iam: Experiences with Persistent Video Recording, Publishing and Sharing

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ABSTRACT
Creating and sharing persistent videos of personal experience presents an array of hardware and software issues. The hardware system to capture mobile personal experience digitally is not currently available “out of the box” and sharing hundreds of hours of video footage presents complex design and usability issues. iam is a research project to explore, catalogue and share user created point-of-view video. The project takes a more extreme position than current vloggers (video bloggers) by focusing on longer, unedited movies, capturing as many uninterrupted hours of footage as possible. The creator becomes the director, editor and actor in his or her own movie.

Wearing a headmounted video camera creates numerous obstacles and opportunities for the creator and the audience being recorded. Having worn the camera for several months, I highlight some of the issues that arose when recording.

Once this large amount of video data has been recorded, a system is needed to navigate through it. Using community filtering, frame extraction and metadata, iam provides an interface that allows the user to quickly absorb an overview of the entire video. These elements combine the strengths of video editing with current vlogging/blogging methods. Using the entire system, authors are able to create personal content and share it with others in a community-based personal space, where community usage determines future representations of the video.

Categories and Subject Descriptors
H.3.3 [Information Storage and Retrieval]: Information Search and Retrieval – Information filtering; H.3.5 [Information Storage and Retrieval]: Online Information Services – Web-based services; H.5.1 [Information Storage and Retrieval]: Multimedia Information Systems – Video; H.5.4 [Information Storage and Retrieval]: Hypertext/Hypermedia – Architectures, Navigation, User Issues; J.5 [Arts and Humanities]: Fine arts.


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Keywords: Augmented memory, video recording, personal experience, first person video, archiving, Internet, weblogging, vlogging.

1. INTRODUCTION
Personal archiving has existed for as long as humanity. From cave paintings to diaries, humans have documented their experiences and thoughts for others to share. The cornerstone of communication relies on this basic tenet of desiring to be understood. As technology has progressed (increasingly quickly in the last fifty years), the tools for self-expression have also changed by leaps and bounds.

No longer limited by location or by materials, the barrier to entry for the field has decreased measurably. Recording experience has shifted from paper (or canvas) to the printed document. In the twentieth century, this shifted again as film and then digital materials offered more realistic ways to represent the world we witness. Home videos, photographs, letters and emails, even mix tapes all reflect documentation of a specific period of time in an individual’s life.

As humans, we create stories to make sense of that which we experience. Jerome Bruner highlights how humans use stories as part of their everyday lives in his book “Making Stories”. [2] Telling stories is how we understand the world and our own lives. Martin Amis has said: “The trouble with life (the novelist will feel) is its amorphousness, its ridiculous fluidity. Look at it: thinly plotted, largely themeless, sentimental and ineluctably true. The dialogue is poor, or at least violently uneven. The twists are either predictable or sensationalist. And it’s always the same beginning; and the same ending…” [1] It is a challenge to wrangle our experiences into a cohesive narrative, communicating our experiences effectively with others.

The advances in capturing personal experiences allow a more unobtrusive capturing of personal experiences. The author is no longer forced to record an event as an outside observer; now an author may passively record an event from within.

Creation is not the only obstacle when communicating; sharing is extremely important. Without an audience, the creation becomes meaningless.

The iam system attempts to record and share these artifacts in a manner that reduces the viewing time for the audience. Built with off-the-shelf components, the project focuses on the process of collecting and using massive amounts of video
footage, rather than concentrating on innovations in hardware to capture the video.

2. PRIOR ART

2.1 Personal Archiving
As computing has become more ubiquitous, personal archiving has grown as well. Wearable computing has existed for decades, allowing users to document their lives. Championed by Steve Mann and the MIT Wearable Computing Group, researchers have built cameras, input devices, personal screens and other devices to take pictures, record events, communicate online and monitor their surrounding environment.

These scientists have focused on the engineering side of wearable computers, compressing chips and wires into something to be mounted on a body. [13][15] They have recorded tremendous amounts of data about their lives. But yet when asked, some of these people have stored the files out of reach. [5] In some cases, the files were not kept at all.

