Designing the Tangible Experience of Interactive Memories

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Designing the Tangible Experience of Interactive Memories

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Fine Arts in Industrial Design

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Table of Contents

ABSTRACT

INTRODUCTION

RESEARCH
  • Memory Capture Tools
  • Memory Review Tools
  • Experiential Engagement
  • Human Memory
  • Professional Efforts & Experiments
  • Research Summary

PRODUCT DESIGN
  • Objectives
  • Moodboarding
  • Design Language
  • Mockups
  • Memory Key Design
  • Build
  • Screen Media
  • Branding

INTERACTION DESIGN
  • Wireframed Scenarios
  • Animated Prototype

FINAL DISCUSSION
  • Runway Model
  • Moving Forward/Next Steps
  • Key Objects
  • Conclusion
Abstract

The process for memory keeping in the digital age has become easier, immediate, and more efficient thanks to the advent of sophisticated pocket-sized toolsets that can capture everyday experiences.

Consumer-level photo and video recording products are introduced regularly and boast more fidelity, faster speeds, and greater control than their predecessors. More often than not, these expanding feature sets do not properly serve all of their users’ needs.

While the technology exists to allow for a near-complete record of one’s life to be made through the use of sensors and storage media, problems involve how best to meaningfully learn from and engage with a lifetime of collected content.

With the intention of designing a system to streamline the storage and review process of digital memory keeping, I devised a conceptual framework of tangible objects and interactions to centralize memory media and provide a tangible experience for the review of life content.

Focusing on the design of products for “lifelogging,” the recording of everyday experience through digital sensory inputs, I researched human memory, memory making processes, and the Quantified Self movement.
My resulting concept is a system of interactions that incorporate physical objects, digital interfaces, wireless communication, and cloud-based storage that is meant to be a tactile, precious, and centralized way to review and engage with one’s memory.
Introduction

As humans, we benefit from the mind’s ability to experience, recall, reflect on, and learn from information taken in by our senses. We can process past memories, learn from them, make connections, and share with others. However, memory is malleable, lossy, and prone to failure. Many technologies have emerged that allow for an externalized recording and review of our memories: from pen and paper to printed movable type, to audio capture, as well as still and motion photography.

“We all need mirrors to remind ourselves who we are”
Leonard Shelby, Memento (film)

Today, we can record and share moments from our everyday experiences with ease and speed. Cheap and ubiquitous technologies, such as digital cameras and mobile devices connected to digital social networks, allow people to broadcast their lives as they live them in ways never before possible.

After initial capture, the ways we review these experiences or engage with the resulting media is ever-changing. Managing photos, video, and audio were once all device-specific and different procedural undertakings. One had to develop
photographs, and play back cassette and VHS tapes, CDs, and DVDs on their respective players. The idea of device and format-specific media is fading rapidly in the digital age. Even now, within the average US household, there is a multitude of screen-based devices that provide access to diverse types of content via wired and wireless networked connections.

Our once personal, space-hungry storage media now exists as if it were water vapor. What is commonly called “The Cloud” is actually internationally networked warehouses of computer server arrays that store and process data. Content stored in these centers is accessible to be streamed from almost every type of personal screen-based playback device—from TVs and personal computers to smartphones and tablets. The future of memory media is conceptually more intertwined with how to prioritize, manage, catalog, and provide context. The complexity of storage formats, longevity, and maintenance of the information will be outsourced away from our products and to cloud-based computing infrastructures.

Online social networks like Facebook, Instagram, Path, Foursquare, and Twitter allow us to keep a running record and commentary of our experiences in a digitally decentralized and profoundly accessible way. As of August
2012, Facebook handles about 500 terabytes of uploaded content and about 300 million photo uploads made by its users every day. The New York Times article “The Web Means the End of Forgetting” speaks to the fact that as our lives are increasingly shared online, we are creating a forever-growing and permanent archive of what we choose to post.

People use myriad devices to share information, news, personal photos, videos, and ideas in ways never previously imagined. The cultural significance of such engagement is becoming increasingly relevant and considered less of a passing fad. In 2010, the Library of Congress announced its plans to archive every “tweet” (a brief snippet of personal content) posted on Twitter. The purpose of their efforts: to have a historical record of communication, news reporting, and social trends as posted by the public.

In 2010, Google CEO Eric Schmidt announced that “Every two days, we create as much information as was created from the dawn of civilization up until 2003.” This quantifies to about five exabytes of data that owes its size to mass amounts of user-generated content: pictures, instant messages, and 140-character tweets.
Looking beyond traditional means of memory keeping such as audio, photography, and video, there are now consumer electronics that allow for the recording and tracking of health metrics. Devices like the Nike+ Fuelband SE and the FitBit allow people to have more insight into their habits and physical activity and are quickly gaining in popularity. Considering the existence of devices that can capture this type of data, one has to wonder what other information can be tracked and/or monitored.

