Digital Memory and the Problem of Identity

Christopher N. Chapman
Microsoft Corporation
1 Microsoft Way
Redmond, WA 98052
chris.chapman@microsoft.com

Reprint of a paper from:
Proceedings of the 6th Annual Hawaii International Conference on Arts & Humanities
January 2008, Honolulu, HI

Abstract
Following a decades-old dream of computer scientists, technology can now capture, store, and retrieve vast amounts of information about personal experience, yielding a capability that has been called "digital memory". When such memory is externalized in technology and potentially made available to others, it presents questions about what such a system means and what it reveals about structures of personal identity. I explore these questions using a psychoanalytic framework based on the work of Lacan. In this model, such technology appears more likely to involve issues of personal identity rather than memory. I argue that the results of such theoretical investigation have direct implications for digital memory technologies and suggest hypotheses for digital memory technology that may be investigated empirically.

Introduction: The Problem of Digital Memory

Advances in computer technology present us with vast amounts of textual and multimedia information about the world and our lives. It is rapidly becoming feasible to record and store every conversation, every document, every phone call, and even all the sights and sounds that confront us in day to day life. Such an information store could be used, among other purposes, to locate and remind oneself of prior experiences and information that are otherwise lost to memory.

The concept of mechanical memory extension was first proposed during World War II by Vannevar Bush (1945) as the "Memex" concept. Today, Gordon Bell and Jim Gemmell of Microsoft Research have begun to develop a digital system in which all kinds of digital information – ranging from documents to continual sound and audio – can be represented in a single massive database of one's life (Gemmell and Bell, 2007; Gemmell, Bell, and Lueder, 2006). This system, dubbed MyLifeBits, allows both replay of the information and associational linking of contents, such as document similarity. The use of metadata such as time, date, and location

from GPS sensors can allow further association among contents using both representational and machine learning techniques (Gemmell and Bell, 2007; Ringel et al, 2003). The content may also be shared with other people, such as friends, family, or the world at large on the Internet.

The contents of such a project, such as individual documents or photographs, are called "digital memories," and the combination of a single person's database with a retrieval interface is "digital memory." More generally, "digital memory" can refer to any such attempt to augment human memory with digital contents. To date, discussion of digital memory has largely emphasized technical considerations, such as the architecture, algorithms, and interfaces comprised by such a system. This is often supplemented by general discussion of potential social issues such as privacy concerns.

One of the factors that has largely been taken for granted is the concept of "memory" itself. In a digital memory system, memory is conceived as a fallible store of specific information, whose ideal function is the precise recall of content:

> Human memory can be maddeningly elusive. We stumble upon its limitations every day, when we forget a friend's telephone number, the name of a business contact or the title of a favorite book. People have developed a variety of strategies for combating forgetfulness – messages scribbled on Post-it notes, for example, or electronic address books carried in handheld devices – but important information continues to slip through the cracks. (Gemmell & Bell, 2007, p. 58)

In such a conception, memory is about retrieval of exact information. To the extent that digital memory is associational, it relies upon associations among specific *data*, such as links between items in time or the textual content of documents.

This poses the question: is such a digital system really "memory" at all? How does it relate to human memory? This in turn poses a more fundamental question: how does such memory relate to the individual, to one's own subjective being? Can one draw implications about how people may relate to such a system? These questions cannot be exhausted in a short paper. Instead, I propose here to begin exploration of the issues in a relatively narrow domain, considering one aspect of the technology – continual photographic contents – from one theoretical perspective, Lacanian theory of the structure of the subject.

