MIRJAM DISSEL

ERASE AND REWIND

Thesis submitted as writing component to
the Master Media Design Programme,
Piet Zwart Institute,
Willem de Kooning Academy,
2012

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1. INTRODUCTION

In this thesis I will manoeuvre through different psychological ideas relating to association, to a brief explanation of how memory is built and developed in the brain, taking the notion of (visual) association as a leitmotiv. An important concept that keeps coming back in my research, is the impossibility of automating processes such as the one the user goes through while engaging with my projects. A human mind is needed to make the meaningful connections between concepts, because a brain is not a computer (Sexton 2008, pp.112-113). Experience and memory are processed in fundamentally different ways by humans than they are by computers. Likewise the way experiences are perceived, processed and stored, and forms of retrieval, are also fundamentally dissimilar. This essential difference will be investigated.

In correspondence with the subject of this thesis and conjugated graduation project, I rely on you, the reader, to be able to construct a visual image 'in your mind's eye' so to say - as a result of everything you know and have seen before in your life. Hence, no actual images are included of the interface of the graduation project, and explained examples.

A reason why this topic is personally interesting to me is the reliability of my own memory. Not so long ago, I used to pay close attention to the littlest details, ensuring the consolidation of memories in my long term storage. After 3 years of medication that changes the activity of neurotransmitters in my brain, causing my nerve cells to calm down and not fire rapidly when otherwise I would be crippled by migraine, I've experienced some side effects. I have troubles concentrating, when I speak I can't find the words although they're on the tip of my tongue, together with the occasional memory problems that I didn't used to have before.

I couldn't believe I put my toothbrush in the dish rack the other day. This is not me, I don't remember, I didn't *experience* it. When the next day as a joke my toothbrush was placed in the dish rack again, although I had in fact put it in the cup where it belongs, I thought I was losing my mind. Maybe my memory of actually putting it back was of another day? Maybe I am not paying attention to these little things and they are not consolidated. I envisioned myself putting the toothbrush in the dish rack again.

I've tried exploring the plasticity of the brain and the meaning of (un)truthful memories also in an earlier project. *Man on a Beach, Posing* (2011) explored the iteration of memory and the rewriting of it. From a 1920s photo album the pictures were removed and hung on the wall, grouped. In the album I rewrote the narrative, letting the clues in the pictures lead me. The owner(s) and people featured in the album are not around anymore to recall the memories over and over and possibly adapt them. To let people experience the story once again, I decided to rewrite the story by very closely following what is seen in the photos, perhaps misinterpreting. The story intensifies towards the end, going from general descriptions to the building of multiple characters. The project thus experiments with family memories and the rewriting of these memories and if this affects the original. Does it matter that the memories are different now, as long as they remembered by someone? Memory and imagination formed an integrated whole in this project.

A project I'm currently working on is *In My Mind's Eye*. This thesis serves the purpose of documenting and supporting the assumptions I made during the realization of *In My Mind's Eye*.

1.1 PROJECT DESCRIPTION

In My Mind's Eye is a machine that allows the user to make associations that lie deep within them; these are personal for each user. The machine takes its mechanism from that of a slot machine, where the usual fruit images are replaced with scraped data. A script uses a simple English dictionary to scrape images from different sources, to establish a spectrum as broad as possible: my assumption is that this ensures free association. Your mind is free to make connections between concepts that may seem very far apart, you are not influenced by suggestions, rather the ideas present themselves as a result of you working through the material (Thurschwell 2001, p.24).

Until the user is satisfied and a final set is created, he changes the images in a set by spinning the wheels (it is possible to hold and unhold one or more wheels). Then he names the set and prints out the cards; they now become part of a personalized game of quartet.