Wearable computing is a concept that engages in the dialogue of making computers more autonomous, unobtrusive, and integrated with our everyday lives. Wearable computing labs at MIT and ETH Zurich are focused on researching and developing devices that use flexible circuitry, smart textiles, context recognition, and health monitoring. Pioneers such as Steve Mann have been experimenting with technologies to make human-computer interaction more seamless and natural, the purpose of which is to augment our abilities and everyday activities.

Some technologies emerging from this research include those that can be worn for extended periods of time that monitor movement, acceleration, and body temperature. These components can be miniaturized to the point of being embedded into clothing and going
completely unnoticed when worn.

As the market for personal record-keeping and experience-sharing expands, how does this process become less obtrusive in everyday life? How will we sift through our memory collections and understand what is most relevant? What will be the proper way to facilitate sharing the content we find to be most precious and relevant? In essence, what do we have to gain by lifelogging?

Initial Sketch Concepts of Life-Logging Devices.
Research

While considering the current state of technology (its improvements and limitations), I am investigating design opportunities centered around the passive recording of everyday life. Focusing on the next stage of memory keeping is an integral part of designing a device that could provide someone with a complete record of meaningful data to fall back on, revisit, and analyze to gain insight and understanding of his or her own life experience; the goal of which is to make more informed life choices for the future.

The scope of my research consists of five main areas:

**Memory Capture Tools**: Trends in existing technologies that can be considered contenders for lifelogging. These include various portable recording devices that allow the user to capture moments and have them stored for later review.

**Memory Review Tools**: Largely comprised of online social media platforms and services (networked computer software that provides content storage, sharing, and review).

**Human Memory**: The enigma that is the human brain, what constitutes memories, and understanding how human memory works.
**Experiential Engagement**: I “lifelogged” to identify a set of user needs and define a design problem to solve.

**Professional Efforts & Experiments**: Insight into researchers and inventors that are making meaningful use of digital technology in reviewing life media.
Memory Capture Tools

There is a growing market for tools associated with memory capture. Digital cameras and smartphones are the most pervasive and feature a wide array of form factors and intended uses. As devices decrease in size and grow in storage capability, the notion of recording an entire life is not entirely out of question.

I researched the current camera market in an attempt to find a niche in the quantitative self movement. I wanted to see what properties may be missing from existing products and identify trends in emerging form factors. I was in search
of gadgets that were on par with some tenets of lifelogging as the practice of first person visual capture.

**GoPro**
This company specializes in cameras that are designed for recording extreme sports such as mountain biking, skiing, skydiving, and other activities that could be perilous to the average camera. A GoPro camera is small, rugged, and portable. These cameras also include myriad optional peripherals that allow for the device to be mounted on one’s person, vehicle, or even fitted for underwater use.

The GoPro camera itself is highly noticeable when worn casually. It has the visual language of a typical camera and all of its peripherals inform their use. These peripherals include suction cups, levers, and knobs. These devices are utilitarian and not very discreet when worn. Storage capacity depends on the size of media cards being used.

**iPhone / Smartphones**
While not strictly marketed as lifelogging devices, smartphones have changed the ways people integrate technology into their lives. There are endless applications available for these phones that provide different ways of engagement. Across each platform, there are differing resolutions along with media output types and quality.
The increased accessibility of phones and data connections has produced a massive shift in the frequency of photos and videos that are captured and shared across countless platforms.

The portability and multi-tool utility that these phones provide have made them ideal for non-autonomous lifelogging. These personal devices are paradigms for how people augment their memory capabilities by allowing for the outsourcing of all manner of information like contact information, calendars, and task lists.

Overall, smartphones are taking on similar form factors and seem to be converging on a pocket-sized rectangular shape. These small blocks no longer focus on conveying a “listen and speak,” “ear and mouth piece” dialogue. Instead, they are minimalized and abstracted down to focus on the touchscreen: an empty canvas where the majority of interactions take place. Even visible properties of the cameras supplied with these devices are reduced to the minimum necessary physical factor of a pinhole to perform their function.

**Vicon Revue**

Though no longer available, this was one of the first devices to be marketed for lifelogging. This product was born out of the SenseCam technology developed by Microsoft researcher
Lyndsay Williams. SenseCam technology was found to allow for human memory enhancement in those with impairments. The Vicon Revue heralded itself as a product for making “memories for life.” It had a number of additional sensors to record light intensity, temperature, infrared motion, and included a multi-axis accelerometer.

The device was meant to be worn as a pendant around the neck and came bundled with software to help organize content captured with the device. The Revue used its sensors to dictate the appropriate times to take a photo. If the sensors were not triggered after a period of time, it took a photo automatically. The device’s camera took images periodically throughout the day and using its additional sensors, gave context to and ordered the photos. The marketing message of the device proposed its use for improving cognitive function, reflective practice, security, monitoring exercise, and for documentation of projects and events.

