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Emerging Technology

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THE HuDVR

Project Title: *HuDVR (Human Digital Video Recorder) / (Human Memory Log)*

Keywords:

Human memory log

Human implanted hard drive

Record your memories

Backup personal events

Relive your memories

Human digital video recorder (HuDVR)

Abstract:

The *Human Memory Log* is a memory recording and retrieval system – one that takes human memory prosthesis light years into the future. This device can capture selected memories, feelings, and sensations (including all 5 senses) and records the data to an internal hard drive chip implanted within a human's brain. The chip also wirelessly backs up the data to servers located in a central location. Once the data is recorded, the user can retrieve any memory or sequences of memories at any time. The retrieval process happens in one of two ways: the user can do so from within their own memory, putting their current vision input 'on hold' to the brain or from a computer, PDA, or mobile phone (any device with an internet browser).

If one retrieves the data from within their own brain, they have the option to 'relive' the memory and experience it again, with all five senses being expressed. If accessed from the Internet, the interface will show video and play audio unless the user clicks a button to "go into"

the memory. The Internet user interface would have many options to save, categorize, trash & delete, share with others, and 'jump into' the memory.

Research: Tangible

My research started with the eye, cameras, and orbital implants. Websites such as http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/V/Vision.html and http://www.ioi.com/default2.htm helped understand the make-up of the human eye and how orbital implants and artificial eyes would help those whose eyes have been injured and the blind. All my orbital implant research yielded nothing in terms of inventions similar to the HuDVR. Whilst devices were desrcribed that contain "hair-thin electrodes" implanted in the eye that receive information from a camera mounted on glasses (http://www.technologyreview.com/Biotech/18193/), none of the ideas suggest recording such information nor deal with recording input and information from the five senses. This Japanese invention, http://www.liveleak.com/view?i=00b_1207503927, shows a glasses mounted camera system that helps a user find his lost keys. The device tags every item it sees with a text label, useful for later retrieval when one can't find a certain item.

I did research in the direct field of human memory devices and neural prosthesis. A *New*

York Times Article entitled, *"Total Recall"*, describes a the possibility of a future invention – a "small memory chip implanted in your brain […] that […] would double the capacity of your short-term memory[.]" The article mainly speaks in broad terms and doesn't describe any specific neural implant invention or idea. It points to the future in a very dreamy, ethereal statement – "However difficult the practicalities, there's no reason in principle why a future generation of neural prostheticists couldn't pick up where nature left off, incorporating Google-like master maps into neural implants. This in turn would allow us to search our *own* memories — not just those on the Web — with something like the efficiency and reliability of a computer search engine". The similarity to the *HuDVR* is the ability to search within one's own memories; the difference being how the senses and memories are recorded.

Research: Philosophical

Vannevar Bush's article, "*As We May Think"*, published in 1945, describes a future invention, the "memex". "A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory" (qtd. in Wardrip-Fruin 45). Bush describes a desk-like structure in which a user can store everything, with internal mechanization to file and retrieve all his documents. "In one end is stored material. The matter of bulk is well taken care of by improved microfilm. Only a small part of the interior of the *memex* is devoted to storage, the rest to mechanism. Yet if the user inserted 5000 pages of material a day it would take him hundreds of years to fill the repository, so he can be profligate and enter material freely" (45). The memex, being the first description of an invention of its kind, paved the way for computer storage systems we have now and for devices like the *HuDVR* to be created in the future.

In searching the internet for applicable readings, in addition to our text, I found *"The Design of a Human Memory Prosthesis"* written by Mik Lamming, Peter Brown, Kathleen Carter, Margery Eldridge, Mike Flynn, Gifford Louie, Peter Robinson, Abigail Sellen. The reading points

to a problem: “How much of your life is spent memorizing and remembering small things that are nevertheless important? How much is spent failing to remember and then finding another way to get the job done?” (1). To solve the apparent problem, the authors recommend the invention and use of a *human memory prosthesis*, a device that acts “as a personal [system], extending the user’s ability to recall things that are specific to his or her life” (2). The device they describe is tied to memory problems at the workplace and addresses the different ways in which workers forget to complete tasks. They reference Tulving and his description of episodic memory, which “is a person’s memory for unique personal experiences” (4). While the *human memory prosthesis* and the *HuDVR* have different specific goals, in essence, they deal with the same problem: recording and retrieving episodic memory information.

Written in 1994, the article continues on to describe how the authors think that computers will soon be embedded in everything from “domestic appliances” to “office and consumer equipment”. “…[W]e only have to look a short while into the future to see mobile computers that will be small enough to be worn rather than carried – perhaps resembling a watch or piece of jewellery. People won’t have to remember to take their computer with them, they will wear it and take it everywhere” (6). The *HuDVR* takes this idea a few steps farther by implanting the computer hard drive and processing chips directly into the users brain.

Full Project Description:

The idea for the *Human Memory Log* came about when I searched for a solution for my fading memories. Specifically, I wanted to remember and be able to relive concerts and theatrical events that I had seen firsthand, from my point of view. More than just watching a performance on DVD, I wanted to be able to fully experience the event again, complete with the emotions and excitement I felt the first time around. The invention was born out of this idea and first materialized as an eyeglass-mounted camera that would wirelessly record the video streams to a hard drive/server located anywhere. Realizing this project had much more potential and could be

advanced further, I considered camera implantation into the eye and storage implantation in the brain. The final invention records directly from the brain, taking information from the cells that receive input from the five sense organs.