Both the mechanism of the slot machine and the quartet have exactly what is needed to force association: they have a strict taxonomy and allow people to create a narrative with images. By putting new images into this format, automatically the user sees them in a taxonomy, on the same level, and he starts to look for links between them. There is no need to force yourself to see a link, the game structure helps you do this automatically. Once again, in accordance with Freud's theory of free association, when the wheels are spinning, images pass and accumulate in the user's mind and get assessed in a second moment. This opens up the creative unconscious and allows for a more free and personal association. The result gives us a peek into their inner self, into their mind and brain. After printing (multiple) sets of images, on a table next to the machine, visitors can communicate the generated associations by playing the quartet (/go fish) game, possibly mix their decks and interpret each other's sets. I'm still considering the possibilities and the ways in which these moments can be recorded and what the possible uses are of that information.

I will capture the narratives in an encyclopaedia, letting *The World Explained* by Erick Beltràn (2011) inspire me, where in my encyclopaedia each page will reflect a personal association, composed of the images and title chosen, and possibly also what happens at the table. Each section of the encyclopaedia represents a day's worth of data collected. The role of the encyclopaedia and how it will it be collated, displayed and distributed, is in a conceptual phase. It might turn out to be more significant to create an interactive database that functions as a visual dictionary where one can look up the different meanings given to the picture of a given item or word.

My aim for this project is therefore collecting different types of results, whether they will be based on personal experience, or the subjective interpretations of public events: associations through popular culture or current events for example.

2. PERCEPTION AND INTERPRETATION

This chapter will investigate human visual perception in relation to *In My Mind's Eye*. First I will explain how exactly *In My Mind's Eye* ensures the automatic sending of cues (keys to start a search in your brain, for retrieving a memory), by using and mimicking the natural mechanism of perception, the brain's tendency to see patterns and Freud's theory of free association. I will explain how these theories will help the user let associative memories surface; how the spinning of the wheels will help him - desperate to make sense of the images - by continuously probing his brain for answers that link the images together.

2.1 GESTALT

The Gestaltist psychology is a theory of the mind and brain, the theory looks at the entire shape of an item and sees it as a whole. It investigates the concept of seeing objects not as a collection of parts, but linking them together as meaningful structures, e.g. seeing the tires, the doors, the windshield as not only parts of a car, but first as a car (Palmer, Brooks and Nelson 2003, pp.311-312). Early 20th century theorist Kurt Koffka (1935, p.176) has been quoted many times saying: "It has been said: The whole is more than the sum of its parts. It is more correct to say that the whole is something else than the sum of its parts, because summing up is a meaningless procedure, whereas the whole-part relationship is meaningful." We as human beings, have the ability to see and make sense of objects in a unique way. We can look "beyond the information given" (Bruner cited in Reisberg 2010, p.61), and perceive the visual world "organized in ways that the stimulus input is not" (Reisberg 2010, p.61).

> *"Gestaltist psychologists were the first to recognize the ubiquity and centrality of this ''grouping'' problem to perception. Max Wertheimer took a giant step forward in his ground-breaking 1923 article by determining some of the stimulus factors that govern this phenomenon, which are the famous ''laws'' (or, more accurately, ''principles'' or ''factors'') of grouping."* (Palmer, Brooks and Nelson 2003, p.312)

A few laws that I would like to point out are the proximity principle, similarity principle, common region, common fate, familiarity and lastly: past experience.

The law of proximity concludes that we will see objects close to each other as aggregated into a group. This is not only true for real life objects (a car, a pile of assorted dirty laundry), but is also often used in logo design. Grouping of the sponsors' logos from that of the organizers' happens by inserting white space separation, which immediately creates two formations.

In *In My Mind's Eye* a grid of four by three square images is displayed, although the second row is where the final set has to be created. The images are separated by the same amount of white space on all sides, so they form one group; a graphic revision has to be made. The law of similarity states that objects are grouped together if they are visually similar to one another. These similarities can be a number of things: shape, colour, orientation, size, lightness. A real life example can be a group of different breeds of dogs or folded shirts. By applying this law to the graphical interface of the machine, automatically the second row is seen as a group. The images in the top and bottom row are lighter of colour and are seen as a group of less importance.

More emphasis is added to the second row by adding a background colour: the images are more connected to each other as they are now bordered, separated even more from the remaining ones. In the early nineties it has been proposed that the law of common region also plays a role in this case: visually connected images are perceived as being more related to one another than images that have no connection. (Palmer, Brooks and Nelson 2003, pp.312-313).