While this device aligned with many of the objectives that I am focusing on, I consider its physical factors to be too obtrusive and thus prohibitive for perpetual use. The object was a plastic square that hung from a lanyard around the neck and appeared cumbersome. It was available in a single color scheme, a mixture of purple and black. It may have been better suited for short-term experiments and projects as the
overall form of the device would likely have prevented it from being truly autonomous.

**Narrative Clip**

Originally called Memoto, the Narrative Clip was announced in 2012 with the objective of mainstreaming the idea of lifelogging for the everyday consumer. The device features the very specific function of providing time-lapse photos of the wearer's day.

The Narrative Clip's simple design gives it the appearance of a nondescript modern accessory when worn and comes in three colors: white, orange, and black. It is a small, unobtrusive square and features a clip that allows it to be worn as a pendant or on clothing. It is very lightweight and does not require active interaction. Its sensors inform when to take photos and it refrains from shooting when there is not enough available light or when the device is covered.

The Narrative Clip does not take video and features very few settings; it has been designed to be passive and objective in the recording of the user’s day. The storage space and battery life serve the needs of one entire day’s capture. The product purchase includes one year of a content storage service with the company’s online servers. After the first year the service requires a subscription. Content can be managed via a
mobile device, such as an iPhone, with a custom-catered application.

**Looxcie3**
Similar to the Narrative Clip in its form and marketed as a lifelogging device, the Looxcie3 provides unique functions in that it allows the user to specifically capture a missed moment, like a real-life instant replay, due to its continual recording. It is a clip-on, wearable camera that also provides the ability to live stream your actions directly to a social media network (i.e; Facebook) via a mobile device or wireless connection. The battery life is not on par with that of the Narrative Clip, clocking in at about two hours. This positions it as more of a targeted experience recording device when compared to the two-to-three days of battery life offered by the Narrative Clip.

**Google Glass**
Google’s project, Google Glass, is an attempt to mainstream wearable computing. For now, it is still in a preemptive phase that has been delivered to developers and select individuals to better understand its potential. The product is based on a wearable computer not dissimilar to Steve Mann’s EyeTap project.

Google Glass provides a seamless experience that allows the user to see information about their surrounding environment, snap photos
on command, record video, and communicate with others. The connectivity and data storage transmission from the product has little impact on its form. It relies heavily on wireless technology and networking for its function. This promises to be a major development for wearable computing and the quantitative self.

One of the biggest drawbacks to this technology is that it is pronounced on the wearer. Because it provides a display for the user by way of a glasses-style mount, requires touch and voice command interactions, it can prove to be as obtrusive as a smartphone during use. It remains to be seen whether this device will be successful or even socially acceptable; if it can exist as a common everyday product in the same way mobile devices are viewed as common personal objects.
Memory Review Tools

A modern concept that has been shaping the current face of communication technology is that of social media. Social media is a blanket term for online tools that allow users to publish and consume text, imagery, and video within a landscape of virtual communities and connections.

Networks such as Facebook, Instagram, and Path not only provide a way for people to share content, they are essentially tools for memory keeping. Users upload moments in the form of textblurbs, visuals, and geolocations to share their
day-to-day activities with others in their network.

I have set aside software localized to the user’s personal computer and focused this part of my research mainly on online and web-based services as they are more in line with goals I have for modern memory management. When dealing with software tied to a specific computer or to local storage, one is limited to formats that are at risk of being outdated and prone to data loss. Online and distributed networks provide the ability to have multiple backups, instant updates, and a degree of processing and management that can grow with a product. Below is a brief overview of some of the most popular social media networking applications.

**Facebook**

A service that began as a way of connecting individuals in an academic environment and is now a massive online social network that connects 1.26 billion users. With the ability to access Facebook via mobile devices and computers, it serves as a way for one to have an ongoing personal narrative.

Users post imagery, video, and commentary of where they have been, who they are with, and what they are doing. All of this is publicly curated with varying degrees of privacy.
There are 819 million Monthly Active Users (MAUs) who used Facebook mobile products as of June 30, 2013. 699 million of them are daily active users, with approximately 80% of them located outside North America.

**Instagram**
A social network that is primarily focused around the posting of images. Instagram provides the ability to alter, edit with filters, and crop images to square dimensions that mimic instant Polaroid-style prints.