The technology I consider is an automatic digital camera research project known as SenseCam (Hodges et al, 2006; Williams, 2004). SenseCam is designed to be worn on the human body and to take photographs automatically, using a variety of environmental sensors such as light, temperature, motion, and warm-body (infrared) detection to determine when to take photographs. The resulting set of images can be viewed as a rapid sequence similar to stop-action photography, and provides both a visual record and metadata on concomitant environmental conditions.[1]

In this work, I examine the significance of this technology for issues of personal identity using a psychoanalytic framework based on the work of Jacques Lacan. Despite Lacan's famous impenetrability, Lacanian theory is useful here for two reasons. First, Lacan's theory of psychic structure focuses specifically on issues of external images and the resulting problems of identification and memory related to the division between oneself and the world represented in images. This makes it especially relevant for the present problems. Second, as a clinically trained psychologist, I appreciate Freud's observation that normal psychology and extreme manifestations in clinical work may operate with similar mechanisms, sometimes differing in degree more than kind (Freud, 1901, p. 278). Lacan's system suggests ways that one may use clinical models to make inferences about non-clinical behavior.[2] On this basis, I draw several hypotheses about interaction with a digital memory system, which suggest areas for further research and potential technological implications.

Photography as Narrative and Identity Construction

We may start our consideration of digital memory and SenseCam by considering the most similar existing technology: photography, especially digital photography. It has long been recognized that photography may serve both to document an event and to distort it. Barthes notes that a photograph is "outside of meaning," thus allowing multiple potential roles as signifier in various narratives (1980, pp. 34ff). Sontag notes that photography serves in social

[1] Conference presentation of this paper is supplemented by a live demonstration of a SenseCam recording.

[2] Taking up Bruce Fink's challenge (1995, p. 152), I try to avoid the commonplace path of explicating Lacan according to a textual approach of commentary upon commentary. Although I do not comment on clinical work as such, I hope to establish a link between Lacan's clinical structures and live behavior as exhibited through technology, and to suggest testable implications for people's interaction with a real technology object.

rites of group identification and preservation, through such artifacts as family and wedding photographs (1977, p. 8), and that interpretation of its meaning requires narrative: “one never understands anything from a photograph … Only that which narrates can make us understand” (p. 23).

Van Dijck (2005) examines the ways in which computer technology serves not merely as a passive tool for recollection of information but may actively structure our processes of memory. She argues that technology must pay attention to how memory and social constructs built from shared memories may be shaped by processes of recall: “the ultimate goal of memory is not to end up as a PowerPoint presentation on your grandchild’s desktop; the ultimate goal of memory (and memory machines) is to make sense of our lives, to create our own meanings of living.” (van Dijck, 2005, p. 329) With digital photography and technologies such as photography sharing sites, cellular telephone messaging, and blogs, people are increasingly using photographs as momentary messages in social exchange, where the function of the photograph is not primarily to trigger recollection but to establish facts about oneself that constructs and manages one’s identity in a social context (van Dijck, 2007, Chap. 5). Photography thus serves increasingly as a tool of identity construction rather than memory.

Although these accounts of identity construction through photography are persuasive, they lack an explanation of exactly how it is that such construction takes place, i.e., what the operative psychological conditions and structures may be. Without such an explanation, these accounts are largely descriptive of current behavior and thus may be limited in implication for future technology. If we link these accounts to more fundamental psychological structures, then we may be able better to derive specific hypotheses about new technologies such as SenseCam.

The Structure of Identity

There are many psychological theories that might be used to construct a model of identity. As I noted above, I adopt a Lacanian model here because Lacan’s work clearly discusses issues of imagery and personal identity. For our purposes, Lacan – which is to say, my necessarily interpretive reading of Lacan – presents a model of the psyche that is structured by

three essential factors: the difference between the real and the imaginary, the symbolic structuring of reality through the Other, and the idea of the unconscious as a chain of signifiers.[3]

The first important aspect of Lacan's theory concerns the difference between the real and the imaginary. For Lacan, the "real" includes fundamental drives of the individual, such as needs for food, warmth, love, sex, and so forth. These are incapable of being immediately met because of social and environmental constraints, and in any case are inexhaustible and insatiable. This sets up a condition of privation where one's needs are split from the external world, which is knowable only through representations or images (and is thus "imaginary"). The individual identifies with these images as both representations of oneself (e.g., in the "mirror stage") and of what one wants as embodied by the images of others. This forms the Lacanian "ego", which is the imaginary self as represented through the imagined views of others (cf. Lacan, 1975, pp. 169-171). For Lacan, unlike traditional ego psychology, the ego cannot be regarded as the real actor or self; the agent who acts at any time is fleeting and perhaps unclear, but is retroactively identified with the imagined ego through the operation of imaginary and grammatical (and other symbolic) identification.