For a consumer, technologies for creating video for personal archiving are still in their infancy. Recording is possible in a variety of ways – the most basic method is using a camcorder. Until recently, camcorders recorded in an analog format. It has only been in the last several years that devices have been introduced that record directly to a digital file.

Unfortunately, many new recording devices also have limitations, most of them in regards to time limits when recording. A company called Deja View has created a small camera that attaches to a hat or pair of glasses. The wire from the camera runs down to a belt pack that provides power and hard drive space. It records straight to a memory card in a Windows Media format. This is an ideal solution, except the device only records in 30-second clips.

Personal archiving does not have to be video. Microsoft has built a dozen units known as a SenseCam. The SenseCam is a small digital camera worn around the neck. Built into it are sensors recording time, infrared, motion and light. It takes pictures automatically based on sensor data, providing a flipbook of pictures recorded with its fisheye lens. [10] This is not unlike the StartleCam built at MIT. [11]

Even in fiction, we find video recordings of personal experience depicted in variety of narrative methods. “The Final Cut” is a film in which first-person video of a man’s life is edited upon his death to create a memorial of the deceased’s life. The tagline to the movie is even “Every moment of your life recorded. Would you live it differently?” [14] “Lovelock” by Orson Scott Card [4] is a novel depicting animal assistants who record their owner’s experiences. Instead of using animals, Bruce Sterling’s “The Artificial Kid” [18] uses programmed floating cameras to capture their owner’s environment.

The bridge between the fictional and nonfiction worlds has begun with the advent of digital recording and miniaturized computer parts. The video diary experiments at Rank Xerox Research Center [12], the Wearable Computer Group at MIT, Microsoft’s SenseCam and MyLifeBits [10] and Deja View’s consumer camera all are exploring the area of passive personal experience archiving.

Thad Starner has written about the experience of wearing computers on a daily basis. [17] Experiments conducted by Xerox Park England have also investigated the effects of wearable computers on memory. [9]

2.2 Web Publishing
Blogging has become the newest Internet fad as both users and corporations attempt to remain relevant on the digital landscape. Developers, however, are already moving blogs into new territories. Where blogging has utilized text and written communication, new types of blogs are appearing that incorporate media -- not just as supporting materials, but as the actual content. Podcasting (audio broadcasts shared online) and vlogging (video blogs) are two of the most recent examples as digital media becomes incorporated into personal lifestyles and experiences.

Publishing video files to the WWW has been tricky in the past because of filesize and bandwidth issues. With the recent opening of sites like ourmedia.com, online storage issues have become moot. ourmedia.com allows publishing of media files to their servers for free, regardless of size. Personal media is now easily publishable at no cost to the author.

The final problem is perhaps the most complex. Hardware and software issues are fairly easily solved, especially at the rapid rate of current development. But the data glut created by having a low barrier of entry is not easily fixed; time-based media makes the issue even more dire.

Given a large enough audience, it becomes trivial to link these videos together using time and space correlations. These intersections allow the viewer to view someone else’s daily experiences in the context of many others – multiple views of the same experience(s). This is easily imagined as a shared multimedia Memex [3] of personal experiences.

When so many authors are creating audio/video content, no one has time to watch even a fraction of the created content. When authors can create hours of footage a day, the problem grows exponentially.

3. THE IAM SYSTEM
iam tackles the issue of viewing time in regards to long-play video files. Recording massive amounts of video is a practical endeavor from the creator’s point-of-view. More video allows a greater number of impromptu (and notable) moments to be captured. Privacy and bandwidth issues aside, the main reason to not release all footage is the amount of time it would take the user to view the material. Expecting a user to watch hours of footage from your day in a traditional, linear format is unreasonable. Time-based media suffers from this in ways that older media do not. There has not been a satisfactory method of summarizing time-based media. Peter Greenaway asserts: “Film has no materiality, has no viable history, and has the passive association of the director having created the time frame. When you look at a painting, you can look for three seconds, three hours, three days.” [6] Viewers are at the mercy of the director – summarizing video for the user has existed primarily by virtue of the fast-forward button.

iam meets this issue head-on by using the viewers of the content as the editors. iam releases the author from the tedious task of
cutting the uninteresting moments of his/her day and allows the creator to focus on creating content. The system is designed expressly for large amounts of uncut data, relying on the viewers to help filter it.