Instagram works with the premise of limitation—initially only available via mobile devices, the network relies on single-stream catered feeds of content. This social network has been cited as altering how its users behave, which is reflected in trends that are so pervasive that they are almost trademarks of the service. Artsy photos of lattes, feet, and skies seem to be the norm; however, it is generally understood that its users typically hold themselves to a higher standard of what content they choose to post (Heffernan). In addition, there are limits imposed on the comments and access to the content. The network succeeds in that it provides a premise and limitations which then affect the behavior of its users. Instagram sees 150 million MAUs with 60% of them located outside of the US. Since its inception, 16 billion photos have been shared, users generate about 55 million posts per day, and photos log about 1.2 billion “likes” per day.
Path
A social networking platform that works with different parameters than Facebook or Twitter. It focuses on smaller sharing communities that have an expectation of higher quality content and connections. As Facebook becomes too much to bear in terms of content, advertisements, and network size, Path attempts to solve the problem by imposing limitations. Path prioritizes a continuing narrative over disposable content and presents content in ways that have more curation and evoke more meaning.

Since its inception, Path has moved towards more privacy, greater user control over content, and smaller circles of connections as a way of mitigating the social implications of sharing moments and content on larger social media networks. It attempts to provide a venue for a narrative of one’s life path by filtering out the noise, and by keeping a record of meaningful life moments.

Everpix
A cloud-based software solution to the disorganization of digital photos with the tagline “Your photo mess, solved.” The service was designed to pull from all of the user’s existing social media accounts, aggregate the user’s photo content, and add a contextual search. This means that one could theoretically search for “cats” and
any photos that have cats in them would queue up for viewing. Everpix also highlighted and grouped photos of events and used algorithms to recognize moments that could be more relevant to the user. Another standout factor of this service was pattern recognition that auto-sorted photos by visual similarities.

The service had a lot of promise in terms of solving problems within the current memory media arena. However, due to high storage costs, the service announced that it was shutting down as of November 2013.

**Vine**

This relatively new social network works similar to Instagram in that it operates with a set of imposed limitations. Vine allows its users to post 6-second videos. These can only be captured by holding down the record button within the application. It produces short, intentional narratives by its users.

The interaction limitations of Vine leads to more innovation and creativity within the posted content. Users’ snippets are often created in unique and surprising ways. The technology’s interaction design informs specific usage patterns which in turn result in a content platform that has a different type of engagement than would normally be seen in a social video platform.
Experiential Engagement

To better find and understand a design problem to focus on, I began lifelogging myself. The purpose was to see how existing products perform and to define user needs associated with the experience. I wanted to see what was to be gained by lifelogging and what the practice of lifelogging would reveal about potential new methods for content review.

Using a GoPro, I spent two weeks recording my day in different ways to get a feeling of what lifelogging actually felt like. Despite the aforementioned drawbacks to GoPro, I chose it
because it was the most affordable and popular device on the market at the time. What follows are some brief summaries of my experiences organized by type of media captured.

**Video Recording**

Things are not ambiguous with video. With real life memory, moments are recorded with a bit of nuance and forgetfulness. With video capture, I felt more aware of my surroundings. I was a little more cautious of what I said, where I went, and what I did. Knowing that my actions were being recorded second by second, I was acutely aware of everything I did. I even felt a bit odd checking my email or messaging on my phone. It felt quite invasive—as if I would not be the only one to see the outcomes of my day and that there would be judgment of my activities.

In reviewing video content on my computer, I would speed through it. I did not feel a need to hear or watch most of it at 1x speed. I would look for benchmarks in the day and for interesting moments or conversations. Occasionally I would screen-capture a composition from the video and isolate it as a photo to store or share elsewhere. As the experiment continued, my desire to review the content continued to wane. Feeling burdened by all the acquired content, I chose to review content that I already knew held some interest for me. Initially, I attempted to do more interesting
things for the purposes of livening up the video—such as taking different routes to work—but this desire similarly subsided.

**Time Lapse Photo Capture**

For a few days I opted out of video recording and changed the camera mode to shoot photos on a periodic basis with no audio.

In going about my day I often wondered “Was that moment just captured?” I would think about the timing interval and hope that the objectivity of the camera timer would capture things I felt were relevant to me. In review, the sequences were interesting en masse as I could speed through them and pick out points of interest or visual outliers. However, stand-alone photos were much less interesting and did not do justice to the visuals they captured. Many of the images were blurry or under-lit. The strongest sense they conveyed was that of passing colors and patterns. The patterns were of greater interest to me because changing patterns indicated a change in my daily routine.

**Periodic Intentional Photography**

This type of lifelogging is somewhat of an extension of my normal smartphone use in which, for one reason or another, I snap photos or take videos that are stored on my phone for later review.
Most of this media accumulates in my phone and some is never accessed again. A good portion of the media is destined for ultimate deletion, but the majority of the media is produced with the intention of being posted to some social network application and is then eventually removed from my phone’s internal storage. In spending time to critically assess this practice, I realized how inconsistently I managed this type of content.

I use several forms of social media and networking: Twitter, Foursquare, Path, Facebook, and Instagram. I have different relationships with how I use each one to post moments of my life. Some are more informal and others are tied in with my professional practice of design and teaching, where I often make note of inspirations and reference photos. However, much like what interested me with autonomous capture, I desired outliers: things that made the day a bit more interesting or that made those moments more memorable.