A second structural factor arises through the operation of language. To interact with the social world, the individual must adopt language. However, language is always imprecise and structurally presupposes conditions that are alien to unmediated experience. Language is independent of any person and poses universal structures that can be non-personal or trans-personal (such as passive sentences). Thus, language poses a structural "Other" that is the universal condition of symbolic discourse and forms the conditions for our understanding of the symbolic world of social existence ("reality"). It is in this space that the "subject" arises, the unconscious actor who appears momentarily in linguistic acts but cannot be identified with the real body, drives, consciousness, or the imaginary ego (Lacan, 1966, pp. 346-348; Fink, 1995, Chap. 4).

[3] Lacan's various models include many more elements than these, but I take these three elements as among the most important and most relevant for the current discussion. My condensed and abbreviated description of Lacan's concepts of the subject and ego is indebted to, although not identical with, two remarkably lucid expositions: Fink's *The Lacanian Subject* (1995), and Dor's *Introduction to the Reading of Lacan* (1998).

The third factor concerns the nature of unconscious chains of linguistic signifiers, which emerge ineluctably as the residua of symbolic language. Language is composed of elements that are reused and have multiple associations. For instance, words may have multiple meanings, there can be many homonyms, and at the most basic level phonetic elements and written symbols are shared among words and phrases. This means that any linguistic expression not only has consciously intended and interpreted meanings, but also potentially triggers a chain of associations that emerge from the relationships of its linguistic elements to other signifiers. One's experiences lead to an embodiment of such a chain of signifiers, which are then able to operate unbidden in one's linguistic/symbolic interactions, yielding parapraxes and other distortions of speech, memory, desire, and action. Lacan refers to this as the "unconscious". This splits the individual between one's own intentional linguistic acts and the unconscious operation of associations that been assimilated from outside (Lacan, 1966, pp. 35-39; Fink, 1995, Chap. 2 and 179-182). In this model, the unconscious is very much an "it" that operates quite independently of one's presumed self, forming automatic associations among linguistic elements.

These three operations project the self out into the world. Somewhat similar to Kleinian projective identification (Klein, 1946) and Sartrean phenomenological theory of the ego (Sartre, 1937, 1943) – although certainly different from them in both structure and implication[4] – the Lacanian ego is constituted from symbols acquired from others and observation of others. Such incorporation of viewing others leads to the reflexive position of adopting viewing from their standpoint (cf. Lacan, 1973, pp. 80-84).

Thus we have a structural condition that presents two facets: being viewed by other people, and the incorporation of such viewing into one's own self-image. When that structure is combined with the reality of desire, it produces the possibility of wanting to be seen by others in a certain way. In Freud's Dora case (1905), this structure is exemplified when Dora wants to

[4] Klein's theory concerns the symbolic projection onto others of a part of one's own psyche, not the Lacanian introjection and interpretation of oneself in accordance to imaginary views of others. For Sartre, the ego is associated with the unifying activity of conscious reflection in relation to interaction with the world, and thus is quite different in construction from Lacan's imaginary ego, which is not identified with consciousness. Nevertheless, both Klein and Sartre present accounts of the ego that are closely related to the engagement of oneself with the outside world, rather than a presumed "real self" substance that exists independently of and prior to one's involvement with the world, and thus share some structural similarity with Lacan's conception.

be an object of desire just as was Frau K, her father's mistress (cf. Lacan, 1975, pp. 184-5). The link between seeing and desire is represented symbolically in Dora's attachment to a visual cue, Frau K's "adorable white body" (Freud, 1905, p. 61; cf. Quinet, p. 144).