Of course, the images move position when pressing the spin button. For instance, in the case of column one and three being on hold, the eye focuses on the remaining columns as they spin; the images that are now passing in front of our eyes, seem to belong to the column that is currently spinning, rather than to a row. Also, this gives the illusion that the moving images are in fact placed on a moving strip, instead of individual objects that happen to move in the same direction.

As soon as the moving stops, this law of common fate is overridden again by the law of common region and we focus on the main row in the center. Cyberneticist Valentin F. Turchin points out that our eyeballs do not remain entirely still

when we look at objects. The eyes make small uncontrolled movements. Before an image is perceived in its totality, the parts are seen; the eyes move over the image, constructing the full image on the retina (Turchin 1977, p.40). This means that, while the wheels are spinning and the images are moving, the eye perceives parts of the image. The user is actually able to see all of the images passing by, even though they appear and disappear quite fast. He is able to interpret them.

The law of familiarity plays an important role in perceiving structures that appear familiar or meaningful as a group. When focusing on the set to be created, the group can force other images to take on a different meaning, that correlates to the rest of the images. Likewise, the past experience principle lets us see elements or events in the images itself that might not even be there. A silhouette of a rooftop could become a mountaintop, a close-up of the triangular spikes of a saw could be misinterpreted as a basic drawing of a christmas tree.

2.2 APOPHENIA

How is it that the mind has this need for finding patterns? Why do we automatically associate? And in particular: why do we associate meaningless things and make them meaningful? Michael Shermer calls this phenomenon "patternicity". He declares the human brain to be "belief engines": "Evolved pattern-recognition machines that connect the dots" and create meaning out of meaningless noise (Shermer, 2008). The original term for this occurrence is apophenia. A subcategory of apophenia is pareidolia, which focuses on patterns in image or sound. Several well-known examples of this are seeing animals in clouds, the face of Jesus on toast or tortillas, or seeing a smiley face in the headlights and bumper of a car. Hoopes (2011) writes in Psychology Today that every living thing on earth is able to recognize patterns, from plants to bees, even one-celled microorganisms. These patterns can be simple survival mechanisms: what can I eat, what should I avoid, with what can I reproduce?

> *"Computers can be trained to do it. Pattern recognition is what a computer does the moment you login with a userid. Higher tech versions include digitally processed recognition of speech, faces, and even such individual and intimate traits as patterns in irises and fingerprints. However, apophenia is not just recognizing patterns. It's interpreting patterns in meaningless data as if it were meaningful."* (Hoopes, 2011.)

We, humans, are the only animals able to attach a symbolic meaning to nonsensical patterns, sometimes loaded with emotion, sometimes different for every being. Furthermore, cultural anthropologist Leslie White has proposed that "the tendency to create symbols is actually what makes us human" (Hoopes, 2011). She states that symbolic behaviour is human behaviour and vice versa (White, 1940 cited in Sebeok, 2001, p.56). Humans are the only ones that can give a physical object a metaphorical meaning: a door can become a symbol of opportunity, separating you from the rest of your career; while for a cat, it will always remain a physical obstacle, separating two rooms.

2.3 FREUD AND FREE ASSOCIATION

I consider parts of Freud's theories to be very useful, to the extent that I've taken the method of free association as an inspiration for *In My Mind's Eye*. Freud's technique of free association lets us perceive complex mental functions that simple introspection will not reveal.

In *The Interpretation of Dreams* by Sigmund Freud (2010), poet-philosopher Friedrich Schiller gives an example showing how the creative mind is blocked when dismissing ideas immediately as they enter the gateway of imagination, under the examination of reason. However, when we leave them to hover and accumulate for a little bit, so that we can assess them all together and see them "in a certain collocation with other ideas" - ideas that at first seemed absurd in isolation as well - we can unblock the creative process (Freud 2010, p.127-128). Consequently, in *In My Mind's Eye*, I've tried to replicate this concept. Similarly to the process of free association, when the wheels are spinning, images pass and accumulate in the user's mind and get assessed in a second moment. This opens up the creative unconscious and allows for a more free and personal association.