Logging Others
It was difficult to find others willing to participate in the experiment due to the size of the GoPro and personal privacy concerns. However, I was able to have two participants who were happy to document their work activities.
Katie Key is a raw foods chef who used the device to record the process of making almond cheesecake in her kitchen from her perspective. She liked the idea of lifelogging as a way to have transparency with her processes so that her customers could see what is done in her kitchen: her sanitization, equipment, and eco-friendly habits. She felt that it would be a great way to have a dialogue with her customers and spread her marketing messages in a new way.

Igor Sobolevsky, a digital concept artist, used the device as he worked on some of his concept art. He found that in review, viewing the video at regular speed was too slow, but that speeding up the resulting video provided the most insight. The ability to rewind and fast-forward and to manipulate how he visualized the completed piece gave him insights into his processes that he wouldn’t have had otherwise.

Lifelogging Summary
Even with my curtailed experience with lifelogging, it was clear that how to best store and review captured media remains unresolved. Lifelogging has been heavily focused on device and capture solutions, and not on transitioning the media from the device to an effective storage and review stage.
The experience of using a mobile device for lifelogging is better than most, as it eliminates the need for a computer. However, the logging is generally isolated to media taken by the device and the user must rely on an external service, like social media applications, for content management.

In using the GoPro, having to download, manage, and sift through photos on my computer was cumbersome; I also didn’t really know what to do with all of the content I was collecting. Relying on a computer as the main gateway for this content felt counterintuitive. I felt that there should be an alternative method for engaging with my media.
Human Memory

Moonwalking with Einstein
One of my primary inspirations in thinking about the purpose and use of my hypothetical device came from insight provided by the writer Joshua Foer in his book Moonwalking with Einstein. Foer explores different understandings of how memory works, its flaws, and ways to “remember everything” by capitalizing on how our brain has evolved to function.

The book is centered around an annual memory championship competition held in New York, where people perform amazing feats of
memorization and recall—from reciting accurate sequences of randomized numbers to epic poems. Foer initially covered the event as a writer, but after learning how memory works and putting the concepts into practice, he returned as a competitor and won the championship.

Foer discovered that championship contestants use mnemonic devices involving contrast-heavy and lurid imagery, information chunking, and buildings known as “memory palaces” that they can build and navigate in their minds for the purpose of depositing and retrieving content. Contestants create “palaces” with many rooms and fill those rooms with imagery associated with things they want to remember. These palaces function on spatial memory and spatial recognition. Walking the rooms of these palaces—which are often based on real places that the person has physically experienced—allows the contestants to retrieve and recite all sorts of information.

In his book, Foer discusses how the image of Albert Einstein moonwalking while wearing a diamond-studded glove, a la Michael Jackson, is such a goofy image that it is difficult to forget. This kind of image he might associate with a specific playing card in a room in the memory palace and thus use it help him remember the sequence of a deck of playing cards.
Contrast is a means by which we best engage with our memories. Most of what we see and experience day-to-day tends to blend together. The things that stick out the most are visuals and experiences that deviate from our commonplace experience. Foer notes that the way people remember life events is through these contrast markers—events that don’t ordinarily occur. For example, a person might not remember exactly when a minor event occurred, but may remember it relative to another (contrasting) event, such as a wedding, vacation, etc. The mnemonic technique that Foer used as part of his process for memory mastery centered on this concept: he used crazy, nonsensical, and shocking imagery to force markers into his mind.

In the process of creating imagery, Foer would chunk information in ways that were meaningful and would often build an image that included a celebrity, an object, and an action—Einstein moonwalking with a diamond-studded glove could very well represent the king of clubs.

Chunking information is a means by which we can remember more by focusing attention on a whole object instead of a series of individual objects. It is easier to remember a single number containing many digits instead of those individual numbers.
Malleable Memories
Psychologist Elizabeth Loftus speaks about the constructive and reconstructive nature of memory in her 2013 TED talk “The Fiction of Memory.” In this talk she explores how memories can be changed and distorted on a situational basis: “When we remember something, we’re taking bits and pieces of experience—sometimes from different times and places—and bringing it all together to construct what might feel like a recollection but is actually a construction.” The brain is reconstructive in how it can approach memory. For details that are not present, the brain may create and impose information to fill in the gaps.

Storytelling vs. Storage
Memory researcher Daniel Kahneman finds that people often confuse a memory with an experience that brought up the memory. We are essentially composed of two selves: one that lives in the present, and the self that remembers. Our remembering selves tell us what we keep from our experiences—a story. Kahneman identifies that the moments that are the most important to a story are the “significant moments and endings.”

For example, let’s say a person has what, for him or her, constitutes a perfect day up until the end. If the day ends in heartbreak, that moment will cast a pall over the experiences of the entire day.
The day is no longer remembered for its hours of joy, but for its negatively-marked ending.