When we put these various elements together, we see that identity is fragmented. There are real drives that are separate from the world outside and are unknowable in symbolic thought; there is the ego, constituted in interpersonal space by images and symbols drawn from others; there is a disappearing subject of the linguistic unconscious; there is the superficially presumed but unreal grammatical subject of language; and there is an unconscious that produces automatic associations that may subvert behavior. Personal identity rests to some extent in all of these – which is to say largely in none of them. Identity is dynamic and fleeting, appearing at one time as the implied subject of speech, at another as the imagined person seen by others, at another as the reflexive self-interpretation of images as one is believed to be seen.[5]

Can there be a stable, permanent identity? The unconscious chain of signifiers is persistent, as are some of the identifications and presentations of the ego with others. But each of those constitutes the self only as what it is *not*, as what is outside it. The primary function that appears as stable, positively present, and interior is memory; insofar as there is a stable, self-present identity, it is constructed through the symbolic operation of memory. Memory exhibits a quasi-linguistic structure: its meaning is formed post-hoc by the remembering individual, just as the meaning of speech is determined post-hoc (at the completion of each utterance) by the hearer (cf. Sayer, 2004, p. 85).[6]

[5] A complete discussion of this topic is beyond the scope of the present work, but it is important to note that such an account by no means denies the importance of our perceptions of ourselves nor our action and experience as agents. Rather, it implies that the ordinary perceptions we have of being unified consciousnesses, independent actors, essential thinking substances, and so forth, are incomplete and misleading. Indeed, it would make little sense if clinical psychoanalysis were strictly to resist and deny the individual. For Lacan, the approach instead is to expose the kinds of mental links, symbolic structures, and other sorts of unconscious detritus that interfere with the enjoyment of individuality. In other words, the goal is to recognize psychic reality, including its important unconscious aspects of desire and enjoyment, and to free it from unnecessary interference and distortion.

[6] Note that, for Lacan, memory and the unconscious are entirely separate systems. The unconscious operates in the order of the real, linking signifiers without regard to the symbolic realities that they signify, and is not available to the person. Memory operates in the symbolic order and is available (albeit partially and fallibly) to consciousness. (cf. Lacan 1966, p. 31).

Memory, Identity, and SenseCam

When this exposition of memory and identity is compared to digital memories taken by SenseCam, we immediately see a fundamental difference: SenseCam memory is externalized. Because it is captured by a device, not by oneself, it is the product of an "other". Because the contents exist independently of oneself, they are, in principle, available to other people just as they are to us. There is no privileged access, no essential link that makes the memories belong to oneself rather than others. There are merely contingent links fostered by the technology, such as passwords and possession of the device and storage media.

Formally, then, SenseCam digital memories are not memories at all, in the Lacanian structure. They are better regarded as a kind of documentary about one's experience, a simple recording taken alongside oneself. Despite that, we can see that such contents present enough structural similarity to memory that they may be confused with it. When I wear SenseCam, images are taken from my own viewpoint and thus appear to be mine. When reviewing them, I have a collection that is unified both temporally over time and in terms of subject matter (what I've seen). Thus, they structurally satisfy some of the conditions of the symbolic identity unified in memory.

From a psychoanalytic perspective, these similarities and differences between digital memory and real memory establish a series of splits – or, to borrow an ego psychology term, conflicts. The unified record of one's activity pulls one to identify with it, but at the same time it demonstrates concretely the essential lack within the subject – the record with which one identifies is possible only because it is taken with a device, and thus is exactly *not* one's own.

In this sense, we may view photography of all sorts as a kind of surrealism, as Sontag noted (1977, p. 48); photography captures some aspects of reality but distorts and re-presents it. Unlike still photography, the moving images of SenseCam include a time dimension, yet they also distort that time: the moment to moment intervals between images are compressed and distorted and whole sequences may be rearranged through simple editing.