In the past, personal archiving has been seen as an intensely personal experience. Many times there was no intention to completely share the media that was created. Even fictional creations tend to view similar devices as PDAs rather than communicative tools [4][16], but there is value to sharing experiences with others. Identity is defined by actions; empowering an author the ability to share his or her actions with others is a powerful way to communicate.

While iam focuses on long play videos of daily life, it is important to note that any video content may be used within the system. When discussing recording daily life, privacy issues abound. It is outside the scope of this paper to discuss these issues; it is assumed that access to content is restricted to those authorized to view it.

iam combines the social community of online sites like consumating.com, Friendster and Flickr with the innovative work being done with vlogs to create a new type of web experience. The front-end of the iam system focuses on compressing time-based media into quickly digestible forms. iam does not remove available footage but instead seeks to empower users with new ways to find and view items of interest. Not an online video editor, iam does not remove footage to create a new piece of video, instead it leverages the user community to filter the video for the most interesting moments. Connecting the video with annotations, blog entries and still photographs, videos in the iam system not only automatically have metadata created about them, but they also dynamically change and adapt as they are used and combined with other pieces of media.

iam works on the ‘client side’ in three challenging areas: navigating large amounts of data, compressing video so that it may be digested at a speed faster than its playtime and allowing the community that watches it to have an impact on how it is presented. All three of these items work in unison with each other in order to make the viewer’s experience as seamless and natural as possible. Navigation through hundreds of hours of video could be a tedious task. But by indexing the video files by the creation date, iam grounds each video in the context of the time it was created. This follows on traditional diary and blog indexing, allowing for a familiar interface and increasing the ease of use. Once a video is selected, frames of the video are displayed to the viewer in a timeline form. This allows for a ‘quick read’ of the video — the movie timeline indicates length of video and the thumbnails help describe the content. The viewer may pick and chose scenes that appear of interest. Viewer’s actions are tracked and summed to impact future viewings. The user interface for iam is designed for a user to quickly find video footage using a date-based calendar and then navigating inside a video by exposing a timeline of frames from within the video. This approach is not unlike Steven Drucker’s work on the “SmartSkip” interface, though “SmartSkip” finds section breaks the video content. [8] Current iam content has no cuts or breaks, thus it concentrates on producing a “quick read” rather than attempting to find a specific moment of content.

Focusing on a “quick read” allows the user to take the content at different levels of resolution without having to discard any data. Unlike a traditional edited video, iam does not remove footage; it allows the user to retrieve an overview in still images or the video in the context of the entire movie.

By taking persistent personal video recording to its logical conclusion, iam confronts several of the larger issues that are evident in this new media experience.

4. IMPLEMENTATION

From January of 2005 through April, 2005, I wore a digital video camera mounted to my head. The recorded footage was then published to the web, creating a large-form video blog. The recording system was composed of an iSight webcam connected to a 15” Powerbook laptop. The camera was worn on the left side of my head by sewing elastic to a headband in loops and sliding the camera through the elastic loops. Video and audio were captured through the iSight, recorded directly to the hard drive on the PowerBook (see Figure 1). A small program called GCam was used to record at 320x240, Motion JPEG A compression with mono 16bit audio. For bandwidth reasons, that video is then compressed to 32 kbps, 15 fps MPEG-4 format. Audio was encoded into AAC at 32kbps. In making these recordings, I was not on any networked system and no others were recording simultaneously with me.

Figure 1. The iam hardware system

4.1 Recording Methodology

Video was to be recorded every day, regardless of the length of the segment. Because the camera was head-mounted, it recorded the direction my head was pointing (line of sight). There were no cuts in the recordings — videos were recorded nonstop. The videos were not to be edited afterwards; instead, all editing was done in camera in real-time.
Creating a massive amount of video with the knowledge that it is going to be viewed by other people as well as available publicly for anyone to view is daunting. There are privacy issues that quickly become evident in everyday routines (such as explicitly showing where you reside).

