENCES

[1] *Merriam Webster Dictionary* http://www.m-w.com.

[2] *TIGER maps* http://imagemaps.mle.ie/.

[3] *Processing* http://proce55ing.net.

[4] *Friendster* http://www.friendster.com.

[5] *WWMX* http://wwmx.org/.

[6] P. APPAN and H. SUNDARAM (2004). *Networked Multimedia Event Exploration*, To appear in ACM Multimedia 2004, New York,

[7] S. BOLL (2003). *MediAether - an Event Space for Context-Aware Multimedia Experience*, 1'st ACM Workshop on Experiential Telepresence, in conjunction with ACM Multimedia 2003, Berkeley CA.,

[8] BRANIGAN (1992). *Narrative Comprehension and Film*. New York.

[9] K. M. BROOKS (1997). *Do story agents use rocking chairs? The theory and implementation of one model for*

computational narrative, Proceedings of the fourth ACM international conference on Multimedia, 317 - 328,

[10] J. BRUNGART, H. SRIDHARAN, A. MANI, et al. (2004). *Adapting Multimedia Design To Context: A design framework for interactive, user context-adaptive multimodal learning environments,*. Arts Media and Engineering Program, Arizona State University, AME-TR-2004-08, Jun. 2004

http://ame2.asu.edu/groups/xdg/pubs/ame-tr-2004-08.pdf.

[11] M. DAVIS (2003). *Editing Out Video Editing*. IEEE Multimedia. **10:** pp. 54-64.,

[12] M. DAVIS (2003). *Theoretical foundations for experiential systems design*. Proceedings of the 2003 ACM SIGMM workshop on Experiential telepresence(eds), ACM Press**:** 45--52.

[13] P. DOURISH (2001). *Where the action is : the foundations of embodied interaction*. Cambridge, Mass. ; London, MIT Press.

[14] J. GEMMELL, G. BELL, R. LUEDER, et al. (2002). *MyLifeBits: fulfilling the Memex vision*, Proceedings of the 10th ACM international conference on Multimedia, Juan Les-Pins, France, pp. 235-238, Dec. 2002.

[15] A. GRAHAM, H. GARCIA-MOLINA, A. PAEPCKE, et al. (2002). *Time as essence for photo browsing through personal digital libraries*, Proceedings of the second ACM/IEEE-CS joint conference on Digital libraries, Portland, Oregon, USA, 326 - 335,

[16] H. KANG and B. SHNEIDERMAN (2000). *Visualization Methods for Personal Photo Collections : Browsing and Searching in the PhotoFinder*, In Proceedings of IEEE International Conference on Multimedia and Expo (ICME2000), New York:, IEEE, 1539-1542,

[17] A. KELLIHER, A. MAZALEK and G. DAVENPORT (2003). *Documenting Digital Dialogues: Engaging Audience in the Construction of a Collective Documentary Across Time and Space*, Proceedings of TIDSE 2003, Darmstadt, Germany, Springer-Verlag, pp. 248-259, 2003.

[18] A. MAZALEK, G. DAVENPORT and H. ISHII (2002). *Tangible viewpoints: a physical approach to multimedia stories*. Proceedings of the tenth ACM international conference on Multimedia(eds), ACM Press**:** 153--160.

[19] B. MOGHADDAM, Q. TIAN, N. LESH, et al. (2001). *Visualization Layout for Personal Photo Libraries*, Prof. of Int'l Workshop on Content-Based Mutlimedia Indexing (CBMI'01),,

[20] J. H. MURRAY (2000). *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, The Free Press, Third Printing.

[21] G. POLTI and L. RAY (1940). *The thirty-six dramatic situations*. Boston,, The Writer.

[22] V. PROPP (1968). *Morphology of the Folktale*, University of Texas Press.

[23] O. SCHNEIDER, N. BRAUN and G. HABINGER (2003). *Storylining Suspense - An Authoring Environment for Structuring Non-linear Interactive Narratives*, Proceedings of WSCG 2003, Czech Republic,

[24] B. SHEVADE and H. SUNDARAM (2003). *Vidya: An Experiential Annotation System*, 1st ACM Workshop on Experiential Telepresence, in conjunction with ACM Multimedia 2003, Berkeley, CA, Nov. 2003.

[25] H. SRIDHARAN, A. MANI, H. SUNDARAM, et al. (2004). *Geography for Active Learners*. Arts Media and Engineering Program, Arizona State University, AME-TR-2004-01, Jan. 2004

http://ame2.asu.edu/groups/xdg/pubs/ame-tr-2004-01.pdf.

[26] Y.SUN, H.ZHANG, L.ZHANG, et al. (2002). *MyPhotos – A system for home photo management and processing*, Proceedings of the 10th ACM international conference on Multimedia, France, 81-82,