2.4 INTERPRETATION OF A SET

When the user presses the spin button in *In My Mind's Eye*, images pass by on the screen, but he is not fixed on one image at a time. In fact, because his eyes make involuntary movements, he can observe everything that is happening and let it influence the set he will create. The images will automatically prompt retrieval cues, but not only because an individual image might trigger something; the fact that the machine makes use of several laws of the gestaltist theory, makes the user see the set as a whole, in a taxonomical way. In my project, I'm using randomness "not simply as the lack of pattern but as the creative ground from which pattern can emerge" (Hayles 1999, p. 286). The user will start to recall information about the subjects he sees, associating them, which prompts even more and different associations. He will try to make them fit in the narrative, even if it means he misinterprets the image objectively. What is actually a snowy street, I might might see as a frozen lake, because of the other pictures I have already gathered. Similarly it happened that somebody saw the earth in a picture of what actually was a picture of the moon. It is exactly this power of subjectivity that fascinates me. The set that is then created becomes a cryptic description of a private thought, remembered in a subjective way. It says something about this memory, much more than if it were just an objective description of facts and details.

3. HOW MEMORIES ARE BUILT

From my computer, from my desk, from my office in my home in Rotterdam, I am writing this to you. I hear the ticking of my keyboard, but I'm not particularly distracted by anything. Reading through some texts I came across a paragraph about a scientific experiment, which made me remember something trivial that happened in high school, which made me think about a girl who usually sat next to me in the classroom I had just though about. This girl used to be friends with me and my best friend. After high school I hardly ever saw my best friend again and I often wonder if she is really doing as okay as she makes it look. Just like that, in less time than it takes to explain it, I am living in a whole different world from the one I was in before.

Now that we've looked at the reasons for making associations, let's have a look at what actually happens in our brain. How is it that we can just prompt a 10 year old memory by reading a text, or for that matter: by looking at something as ordinary as a flower in a vase?

Contextualization of what goes on in our mind cannot be done without navigating through the framework of our brain. To understand the significance of human computation when we talk about perceiving images, and the differences between a human mind and the logic a computer uses to perceive, compare or for instance associate images, it is important that we look into how memories are developed over time and how recalling memories actually works in our brain. The more associations you build, the more cues (keys to start a search) you will have for retrieval.

3.1 DEVELOPMENT OF MEMORIES

Over the past decades, many different models have been proposed to describe the workings of our memory systems and the relations between these mechanisms. I will refer to the "Atkinson–Shiffrin memory model", which is commonly accepted as the standard model. In short, there are three memory systems. We experience the world through our sensory memory. This is the brief lasting of a sensory 'image' in our sensory register. The image is held onto for 0.25 to 2 seconds at most, and is transferred into the short-term memory by at-

tention. In other words: when we take notice of something, we become aware of it.

The short-term memory is also very limited. The information stored in here lasts up to 30 seconds, unless actively repeated in order not to forget about it. The amount of information that can be contained in the short-term memory is said to be between 4 to 9 items, different models have varying theories on this. More information can be contained through a process called 'chunking'. Let's say you want to remember a telephone number, instead of remembering each of the digits individually, you chunk the number into rememberable chunks. 0103563527 Is a lot harder to remember than 010 356 3527.

During the period in which information is being held in the short-term memory, it can get copied (encoded) into the long-term memory. Whether this happens or not depends greatly on the repetition of the information in the short-term memory. Repetition increases the strength of this information being held in the short-term memory momentarily, or otherwise delays its loss. An example of the the latter case could be copying a passage from a book until it can be written down, carrying numbers in arithmetics. (Atkinson and Shiffrin 1971, pp.6-7).

Some encoding however happens naturally and does not require repetition to be remembered. Here we are talking about memories that may be consolidated in your long-term memory because of their high interest, because they are personal experiences, perhaps paired with strong emotions, or particular kinds of learning such as motor learning (improving motor skills, such as playing the piano, playing tennis, speaking).