Performative aspects also become apparent. Knowing that others will view the footage, maintaining a level of interest and excitement is crucial. Paths of travel, interactions with others, even head movement becomes hyper-realized as the author is conscious of creating content with this passive device.

Much of the fiction written about similar devices revolves around personal assistant applications. The ability to retrieve data you have previously encountered implies a system that allows for finding information within the video easily and quickly. This is not a goal of the iam system; the project is concerned with sharing the videos with others rather than creating searchable video algorithms.

Marking moments at the time of recording is also crucial. By flagging moments as they occur, it allows the author to comment on events as they occur. This method of creating metadata does not require the author to edit the video after recording is complete.

4.2 The iam System
The software portion of iam is a web application. Video files are recorded by the author and uploaded to the server. The application is built in PHP, MySQL, ffmpeg-php, JavaScript (on the client side) with HTML and CSS. The application relies on iframes to prevent having to reload all but the specific information being requested by the user.

Figure 2. Overview of the iam interface
Video is uploaded to the web server and meta-data is entered into a MySQL database. Path of the file, date, start time of the file (in military time) and length of file are recorded. (Length of the video can be computed programmatically, but for optimization reasons, it was retrieved from the database rather than computed on the fly.)

By querying this information, days with video content are then reflected in the calendar on the website. This calendar loads to the most current month with video content available. Days with content are highlighted and linked to the weekly timeline (see Figure 3). By selecting a day, the weekly timeline is updated to reflect that calendar week.

Figure 3. Detail of calendar
The weekly timeline shows the full week (within the current month), with each day as a solid block of color. Movies in that week show up in a different color on the timeline, placed when and where they occur. Each movie is rounded to the nearest hour in the timeline. This keeps the listing easy to view (see Figure 4).

Figure 4. Detail of timeline (Partial)
(Because iam was developed for long-playing movies, it is assumed that footage from a given hour will not exist in two different movies. That is, there will not be two movies, each less than 30 minutes, within the same hour. This assumption can be corrected in a number of ways on and off the server should the need arise.)

By clicking on any of the represented movie files on the weekly timeline, that particular movie is loaded into the main viewing area. A movie specific timeline is loaded beneath the viewing area, while the movie itself is loaded in the movie pane.

On the server, frames are pulled from the smaller movie dynamically. By default, these are set to pull one frame from each minute of the film. The layout of the movie timeline displays 60 of these thumbnails per row, an hour of movie data. Larger images are displayed above the smaller in five-minute increments. A quick glance at this movie timeline allows the user to easily see the length of the movie they are currently browsing see Figure 5.)

Figure 5. Detail of a Movie Specific timeline (Partial)
Mousing over the movie timeline not only highlights the image under the mouse cursor, but also reflects that image in the preview pane. By loading each still into the same area, the interface allows the user to mouse over the movie timeline quickly and create a virtual flipbook of the movie. This creates a continuity that would be impossible if these actions occurred directly on the weekly timeline.

By clicking an element on the weekly timeline, the movie in the movie pane jumps to the same point in time and plays. The user is thus able to skip through the movie using the movie timeline (with the preview pane) as a preview tool for the entire movie.

A user is also able to comment on any moment within the movie. Doing so flags that specific frame of the movie on the server. When displaying the dynamic thumbnails on the weekly timeline, the frame with the most comments within that specific minute will automatically be reflected on the movie timeline.

In addition, all clicks on the movie timeline are aggregated into another database on the server. These results are weighted and serve to impact future loadings of the movie timeline. Presently, a simple weighted average is used – every frame is tallied plus the count of the weighted ones. Thus, if one frame has four recorded clicks with it and no other frame within the minute has any, with 15 frames per second, the total is 904. The clicked frame is then four times as likely to be displayed as any other, but it does not diminish the chance of any frame from being displayed.

Over a long period of usage, the frames that the total audience found most useful get displayed more, though even with very large numbers of viewings no individual frame is prevented from being displayed.

Both of these methods of displaying the movie timeline allow for dynamically generated points of interest for the user. By displaying the thumbnails dynamically the system helps inform users without any conscious effort on their part. By tracking their actions “behind the scenes”, the most interesting moments of a film can be found and displayed, while still offering the entire movie to those who are interested.