Our memories are never a true second-by-second recounting of our experiences. Instead, they form a story that is marked by contrasts, by what stands out as memorable and significant.
Professional Efforts & Experiments

One of the biggest challenges in lifelogging is finding meaning in the activity of logging and reviewing life content. To gain insight into this area, I examined the work of current innovators and their experiments and projects.

Deb Roy, Birth of a Word
An MIT researcher who for two years tracked everything within his household with the purpose of discovering how his son learned language. He mounted wide angle cameras on the ceiling in every room and recorded video and audio for every second of his son’s development. His project, “Birth of a Word,” allowed him to track the movements of his son, interactions with others, as well as every vocalization that was made inside the house.
Not surprisingly, the project yielded massive amounts of data. When sorted and pushed through sophisticated algorithms, Roy discovered ways his son learned language. His discoveries into his son’s cognitive processes were so profound that he could trace the genesis of the 500 or so words his son learned during that time.

**Cesar Kuriyama, 1 Second Everyday**

His project, “1 Second Everyday,” is an ever-growing montage of one second of video that he selects from every day of his life. He states that this project not only allows him to have a recording of his life, but it also forces him to reevaluate how he approaches each day, which encourages him to do things that are more interesting.

Kuriyama states that “…visualization is a way in which to trigger memory.” Viewing a single second of footage allows him to remember the events of that day. He chooses to shoot from the first-person perspective to get a better sense of how he experienced that moment and to better relate to that memory.

**Steven Addis**

Founder of the Addis Creson agency, Addis embarked on a personal time-lapse project. During a yearly trip to New York City with his
daughter, he takes the same photo around the same time of year and has done so for the last 15 years. He claims they are the 15 most important photos he owns. He notes that while the photos have similar properties in terms of location and subject, each year brings a different perspective that highlights the changes in his relationship with his daughter from one year to the next.

**Brendan Dawes, Cinema Redux**

The Cinema Redux project is a series of posters that represent a “visual distillation of an entire movie.” The project consists of a grid of frames from a set of films. Each row in the grid represents a minute from a movie. Viewing the posters provides new insight into the color patterns of the film. “The result is a unique fingerprint of an entire movie, born from taking many moments spread across time and bringing all of them together in one single moment to create something new.” These posters are part of MOMA’s permanent collection.

**Pharrell Williams, Happy**

In November 2013, the singer/musician Pharrell Williams released a 24-hour music video on the internet entitled “Happy” at http://24hoursofhappy.com/. Filmed on the streets of Los Angeles, the entire piece plays continuously throughout a day, as one continuous shot, with different people dancing along to a
The interactions allow you to scrub through and play any aspect of that day using a circle controller with markers for sunrise and sunset.

What is most interesting about this project is that while the player has the ability to play back all of this media linearly, the user is prompted to scroll through and look for different moments. Users also have the ability to share specific moments or timecodes with others via social media. The controls also offer the ability to skip through to the specially marked points where Pharrell himself is singing and dancing to the song.

The experience is very rewarding and intuitive. Every user that engages with the video will have a completely different experience depending on how they interact with it. The review experience becomes that of a reconstructive narrative.
Research Summary

In considering these notions of memory, devices, and software, I feel that a device created with the intention of life review should be an extension of how we operate with our memories. There should be marked moments, nuance, and a sense of reconstruction that takes place. Any interactions or review should form a user-controlled narrative. With continued use the user should gain insight and begin to establish meaning, make connections, and potentially isolate new narratives and patterns as they make present and future choices.

We are bombarded with devices and options, and rarely have the time to reflect on our experiences. Much of the social media that we use gives us a running commentary of events but is not geared towards allowing us to sit back and engage with the documented material. My intention is to design a device that helps the end-user extract meaning from the noise of personal information that he or she is presented with on a daily basis.
Product Design

I seek to create an interactive memory review experience that relies on digital technology and is tactile, private, centralized, and precious. It will be a modern take on the traditional photo album experience by allowing users to create their own associations, narratives, and relationships with memory totem objects.

The concept exchanges some current trends in technology for a more tangible, object based dialogue. The device will use cloud computing and wireless technology. However, it will favor privacy, be non-portable, and will have the properties of an heirloom object. The ability to easily upgrade the object will give it a degree of longevity.
Objectives

Ritualize the experience
The design should be a system of interactions that may, over time, become ritual for the user. Right now digital experiences are haphazard: most people have multiple devices and their media is scattered over different platforms.

Precious
The object’s design should influence the user so that he or she consider it precious. The design should have value for the user, much like the memories it holds. The object should have the form factors of an heirloom object, not dissimilar to a family album, that can be passed from one generation to another.

Intuitive
The design materials and proportions should inform and provide appropriate feedback to the user.