When talking about the short-term and long-term memory, it is important to note that it "does not require the two stores necessarily be in different parts of the brain, or involve different physiological structures. It is possible, for example, to view [the short-term memory] simply as a temporary activation of some portion of [the long-term memory]" (Atkinson and Shiffrin 1971, p.4).

The connections in your brain that compose all of your memories, change continuously. The neural network receives signals the whole time you perceive or pay attention: when you learn. Connections between synapses (structures in the brain that allow neurons to exchange electrical or chemical

signals with each other) grow stronger with each experience and your brain actually rewires its physical structure. "The brain organizes and reorganizes itself in response to your experiences, forming memories triggered by the effects of outside input prompted by experience, education, or training." (Mohs, 2007) This lifelong ability of the brain to alter its state is called plasticity.

3.2 ACCESSING MEMORIES

The long-term memory is believed to be "a relatively permanent memory store, from which information is not lost" (Atkinson and Shiffrin 1971, p.4). But how exactly do we retrieve memories tucked away in there?

How memories are encoded in the first place, defines how you will retrieve them. Successively, the depth of the memories (how well you processed them) is crucial to how effectively they are retrieved. Forgetting is assumed to be "a resulting failure of the retrieval process" (Atkinson and Shiffrin 1971, p.18). The options we have for retrieving information are recall and recognition. "Recall is that aspect of memory process in which a setting, a background or association cluster, is present in clear consciousness, but a desired focal element is missing." (Hollingworth 1913, p. 533). Here we can think about trying to remember the protagonist's name of a book recently read. The recalling process might go something like this: Bill - William - Wilbur - Brian. The word exposes itself to me in bits and pieces, every word, every syllable helping to construct more of the original (Hollingworth 1913, p. 533). "Recall involves remembering a fact, event or object that is not currently physically present (in the sense of retrieving a representation, mental image or concept), and requires the direct uncovering of information from memory, e.g. remembering the name of a recognized person, fill-in the blank questions, etc." (Mastin, 2010).

In the example of Brian, whenever I recall a name, I then assess it in my mind to be right or wrong, which makes recall a two stage theory. Recognition however, involves just one stage and happens mostly unconscious. "Recognition is the association of an event or physical object with one previously experienced or encountered, and involves a process of comparison of information with memory, e.g. recognizing

a known face, true/false or multiple choice questions, etc." (Mastin, 2010). When we see a face we know, recognition ensures we experience a sense of familiarity. Then, we might recall his name from memory. Or first, through the same process of recollection we remember that we once saw him, on a party, at the post office, or perhaps some other specific details like what he wore in the previous encounter. Depending on the strength of the memory, the object or person may either be remembered (this would be a recollection judgement) or simply "known" (this would be a familiarity judgement).

In *In My Mind's Eye* the user also prompts autobiographical memories by automatic retrieval of past events. Even if the user is reminded of unimportant thoughts (perhaps something seen on television), the interpretation and personal take on this is a charm too significant to ignore, because of the ability of the brain to rewrite memories. I will elaborate on the plasticity of the brain further in the next chapter.

3.3 REPETITION AND ALTERATION OF MEMORY

"Why do some cognitive psychologists argue that human long-term memory stores not only knowledge in the form of propositions, but also as images? Because if we store appearances of objects then later we can compute those properties that could not be anticipated when we saw the objects initially." (Manovich 1993, p89-90). Along with the interpreted meaning, we also store the original image, so that later, with additional information added, we can process the image again and extract more meaning or a different meaning, see things we hadn't seen before. This might be partly how we change a memory.

When you perceive something through your sensory registers - it catches your attention and you therefore become aware of it - also parts of your long-term memory will be activated and be entered into your short-term memory. For example, when you look at a visual presentation of an object, its name and associated meanings will be activated (i.e. you recall them) from the long-term memory and placed into the short term-memory (Atkinson and Shiffrin, 1971, p.3a). Let's make it more concrete: when I look at my cat, also her name comes to mind, her nicknames, the fact that she is a cat (and not the plant I sometimes mistake for the cat when it is dark), I also wonder how her stitches on her belly are healing and if I should put more cream on that bald spot in her neck. Here I'm linking new material to existing memories. My memories and associations are updated in this sense; this doesn't always happen in a truthful way.