5. RECORDING EXPERIENCES
A system to share extreme amounts of time-based media is crucial to sharing media; recording the media created far more interesting social situations. It was the media creation where the true reactions of those around me were displayed.

5.1 Wearing the Camera
Once recording began, it was natural. This was unexpected. I did not expect to acclimate so quickly and easily to recording my daily life.

I wear glasses and, sometimes, contacts. The headband I used for the headmount reacted differently with my head depending on whether I was wearing glass or contacts. The glasses would push the headband back, aiming the camera more diagonally across my field of view than when I wore contacts. In doing so, my glasses would be captured in the foreground of the video. Reviewing the two different types of videos – one where there was no item in the foreground and the other where the corner of my glasses frame was visible, it was less distracting to watch the video with the glasses in it. The glasses provided a sense of grounding and personal information about me that was unavailable in the other videos. This grounding kept the videos from becoming too abstract and reduced the number of sudden roller coaster like movements with the camera.

5.2 Privacy
I often got stopped wearing the camera by people asking what I was doing. Explaining the project, people seemed genuinely excited by the rig I had constructed. I expected to be hassled because of my recording – if not by particular people who were upset by my filming, then by the locations I was choosing to film. I filmed on an airplane, through LAX and in the Los Angeles Getty Museum. I wore the SenseCam through stores and into Grauman’s Chinese Theater. None of these experiences were questioned by employees of these establishments.

Several people who questioned me about wearing the camera claimed it was “weird.” I found I could change their minds by pointing out it was acting much like a camcorder, without having to hold the camera in one’s hand.

I found that privacy became important when I was filming friends. On more than one occasion, I was asked to delete content or in some way edit it to prevent embarrassment by friends. I obliged with these requests (which were thankfully rare) by simply trimming the offending footage out of the published version. In all events, these requests were about things filmed at the beginning of a video – it seems my friends needed “warm-up” time to modify their behavior on film.

I spent ten days in the hospital during my filming time and managed to record video documenting my experience. I received a PIC line, a more intense form of IV that requires a special nurse to insert. My mother was present and recording with the headmount while I got the line inserted. Because of the hardware requirements for the system, it was easier to have her document the procedure. My surgeon entered the room, saw that we were recording and positioned himself to not be on camera. Not only this, but he refused to discuss anything with me, saying he would return later. I met with him several months later, wearing the SenseCam to an office visit. Again, he moved out of the line of sight and asked me several times if audio was being recorded. (It was not.)

I didn’t think too much about the nuances of privacy before filming. I have kept a personal blog for years, complete with webcam. Because of the arrangement of my room, the webcam has been pointing at my desk and bed the last three years. I have gotten more than a few confessions from people over the years that they have watched me sleep. The idea of recording my day for public consumption did not worry me.

The same cannot be said for those around me. My girlfriend immediately constructed a list of rules for when I could film around her. Many were basic considerations – things like not filming her nude, for example. Once I was wearing the camera every day, she forgot the rules and grew used to being filmed. One night, I filmed the two of us in bed reading. Perhaps the most personal moment I captured during the three months of recording, I found myself very conscious as I filmed. This was sharing a moment with the public world that they would never be able to see otherwise. She didn’t mind and I was grateful.
5.3 Behavioral Changes

Wearing the camera changed the way I processed information. Knowing that I was capturing the things I was seeing, I found I did not concentrate as intently on them. I knew they were captured and I could review these items whenever I needed to see them again. Some of my friends found this approach terrible, feeling that it artificially changed my natural reactions.

I disagreed. I found it refreshing – I didn’t feel as if I needed to hold onto every moment until it was over. I also found that I remembered the moments I captured more clearly than the ones I didn’t.

I was asked if I knowingly altered my behavior when wearing the camera. I don’t believe I did, but I did learn how to dodge the camera. The iSight camera films at about a 54 degree angle. Normal human vision hovers around 90 degrees. Over a third of what I see naturally is not captured on film. In addition, eye movements do not match head movements. It took no time to realize that I was filming where my head was facing, which may or may not be where my eyes were looking. This was often a detriment, but there were instances in which I used it to ensure certain things did not appear on screen.