The Link to Clinical Structures

We have seen various splits between the subject and other, between one's own subjectivity and the symbolic order, one's own agency vs. the unconscious, and now one's own memory and identity vs. an externalization of memory. In the Lacanian system, these splits pose structural questions within being, which lead directly to various clinical manifestations (cf. Lacan, 1966, pp. 376, 432; Lacan, 1981, Chap. 12; Fink, 1997, Chap. 8). The core question for split being is "What am I?" but it manifests differently in different neurotic orientations.

Because identity is partially inside, partially outside, it poses the question "Am I alive or am I dead?" This form of question is the essential issue for obsessional neurosis (Fink, 1997, p. 122). With digital memories, this question becomes even more pronounced. If my memory and identity live outside myself in SenseCam sequences, will they not persist death? If so, am I not as good as dead already? Am I the same as this dead object that captures experience?

Likewise, because ego is constituted through the symbolic order and identification with the other, it poses the questions, "What kind of being am I," or more specifically, "Am I a man or am I a woman?" (Lacan 1981, p. 171) and "Am I desirable to others?" (for various formulations see Lacan, 1981, Chaps. 12 & 13; Soler, 1996b, pp. 262, 272, 276; Fink, 1997, p. 122). This is the essential issue displayed in hysterical neurosis, which survives in Lacan as a generalized, more abstract concept than in traditional psychoanalysis. Again, this question is raised quite obviously in SenseCam sequences: am I the same as these images of me? What do the images say about me?[7]

These structural questions are quite different than one might imagine simply on the basis of considering digital contents to be memories. In the case of memory, one might suppose that the fundamental questions would be about the content – the technological data – and its veracity and meaning. For instance, "What did I see?", "When did I see it?", "What else

[7] For purposes here, I leave aside other clinical structures, such as perversion (fixation on a narrow slice of the imaginary) and psychosis (failure to establish a place in the symbolic order), although both are clearly also relevant to SenseCam. In psychotic organization, for instance, one could expect issues such as direct conflation of oneself with the device ("it is linked into my brain") or of the device with others ("they are using it to watch me"). With perversion, it could of course serve a fetishistic or voyeuristic purpose, as do other photographic devices (cf. Sontag, Chap. 1).

happened that I did not see?", "What have I forgotten?", and so forth. We may ask: which of these sets of questions is substantiated by experience?

Another important consideration, which is not strictly a clinical structure but a psychic structure in general, is the question of time. Sontag argued that the absence of a time dimension helps to make still photographs more "memorable" than moving images (1977, p. 17), by which she seemed to mean "compelling." This concept of the memorable raises issues about the extent to which memory should be considered as the operation of recalling data, as in the model presumed by advocates of digital memory, or whether it is better conceived as the residue or recall of more emotional states.

In the Lacanian model, the question of time is closely linked to the operation of the symbolic realm through which we experience and interpret the world. Soler notes that:

> The temporality of the subject is neither clock time, nor the temporality of living beings; it is the temporality of the signifier … a time shared between the anticipation, while you are speaking, of the moment of conclusion (the moment at which you can grasp what you meant), and retroaction, for when you arrive at the anticipated end point, all previous speech takes on new meaning, that is to say, new meaning emerges retroactively. (Soler, 1996a, p. 64).

With regards to SenseCam sequences, this observation has two implications. First, the meaning of the sequence can only be established retroactively, whether that is through the addition of other signifiers, or on the most basic level, through the simple conclusion of the recording and then conceiving it as a single complete record. Second, the expression of time as shown in an externally captured sequence will differ fundamentally from our experience of time; it may seem faster or shorter or otherwise different in subjective time intervals from moment to moment, exactly because viewing of the sequence later will link it to a quite different chain of signifiers than those present at the time of recording.