Nader, a neuroscientist at McGill University in Montreal (cited in Miller 2010) explains that so-called flashbulb memories (memories of where you were and what you were doing when something momentous happened) of a notable event like September 11 2001 might be especially unstable. "[W]e tend to replay them over and over in our minds and in conversation with others—with each repetition having the potential to alter them" (Miller 2010). This means we do not keep an accurate record of our history, our memory is tweaked by iteration and eternally pliable with every recollection, researchers call this process 'reconsolidation'. Research suggests that "filing an old memory away for long-term storage after it had been recalled was surprisingly similar to creating it the first time". Miller (2010) continues: "Scientists have long known that recording a memory requires adjusting the connections between neurons. Each memory tweaks some tiny subset of the neurons in the brain (the human brain has 100 billion neurons in all), changing the way they communicate." Briefly explained, Nader's work suggests that the act of remembering itself can modify the memory recalled.

Every second of the day we receive input from the outside world and we process it. We compare it to memory and make conscious and unconscious choices based on these evaluations. Not only do people make choices based on more than logic and reason, through the brain's pattern seeking habit they also make choices based on personal experiences. Our brain seems to make mistakes, every time you recall a memory it is subject to change. Personal memories (or experiences) that are not universally true, but just experiences, are not any less valuable because they are altered in the individual's mind. In fact, I would argue that it makes them even more valuable because it gives us a personal perspective on perhaps something trivial. From this we can deduct meaningful things, whether mundane or very insightful.

> *"Then again, editing might be another way to learn from experience. If fond memories of an early love weren't tempered by the knowledge of a disastrous*

breakup, or if recollections of difficult times weren't offset by knowledge that things worked out in the end, we might not reap the benefits of these hard-earned life lessons. Perhaps it's better if we can re-write our memories every time we recall them. Nader suggests that reconsolidation may be the brain's mechanism for recasting old memories in the light of everything that has happened since." (Miller 2010).

4. AN INTELLIGENT MACHINE

I have explained through several approaches how our brain is a pattern-seeking system. Next to the Gestalt laws of grouping, we build on past experience to bend our perception of objects when they first enter our memory system; we pass judgement on them, we cannot see them out of context. When recalling events, they convey meaning by the evoked related memories; the network gets rearranged, new associations form, memories are updated and rewritten. We do not bluntly respond to the world as we register it, we filter the world as it is by our nervous system's practice of referencing (Wilson and Unruh 2008, p.26). The construction of identity makes different people judge every moment differently and react individually to it.

In contrast to humans, a computer lacks self initiative and is the child of its master. It 'knows' just as much as the programmer has established. This poses a potential problem. If instead of a user, I were to use a computer script that has 'knowledge' of associating concepts, first it would have to be able to interpret the images correctly and then connect them. When is something defined as dog? Seeing as there are so many different breeds, which could be photographed in any angle, running, sitting, in the shadow or in the sun, even with or without humoristic clothing on. But what meaning lies in that? More pressing: who is the author of the database of associations? Who is the author of the algorithm of recognition? Again the program would be the child of the programmer. As it is now, there is no computer program that has the capability to deduce meaning from a set of images, or to group a meaningful collection. Even if a program this complex were to be built, the only meaning it could deduct would be the meaning that the creators of the program have inferred. Meaning is only imposed by a human, creating a context for the images by seeing, interpreting, misinterpreting.

If a computer script was to be built with the same characteristics of humans (or at least behaving exactly like a human), it would need to have all of the flaws of humans. Aside from wondering why anybody would need to create a flawed machine, if it can be perfect; the complexity of the creation of such a program lies in the understanding and reproduction of those "mistakes" that make us human. Mistakes such as the alteration of memories when recounting them,

or the imperfection of the retrieval system in remembering something precise. If a computer could achieve perfect recall, it would be unlike a human being; even if the computer was programmed to be flawed (thus to misinterpret) and an unexpected match was made, the computer would not be the one to give it meaning. The created set, as we observe it, would not be his choice and it would not be perceived as erroneous by the computer, and would thus bear no meaning.