The invention has several components:

1. Human Hard Drive:

The implanted hard drive will be a miniscule storage device, smaller than modern day hard drive chips. Most likely square in shape, it will be surgically located in the users' brain and connected to essential brain sections and cells to record memories. Wires will connect to various points of the brain, allowing the chip to receive data from all the sensing organs. It will have a wireless antennae built into it that will be able to receive cellular and wireless internet protocols (Edge, 3G, Wi-Fi). The data will be recorded locally on the hard drive and wirelessly sent to centrally located servers for backup. Capacity of the human hard drive will be big enough to store 80 years worth of memories. The first generation product will not have the capability to record emotions directly, but down the line, that advancement may be added to the product.

The raw recorded data will also be processed in the implanted chip and all five data streams will be 'muxed' together, creating a single file for each event.

2. Servers:

Standard "off the shelf" servers are used to store events and memories and continually back up the essential data. These will be located in a centrally located server farm and will act as storage backup. They will be maintained like modern day servers – cleaned, kept in cooled, air-conditioned rooms, etc. Access to the servers will be very strict, seeing as the data contained is highly sensitive and personal.

3. User interface:

A web-based GUI program that will allow users to log-in and access their memories will be available for a subscription fee. There will be various membership levels in regards to quantity of server space, how many years your memories are kept on file (lifetime and post-lifetime memberships will be available), and how many users you can "share" your memories with. The site will have the most advanced and extreme protection capabilities available at the time of coding.

The user will have various options when logged into the web-based interface. He will be able to review his memories via the computer's video monitor or iPhone or applicable device – receiving only audio and video information, or if all five senses are desired, he may "jump into" the memory. When choosing the latter option, he will relieve the memory internally, being able to feel, smell, hear, see and taste everything originally recorded. The current surroundings and senses are put on hold (paused) and recorded like a DVR for later review once the memory is completed and the user "returns" to present activity.

The interface will also control file structure and event categorization. The files will automatically record with day, date, time, location and temperature information. People and places will automatically be "tagged" as well when the events are recorded, taking advantage of the wireless communication protocols available. One can further tag and categorize the events based on an unlimited amount of categories. The interface will contain an advanced search function aiding in the retrieval process. The events will automatically be recorded in a chronological time sequence. Users will have the ability to share their memory events with others and received others' shared memories. This may aid in disputes, allowing one to see another's perspective, but also will be a way for friends to share important milestone events with others.

Since the data is being backed up to a centrally located location, this allows for retrieval after accidents and memory loss. Let's say a user has a stroke or is involved in an auto-accident and doesn't remember the events of the accident or any memories prior to it, they will be able to

download their memories from the server and relieve them over and over. This will hopefully aid in the users recovery process. Depending on the users' membership level, memories will be saved after his death. This has a number of uses. Memories can be saved for future generations of his family, in a time capsule like fashion. Viewing memories post-mortem may help doctors and scientists in determining the cause of death and will help one understand what the user experienced prior to death.

Social Issues

Being able to view your family members' last memories could be emotionally disturbing for some users, and caution should be exercised in such cases. Strict contracts will be drawn up and created for users with these accounts to avoid misuse of the system and psychological degradation. Psychotherapy will be provided as needed for post-mortem family accounts. The contracts and terms of conditions will also address issues of privacy and intellectual property. The goal of this invention is to avoid all intellectual property disputes, as memories are single and personal to each person and the *HuDVR* acts solely as a backup memory device, and does not function in anyway as a means for capitalizing off such events.

Timeline of Tasks for Remainder of Semester:

I will create the deliverables as described below, with drafts being created by Tuesday, April 21st, and final deliverables, Thursday, May 21st.

Drafts of deliverables:	In Class	TUESDAY	APRIL 21ST
Presentation of Final Project:	In Class	TUESDAY	MAY 19th
Final Deliverables:	In Class	THURS	MAY 21st

Description of Deliverables:

I. ***Journal entries:*** Short abstract descriptions of the initial ideas and design.

II. ***Brochure:*** A tri-fold or similar brochure that markets the product

III. ***Images:***

a. Interface – A mock-up of what the web interface will look like. Will include some of the following commands, displays and buttons:

i. USER LOGGED IN: NAME/USER #

ii. SECURE CONNECTION

iii. OPEN MEMORY/EVENT/SEQUENCE

iv. CLOSE

v. SAVE

vi. DELETE

vii. SHARE

viii. TAG (S)

ix. CATEGORIZE – DATE, LOCATION, PEOPLE

x. "TIME MACHINE" (Apple) LIKE CHRONOLOGICAL RECORDING STRUCTURE

xi. "JUMP INTO" MEMORY

b. Image of how the system works: view of a human head from the side, with chip implanted, wirelessly streaming data to the servers. (Perhaps collage like)

IV. Patent Application Form

V. Sample user contract/terms and conditions of use for the HuDVR system