Hypotheses, Implications, and Directions for Future Research

With this theory we may now form hypotheses that address the structural questions of identity in order to assess observed behavior with digital memory systems such as the SenseCam. One possibility is that the account of memory as data recall will be dominant and persuasive in accounting for people's behavior with such a system; an alternative is that real

behavior will agree more with implications of the structural identity model. To empirically assess the structural account vis-à-vis the memory/data alternative, one might pose hypotheses such as the following.

- Hypothesis 1: People will be more intrigued to see SenseCam sequences that show themselves than to see images that face outward and only show external people and things.
    - Rationale: This is because people will be more interested in neurotic questions ("Who am I? Am I alive?") than content questions ("What did I see?").
- Hypothesis 2: Others who view these sequences will likewise be more interested to see the person in question rather than his or her putative experience.
    - Rationale: This is because people will be more engaged by fundamental questions that respond to the split in being (between the real and the symbolic) than by questions about content within the symbolic realm alone (i.e., memories). For instance, "What is the experience of the other (e.g., what does it mean to be alive)?" and "Is that person desirable?"
- Hypothesis 3: The meaning of SenseCam sequences will not be determined by the contents themselves (i.e., the data) but rather by post-hoc structuring that fixes the meaning through addition of other signifiers.
    - Rationale: Because the content is "outside of meaning", other signifiers are required to place it in the symbolic realm; the meaning and interest then depends on those signifiers. For instance, adding a music track to a sequence would simultaneously alter its meaning and make it more interesting than the content alone.
- Hypothesis 4: Manipulation of the time dimension will affect the meaning of SenseCam sequences and the level of interest that people have in them.
    - Rationale: One set of signifiers that is available to fix the meaning of a sequence post hoc involves time; one could speed up or slow down the sequence or parts of it to convey time analogies that suggest meaning (such as anxiety, activity, lethargy, boredom, etc.). We can predict that such manipulation might be

viewed as being more interesting, and thus more memorable (in Sontag's sense) than a pure representation that attempted to be maximally congruent to the external clock time of a strict memory/data model.

These hypotheses should be amenable to straightforward research and assessment once SenseCam has been made available to a substantial number of people who collect, share, and reflect on their sequences.

The two possibilities of addressing the structure of identity vs. collecting memory-like data are not exclusive; both can operate, but one of the forms of activity may pose more striking, intriguing, engaging, and interesting results than the other.[8] Likewise, empirical assessment of such behavior and its consequences does not preclude the opportunity for investigation through other methods such as ethnographic or psychoanalytic techniques (e.g., to explore how elements such as unconscious signifiers manifest in overt SenseCam behavior).

Evaluation of the above hypotheses would not be intended to substantiate claims about validity or invalidity of Lacanian theory; rather, it would merely evaluate the usefulness of implications I have derived from Lacanian theory. In that sense, we may use Lacan opportunistically because of the apparent utility of his framework for the problems at hand; there is no necessity here to posit an absolute "truth" of the psychoanalytic framework (cf. Fink, 1995, Chap. 10).

Implications for the technology follow directly from the acceptance or rejection of these hypotheses. If digital memory is truly about content, then the crucial technological implications are to make it maximally trustworthy, to capture as much information as possible, to mimic the viewpoint of an individual, and to make the content readily accessible for recall. Alternatively, if people respond to digital memories more in terms of the structural questions, then the implication will be to make such technologies amenable to adding symbolic content such as

[8] As with all psychoanalytic mechanisms, it is possible that the operation of structural splitting could be demonstrated not through positive appreciation of specific results but rather through negative response yielded by repression or censorship. However, framing the requisite bivalent hypotheses and defending the resulting experimental model are beyond our scope here. In any case, such investigation could logically follow an initial examination of the univalent hypotheses as given.

music or narration, to embrace viewpoints other than those that mimic a person's view, and to enable usage apart from putative correspondence to an individual's experience.[9]

In the longer term, the answers to these questions can be expected to have ramifications for the social experience of these technologies. I have argued previously that information technology developers create – perhaps unknowingly – ethical structures that mediate interpersonal activity, and digital memory presents many possibilities for such mediation (Chapman, 2005).