5.4 Narrative Performance

Performance while wearing the camera never manifested itself through me personally. I expected to act for the camera, making my life more dramatic so the footage would be more exciting to a viewer. I do not know if the lack of this is a behavior issue or that I simply did not have enough energy to act while recording. While I did not knowing perform, other people did.

These actions covered everything from covering the lens with their hands to making faces into the camera to creating entertaining incidents.

At the Los Angeles Comic Convention, I met a young man named Tory. He asked me to follow him around the convention for over an hour taping him. We bought a sword for his girlfriend, delivered it to her as a present and had several extended discussions with the two of them and the friends they came with. As I parted ways with them, he made me walk away backwards from him, filming, as he put it, his “outro”. He arranged me to capture the most dramatic view. He used me as his camera, making himself the star of my project for the time we were together.

5.5 Point of View

One of the rules involved recording only point-of-view of the person wearing the camera. I am not the only person to wear the rig during the three months, though time spent with others wearing it was limited. This was due to hardware limitations, interest and time. Others who wore the rig abided by the rules.

About two weeks before the end of the three months, I went to the dentist to get a tooth filled. I had to have a rubber dam put over my mouth and ended up getting two fillings at the same time. I realized during the procedure that I was not capturing from the ideal vantage point. I took off the camera, lifted it up and pointed it down at myself. This broke my self-imposed rule of only filming from my point-of-view, but it allowed me to see from a vantage point I had never been able to witness. I had never seen what a rubber dam for a filling looked like on me.

Not unlike “The Artificial Kid,” I found myself wishing for cameras revolving around me. While I still firmly believe the most useful placement for a single camera is one that matches the author’s point-of-view as closely as possible, it is not always the most interesting.

5.6 Marking Moments

To mark moments, I used a Griffen PowerMate, a small USB button mainly marketed for editing video. Various button interactions were mapped to keyboard buttons that were then recorded to a text file with a timestamp. This allowed the moments to be entered into a database and synced with the appropriate movie.

There was much discussion regarding the appropriate way to mark interesting moments. It was concluded that there were three primary situations that would be marked – an event that already occurred (marked after the fact), a moment marked as it happened (marked in the moment) and marked for an upcoming event (mark before the event happens).

Complications were visible with this system. For any event that wasn’t in the moment, how far back (or forward) should the system look? It is trivial to say “If an event is marked in the past, look five minutes before this mark.” But every event is different and it is impossible to gauge how these in and out points might fluctuate without more information from the author.

A larger problem emerged when using the button: it wasn’t natural. While it makes sense to mark interesting moments as they occur, doing so actually removes the author from experiencing the event. By consciously remembering to mark the moment, the author is no longer in the scene and passively recording it, but has stepped outside of the event to capture it.

The elegance of wearing the camera is that the author becomes less aware that it is recording. It allows for a more passive, impartial recording. By marking moments actively, the author has shifted back towards someone filming from outside the scene.

I stopped using the button after a few weeks as a result of this feeling.

5.7 Recalling Memories

This project creates a strong sense of nostalgia. While I initially thought I would review the movies I made, this was not the result. The times I recorded remain more clearly in my memory than times I was not recording. This is true even for the times that the recording ended up failing.

When wearing the camera, I was conscious of wearing the camera and that I was capturing the moment. Discussing with a teacher about recalling these moments, she wrote to me saying: “A consciousness of recording action as it is experienced allows for that action to register in your memory at a much higher level. It combines several levels of learning – registry, recall, synthesis – to become a hybrid, elevated education and may promote better recall and understanding at a later time.” [Hirw, personal communication] I was not only experiencing what I was recording but also recalling it simultaneously through the
awareness of recording. Memories became more grounded in extension and substitution instead of just synthesis.

Several times during the project, I did not capture information outside of the video itself. Speaking to people, they would offer their emails, phone numbers or other personal information. Instead of writing it down, I simply made a mental note of the scene arrangement and was able to review the video afterwards to get the information.