Timeless
The design form should attempt timelessness through minimalism and abstraction, therefore better enabling the user to develop his or her own relationship with the object. The form should not reflect the technology in a way that allows the device to be easily dated.
The technology should be seamless and hidden from the user. The inner workings need to be easily upgraded without infringing too much on the form. The object should have a perceived shelf life that is greater than those of other products currently available.

**Tangible**

It should be easy to visually and physically engage with the media. The user should have a tangible connection with the content and feel as if the means of accessing it reside with the interaction. The device should inspire the perception that the memories physically live on or are centralized to the device, even if the logistics of the device operation mean that the data is stored elsewhere.
Moodboarding

“Texture and color in a mutually supporting dialogue define any creative artifact – anything waiting for us to decode its inner secrets and thereby enrich our perception and transfer it to whatever we choose.”

Massimo Vignelli

I created moodboards to represent the feelings the device should evoke. I chose colors, materials, and images of objects that I consider as having properties of timelessness. For inspiration, I looked to objects and products (furniture, jewelry, watches, leather bags, etc.) of sophistication and
lasting value. To guide the physical properties of my object, I sought out geometric and distinctive attributes that would inform the user of its function, yet hide the technology that drives the device. For colors, I looked to earth tones, accentuated by rich primaries for contrast. For qualities of a precious object, I studied products that made use of natural materials that were durable, but evoked fragility, and had timeless value as opposed to transient appeal.

**Design Language**

In considering my design, I set objectives concerning visual language and properties to best inform the device’s use:

1) That its form be simple
2) That it not outwardly convey technology
3) That it not be a tablet device or be portable
4) That it not be a remote control that can be tossed aside
5) It should not contain a screen
6) It should have the appeal of ornamentation, like an heirloom object
7) That it be made of glass, wood, or other natural materials
8) That it have balanced weight & feel
9) That it have different illumination modes
10) That its components be modularly upgradeable
Mockups

“Omit the unimportant in order to emphasize the important”
Dieter Rams

I made simple mockups to better understand the proportions and human factors.

Working with foam core, I created tile objects and a surface to place them on. The tile objects, a metaphor for the storage, are a way to group photos similar to photo albums. The surface serves as a means through which to engage memories. Interfacing the objects and the surface
constitutes the review, transfer, and engagement with memories when paired with a screen.

The proportions of the tiles are based on domino game pieces. I reasoned that establishing a kinship with a common game board and pieces would be a good starting point for initiating interactions and gestures that could potentially amount to a use ritual. The dimensions of the surface were based on ratios from current standards for a 1080p High Definition display.

I tested out several variations and modified the sizes. I had others “play” with the device while I filmed their interactions. Without me providing information about how to play with the objects or what they were, I had test users make up stories and talk through what they did with the objects.
Memory Key Design

Each tile acts as a key to access media; the tiles are not the physical storage points. The user will use the surface as a centralized port to distribute the moments/memories to the tiles.

In designing the tiles, I needed to differentiate them from each other. I chose to create unique color signatures for each key because we all have our own physiological responses to color. The results are color patterns that abstractly represent the grouping of visuals with similar properties and how they assume color patterns over time when viewed en masse.

The tiles will also have different weights and can potentially be made of different materials, thus providing the user with different tactile associations for each key.
The designs are ambiguous enough to allow users to create their own associations and meanings. I entertained the idea of creating category names for the tiles, such as “family” or “weddings,” but ultimately felt that it should be left to the user to develop a relationship with the key objects and to organize moments how he or she sees fit.

Because the objects will be keys, there is no need to fit a specific form factor to accommodate space. They will need only to house a radio frequency or near field communication (NFC) tag, as well as capacitive contact points with the surface.
Build

The main surface is made of glass and it will capture movements made by touch and the memory key tiles. The base will house the electrical WiFi-capable components as well as have contact points to charge with a charging station. My ambition is that this base can either be swapped out or have a removable component that allows for the device to be upgraded with new hardware.

The device has an illuminated base that will glow when interactions take place and the types of illumination patterns will indicate the interaction. For example, a glowing pulse will take place while the device is loading or transmitting media, and any tap interactions will cause the glow to brighten or dim.
Screen Media

For the design of my device, I chose not to include a display for a number of reasons. For one, screens are ubiquitous in daily life and are not unique. At the moment, screen technology is quickly evolving and this can easily outdate the product. Having a display adds another component that may need to be replaced after a short lifecycle.

Essentially, my device will act as a controller that will be paired with an existing display through a wireless adapter.
Technology like Google’s Chromecast is an example of how this will be accomplished. Chromecast is a small and cheap HDMI adapter that adds wireless broadcasting capability from a device to any display with the peripheral plugged into its HDMI port.

The Chromecast is barely larger than the width of an HDMI port itself and exemplifies how technology can outsource the need for a screen.