Consider the case of a distributed system in which people are able to share their digital memories and link them to those of others on the basis of location and time, thus sharing digital memories of the same event. If the system is structured by models of memory, then the fundamental interpersonal and ethical questions that arise could be expected to include issues such as whether the information is public or private, whether it is complete or not, and to what extent different people's "memories" agree or reflect different concurrent experiences of an event. However, if the system is structured by models of personal identity, then we can expect these issues to involve questions such as whether people are properly portrayed (i.e., signified and associated with meaning), whether their interpretation of the experience is unique, and whether it can be linked to other expressions of their identity.

To take a concrete example, if a person captures digital memories at a popular concert, some of the ethical questions would involve ownership of the content and rights of reproduction such as posting it online. If the system is about memory, then capture and reproduction may be unnecessary; the person could always buy an album, video, or other compilation and have a similar "memory" of the event. If, however, it is about identity construction, then the loss of one's own specific experience together with post hoc assignment of meaning could be felt more strongly. Losing the ability to assign meaning to that experience

[9] The structures outlined here also have implications for other areas of technology that involve digital content and personal experience. One such area would be the phenomena of social networking and related forms of online sharing and communication. We can apply the structural concepts to those areas and pose similar questions about people's experiences. If social networking is driven by a need to address structurally neurotic questions, then we might expect it to lead to patterns of behavior that display obsessive and hysteric qualities. For instance, such behavior could tend towards an insatiable urge to demonstrate what one has done (answering the obsessional neurotic question) or towards exhibitionism of oneself (answering the hysterical question). However, I shall defer investigation of those structures for future research.

might be a significant loss. Depending on which of these views an engineering team adopts, there will be varying implications for the technology system they develop and people's consequent experiences.

Conclusion

Digital memory systems do not appear to be memory at all but instead are documentaries about oneself and others. On the basis of psychoanalytic theory, it appears that these systems may be more closely tied to the construction of identity and the operation of psychic identity structures, rather than to the operation of specific information recall. This has wide-ranging implications for the future development of technology because identity construction can benefit from technology features, models, and systems structures that differ from those needed for information memory. Future research is needed not only to identify whether this thesis is correct, but if so, to explore the issues that are likely to arise in such technology systems and how the systems may be optimized for enjoyment, ethics, and interpersonal interaction.

References

(For translated works, the year of original publication is listed first. Page numbers are cited for English translations.)

Barthes, R. (1980). *Camera Lucida: Reflections on Photography*. Tr. R. Howard. New York: Farrar Straus and Giroux, 1981.

Bell, G., and Gemmell, J. (2007, March). A digital life. *Scientific American*, March 2007, 296:3, 58-65.

Bush, V. (1945, July). As we may think. *Atlantic Monthly*, Vol. 176, No. 1, pp. 101-108.

Chapman, C. N. (2005, January). Fundamental ethics in information systems. In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences*, Poipu, HI.

Dor, J. (1997). Introduction *to the Reading of Lacan: The Unconscious Structured Like a Language*. Tr. and ed. J. F. Gurewich and S. Fairfield. New York: Jacob Aronson.

Fink, B. (1995). The *Lacanian Subject: Between Language and Jouissance*. Princeton, NJ: Princeton University Press.

Fink, B. (1997). *A Clinical Introduction to Lacanian Psychoanalysis*. Cambridge, MA: Harvard University Press.

Freud, S. (1901). The psychopathology of everyday life. *Standard Edition*, vol. VI.

Freud, S. (1905). Fragment of an analysis of a case of hysteria ["Dora"]. *Standard Edition*, vol. VII.

Gemmell, J., Bell, G., and Lueder, R. (2006, January). MyLifeBits: A Personal Database for Everything. *Communications of the ACM*, 49:1, 88-95.