This was not the goal of the project, but it did show that such dependence on a personal archive device could be useful. However, the current requirement to scrub the visuals of the movie to retrieve audio information is not ideal.

5.8 iam Hardware

Hardware failure quickly impacted the movies I made. Various issues arose using the iSight camera – the recording program crashing, bad FireWire cables that shut the computer off cold, the computer sleeping accidentally.

Battery life and file size also negatively impacted the experience. Capturing video at a reasonable rate of compression allowed for approximately a 1 gigabyte file for each hour of video recorded. Coupled with a battery life of about 3 hours for recording, the system became clumsy over long periods of time. Even with two hard drive batteries, recording for more than five or six hours with the system became difficult.

Every couple of days, files had to be offloaded to another hard drive to free space. Because the camera had to be connected to the computer when recording, basic activities became difficult, if not impossible. Simple things, like driving, became more difficult as the computer had to be arranged in the car so that it would not fall asleep.

Physical space also became an issue. Simply arranging a workspace (or other familiar environment) to accommodate another computer was frustrating. Because of the limited field-of-view in the camera, many times it became imperative to watch the computer screen to ensure the camera was capturing the expected information. A knowledge of the limitations became more intuitive as time went by, but the limitations of the camera were frustrating.

The iSight has autofocus, a feature I initially believed to be extraneous. In fact, it turned out to be a huge boon as I recorded. The camera was easily confused sometimes by trying to determine distances, but during these times, the camera made a lot of noise as it attempted to focus. Hearing this made it easy to adjust the camera or the objects in the field of view to correct the focus. By automatically focusing, videos were rarely out of focus or difficult to read.

6. DISCUSSION

Sharing my experiences and involving others in these movies has led me to conclude there are three basic forms of nostalgia. The first is common. This is a memory of something that is engrained and experienced by people who did not share the same space at the time of the occurrence. To talk of G.I. Joe toys or the 2000 presidential election with new friends is to engage in common nostalgia. There is a common language because of similar experiences.

The second form of nostalgia is shared. These are events that two (or more) people have in common. To speak to my sister of watching TV as children is an example of this. Those that did not directly participate can hear second-hand about these memories, but they will never have personal memories of the event.

The third is personal. These are memories I have that I can relate with no one. It is arguable that all memories are personal, but this overlooks our ability to share common experiences. These personal memories are the most common and the most powerful. The association of a song, an emotion from a particular time or place, the way we behave based on preceding events – these are all very personal and specific forms of remembrance.

iam, as a recording project, moved my experiences from personal nostalgia to common. Of course, viewers were not directly placed into the experience, but this shift is still dramatic. Anyone is able to view my experiences from my point-of-view. A viewer is able to experience what the author has as directly as possible. This type of eavesdropping and sharing has been virtually unheard of until recently.

The ability to move my personal memories into a realm where anyone can partake them is overwhelming. Over the years, from my personal blog, people have approached me to discuss incidents they had no part of. Because I had written about these in a public space, I had invited these comments from others. Sometimes these comments were innocuous; other times, they had a very real impact on my life. The idea that people can now involve and invest themselves so deeply into my life, watching me act and react to those close to me and then critique my behavior is frightening and exhilarating.

Peter Greenaway has said, “We see enough death in the documentary tradition, but not in dominant cinema. It is obvious that actors don’t die. This is the big dichotomy.” [7] This experience of recording all my experiences does not fall into an easily definable cinema genre – I am not an actor, if I die while filming, I am truly dead. But the video is not a documentary either. It has no goal, no stance on a particular subject. It takes cues from Cinema Verde in recording “true life” without attempting to impact the outcome of the situation. Even so, it does not fall into any of these categories.

The project exists as a video record of my life over three months. It is incomplete, but the most complete record I have. Diaries, photo albums, home movies: none of these show more of my life than this video record. Incomplete (as compared to the hours I experience personally) or complete (as compared to other documents of my life), the result is powerful. Combined with these other forms (such as my personal blog, digital pictures taken during this time and other items), I have a portrait of myself during the first quarter of 2005. The ability and willingness to share this with others publicly is exciting to me.