**Branding**

I branded the device “Moonwalk” in homage to Joshua Foer’s mnemonic device for remembering through contrasting imagery. The name also references the iconic dance itself, which “presents the illusion of the dancer being pulled backwards while attempting to walk forward.”
Interaction Design

Since I was designing a device that would be paired with screen media, I felt it necessary to design how the interactions would take place. I wanted to keep things simple and intuitive. To work with the ways in which we remember, I focused on contrast and spatial memory.

There will be a grid of snapshots representing photos and videos. The initial view will be zoomed out to present the content as more of an abstracted pattern, not unlike Brendan Dawes’s Cinema Redux project. Key moments will be displayed as larger snapshots. This arrangement will aid the user by providing a context marker around which the user can place other photos or videos. For example, the user can locate content “before this wedding” or “after this vacation” and generate a stronger sense of context in terms
of where his or her experiences lie in the larger scheme of life.

When the user moves the key object around the grid they will be navigating within an infinite space that moves in two dimensions. Finger taps on the key object will bring the user closer to the content by zooming in. The more the user zooms in, more content is made available. The user will define how deeply he or she wishes to go.

Orienting the key object vertically brings up a context menu allowing for the deletion or transmission of content elsewhere. The Moonwalk device is designed to act as a mediator between the memory keys. It acts as a temporary depot for your content and media can be stored on it before being transferred to other keys.

“Multiple layers create a sense of context and space.”
Muriel Cooper
Wireframed Scenarios

Using Adobe Illustrator and After Effects, I created and animated wireframes depicting the experience of interacting with the device and demonstrating user case scenarios.

I wireframed three main scenarios: (1) importing from a device with touch, (2) importing from a wireless device or computer, and (3) content review.

**Review Scenario**

The following wireframes demonstrate how the user will review content associated with a memory key. This scenario starts with the user placing a key onto the Moonwalk base. It then displays how the user moves through the infinite space using the key object. The user zooms in closer, pulls up a gallery 1up view, side scroll reviews content, chooses video media, and initiates playback. Removal of a key removes the media from the screen.
Device Import Scenario
In this scenario, the user places a phone or lifelogging device onto the Moonwalk and wirelessly transmits the content made available to the Moonwalk. Content can be placed into the Moonwalk’s temporary depot, or deposited directly to a memory key if one is also sitting on the Moonwalk device.
Computer Input Scenario
The following wireframes demonstrate how the user can drop media from an existing computer. Importing from a networked device will be similar to the previous scenario. However, there is an added step wherein content is dropped from an external device onto the Moonwalk device and placed into the Moonwalk's temporary depot prior to being deposited onto a memory key.
Animated Prototype

I produced an animated prototype based on my wireframed scenarios. This animated prototype demonstrates the process of review with cut scenes of how a user interacts with the device.
Final Discussion

“Runway Model”
My concept is still very much what I would consider a runway model, and is mostly a recommendation for what the narrative of a future device would look like. Materials and form may take more testing and revision to become an economically feasible and marketable product.

I see the memory key concept as providing the greatest opportunity for maintaining a tangible form of content that is not restricted to storage or a format technology, that gives access to digital content, and pairs that access directly to screen media.
The interaction design still needs fine-tuning in order to present a refined experience that supports my objectives: pulling the most meaning from content, making the outcomes of life-review more apparent, and providing users ways to choose how they keep and compose their personal narratives.

**Moving Forward / Next Steps**
In resolving the viability of my designed system, I would create a working prototype using openFrameworks software, Leap Motion's gestural motion capture technology, and near field communication (NFC)—a set of standards for short distance radio frequency communication.

This would allow me to build and demonstrate how the physical device would work with a paired screen within a real environment and to solicit user feedback.

Radio-frequency identification (RFID) would be attached to the key objects to inform the system of which unique digital collection to display, and the Leap Motion technology paired with a software simulation would inform the touch gestures of the surface device. This would allow me to provide a mock simulation of the entire experience.
**Key Objects**

I would also like to explore the possibility of turning any personal object into a memory key. One issue that troubled me in working with the tangible aspect of the design system was how to design a set of meaningful objects for a user.

I wanted ways to create a set of objects that could be customizable and provide the user with an opportunity to make a set of keepsakes. If any personal object could be turned into a memory key (by using RFID or NFC tags), the user could have a real association with any personal object of his or her choosing and that object could unlock any memory media when paired with a device reader.
**In Conclusion**

Although the market for lifelogging has yet to fully mature, how to deal with the amassed data of life content will become a pressing issue. My design concept seeks to change and potentially resolve the issue of managing memory media. As we begin to increasingly aggregate personal digital media, the need to manage it in a meaningful and user-friendly way will only increase. Of course, ethnographic and in-depth user research may reveal that my notions of preciousness, centralization, and tangible key objects do not resonate with the modern user. Nevertheless, the purpose of my design is to initiate and take part in the conversation that envisions the development and growth of memory media management and technology.
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