Gemmell, J., Williams, L., Wood, K., Lueder, R., and Bell, G. (2004, October) "Passive Capture and Ensuing Issues for a Personal Lifetime Store", *Proceedings of the 1st ACM Workshop on Continuous Archival and Retrieval of Personal Experiences*. New York, NY.

Hodges, S., Williams, L. Berry, E., Izadi, S., Srinivasan, J., Butler, A., Smyth, G., Kapur, N., and Wood, K. (2006). SenseCam: a Retrospective Memory Aid. In P. Dourish and A. Friday, eds. (2006). *UbiComp 2006: Ubiquitous Computing* (Proceedings of the 8th International Conference on Ubiquitous Computing), pp. 177-193. Berlin: Springer-Verlag.

Klein, M. (1946). Notes on some schizoid mechanisms. In R. Money-Kyrle, B. Joseph, E. O'Shaughnessy & H. Segal, eds. (1984). *The Writings of Melanie Klein*, *Vol. III*. London: The Hogarth Press.

Lacan, J. (1966). *Ecrits*. Trans. B. Fink, with H. Fink and R. Grigg. New York: Norton, 2006.

Lacan, J. (1973). *The Four Fundamental Concepts of Psychoanalysis* [Seminar XI]. Ed. J.-A. Miller, Trans. A. Sheridan. New York: Norton, 1981.

Lacan, J. (1975). *The Seminar of Jacques Lacan, Book I: Freud's Papers on Technique (1953-1954)*. Ed. J.-A. Miller, Trans. J. Forrester. New York: Norton, 1991.

Lacan, J. (1981). *The Seminar of Jacques Lacan, Book III: The Psychoses (1955-1956).* Ed. J.-A. Miller, Trans. R. Grigg. New York: Norton, 1993.

Quinet, A. (1995). The gaze as an object. In Feldstein, R., Fink, B., and Jaanus, M., eds. (1995). *Reading Seminar IX: Lacan's Four Fundamental Concepts of Psychoanalysis*. Albany: State University of New York Press, pp. 139-147.

Ringel, M., Cutrell, E., Dumais, S., Horvitz, E. (2003, September). Milestones in Time: The Value of Landmarks in Retrieving Information from Personal Stores. *Proceedings of Interact 2003: Ninth International Conference on Human-Computer Interaction*, Zürich, Switzerland, pp. 184-191.

Sartre, J.-P. (1937). *The Transcendence of the Ego*. Trans. F. Williams and R. Kirkpatrick. New York: Noonday, 1962.

Sartre, J.-P. (1943). *Being and Nothingness*. Trans. H. E. Barnes. New York: Philosophical Library, 1948.

Sayer, D. (2004). Incognito ergo sum: language, memory, and the subject. *Theory, Culture, and Society*, 21:6, 67-89.

Soler, C. (1996a). Time and interpretation. In Feldstein, R., Fink, B., and Jaanus, M., eds. (1996). *Reading Seminars I and II: Lacan's Return to Freud.* Albany: State University of New York Press, pp. 61-66.

Soler, C. (1996b). Hysteria and obsession. In Feldstein, R., Fink, B., and Jaanus, M., eds. (1996). *Reading Seminars I and II: Lacan's Return to Freud.* Albany: State University of New York Press, pp. 248-282.

Sontag, S. (1977) *On Photography*. New York: Farrar, Straus and Giroux.

van Dijck, J. (2005). From shoebox to performative agent: the computer as personal memory machine. *New Media & Society*, 7:3, 311-332.

van Dijck, J. (2007). *Mediated Memories in the Digital Age*. Palo Alto: Stanford University Press.

Williams, L. (2004, October). "Human Computer Interaction and Accessibility: SenseCam - A black box and image recorder for the human body". Presented at the British Educational Communications and Technology Agency (BECTA) Expert Technology Seminar on Human Computer Interaction and Accessibility, London, UK.