The system is obviously not impartial – simply the choice of what I shoot and when impacts the resulting movie. It is a balance. The choices I make when wearing the camera do have an impact on the rest of my life. The more I wear the camera, the more footage shared, the more the impartial the experience becomes. It becomes a very real document of my life and activities.
Through working with the iam system, it became obvious that better hardware is needed – both for recording and storage. Battery life and storage space are obvious limitations; field of view, focus and hardware size and mounting are also issues that must be investigated.

Comparing the silent images of the SenseCam, worn around the neck, to the video and audio recorded by the iam system, worn on the head at eye level, it becomes obvious how important audio and head mounted recording are to creating an engaging, experience.

With user testing of the software system, it became obvious that users associate date with a single movie and had difficulty visualizing days that contained more than one video file.

These one-to-one relationships made many of the links on the page confusing and redundant to the users who did not spend more than ten minutes with the system.

Those casually using the system used the calendar as a familiar index, rather than a contextual organizer. Only one user declared, “This is what you were doing on my birthday.” Users who also appeared in the movies wanted to see themselves from the author’s point-of-view more than seeing other movie clips.

7. FUTURE WORK
Investigating other hardware and methods for documenting personal experience is valuable. Capturing video at a lower datarate (whether by resolution, compression or framerate) will allow more minutes to be recorded in the same filesize. Digital video recording devices exist now that can use 1 gigabyte cards to record video. These devices are not ideal for head mounting yet, but as they shrink, mounting them to one’s body should not be unreasonable.

Finding other ways to augment and document experiences is another avenue to explore. There has been much wearable computer work that has focused on the written word (reading and writing of text). This is more subjective than video recording, but offers another powerful way of documenting experience as it happens.

Further work is already being explored with Microsoft’s MyLifeBits team, incorporating other forms of personal media into the system. This exploration allows for further development of different types of personal media, allowing much of it to be tied together for a new type of user experience. Still photos, movies, text, other websites can be tied together using different calendar methods. Though iam uses the most basic form of calendaring, using an events-based calendar is already being explored.

Tagging, audio annotation and speech recognition are all important areas for the system to explore on the software side. Creating a system that continues to help the user find the most useful and interesting moments in a video file paramount to making large amounts of video on the web accessible.

The algorithms to select frames will be refined. The initial release of the system assumed a large number of users viewing much of the data. Because the number of views for any given piece of media is tracked, the algorithms used to select a frame can also be selected dynamically. Movies with fewer views could weight selections to those scenes that have been seen previously, with movies with more views could weight towards unseen moments. (The inverse could also be implemented – the implementation is what will be explored in the future. It is important here to simply note that these algorithms will be tweaked and multiple ones can be used based on usage.)

Exploring narrative possibilities with the system is a high priority, as the system offers a unique method for first-person video recording, whether the resulting video is fiction or nonfiction.

8. CONCLUSION
Technology will continue to improve the devices we use to record our lives. Keeping long play video recordings of everything we see and experience requires a very specific set of hardware and the ability to record video and audio from an unobtrusive headmount is critical. This device should be able to record for several days without problem. Battery and hard drive must support this requirement. Once it becomes simple to record massive amounts of data digitally without multiple steps of post-processing, the true benefits of such a system can become apparent.

Many people are of scared of opening themselves up to strangers by sharing their recorded personal experiences. I firmly believe that by sharing like this, we can be more understood as individuals. And, as more and more people share their lives with others, the less any singular voice matters. Instead, we can share our experiences and move on with living our lives.

As technology moves forward, there is little reason to discard the information we create; the challenge becomes how to utilize it in a meaningful way. Sharing the very things we experience is not necessarily an invasion of privacy, but could be a new way to communicate and be understood.

Persistent video recording is still an immature field. Hardware limits consumer adoption currently. But there can be little doubt the field is growing as the tools to create personal media continue to develop.

While iam has focused on first-person video, the system is not limited to this application. The ability to document personal experiences that are shared with the public in an open forum cannot be underestimated. Never before has the ability to witness and critique other’s actions so directly been possible.

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10. REFERENCES