Computer scripts prove not to be ideal as a player, however they are ideal as an interface for communicating with the player. The script doesn't have an agenda, no personal priorities. Its decisions itself are objective, based on the instructions given by the programmer. This allows for the presentation of a set that is unemotional, the script ignores all symbolic and associative meanings, a trait a human cannot simply turn on and off; it selects purely the elements requested.

Lev Manovich explains how "[t]he computer can be said to "understand" a scene if it can act on it -- move objects, assemble details, destroy targets" (Manovich 1993, p.143). This however does not mean the robot has an actual understanding of the world, parallel to the way humans do. It has an understanding of the scene but it can only draw predetermined conclusions from it. Destroy a target, unblur a picture, signal the operator an image match is found. As I've stated before, not the computer but the human operator, rules how the priorities will be dealt with. What makes us different is that we can contemplate our own actions. If such behaviours were to be built into an intelligent machine, it would still be the slave of its master, To be an intelligent machine and make self-initiated decisions, something 'simple' as language would have to be a didactic process. A learning algorithm and a pattern recognition model would have to be programmed into the machine, inspired by biological systems. This is why in the 1980s the field of Artificial Intelligence turned from reason and logic to the simulation of primitive organisms, having the functionality of insects. (Manovich 1993, p.82).

> *"The mind's interpretation of subjective experience is an essential ingredient for learning, but also for building community. Why? Experience shapes us and reshapes our networks. As Solms states, Modern neuroscience is becoming increasingly aware of the role played in brain development by experience, learning, and the quality of the facilitating environment—and not only during childhood. In short, the fine organization of the brain is literally sculpted by the environment in which it finds itself—far more so than any other organ in the body, and over much longer periods of time. The brain, therefore, is not like a computer, as it is not an isolated organ, connected, in various ways, with other organs as well as with an external world."* (Sexton 2008, pp.112-113).

Solms and Tornbull (2002) as cited in Sexton (2008, p.113) suggest that, unlike other organs, "the brain has a special, mysterious property that distinguishes it from all other organs. It is the seat of the mind, somehow producing our feeling of being ourselves in the world right now".

> *"Our self-concept, it seems, depends on our knowledge ... Our emotional adjustments to the world, ... rely on our memories. Or, to take much more ordinary cases, our ability to understand a story we've read, or a conversation, or, presumably, any of our experiences, depends on our supplementing that experience with some knowledge."* (Reisberg 2010, p.7)

5. CONCLUSION

In the previous chapters different theories have been investigated. The Gestalt laws of grouping, the brain's tendency to see patterns and symbolic meaning in meaningless patterns, combined with the notion of free association, allow a human being to perceive more than that is objectively presented: they make it possible for a person to access memories that are stored deep inside himself. Memories can be accessed through a process of recognition and recall, but depending on how well the information is encoded, we retrieve it entirely, partially or not at all. As we have seen in chapter 3.3, recalling a memory also alters it. This, together with an imperfect encoding and recalling process is what makes us incomparable to computers.

Would a computer be able to read tarot cards or play poker? These architectures are evidently not plainly based on rules or a pattern, but the interpretation of these patterns. As Hoopes (2011) puts it: "It's the constant, changing interpretations of patterns that makes human experience so fascinating. In fact, pattern recognition and interpretation is fundamental to human existence."

> *"Anthropologist Leslie White suggested that the tendency to create symbols is actually what makes us human. Religious symbols, intentional or not, are recognized in crosses, stars, or even lighted glories that appear around a spectacular sunset. [Symbols] evoke connections, sometimes pulling them from the ... deep recesses of unconscious memory ... It's what makes us feel nostalgia. However, when those connections are spurious and erroneous, that's apophenia."* (Hoopes, 2011)

Why and how we are sparked into finding these hidden clues to uncover a pattern that might not ever be there, is paramount to understanding why a robot could and would not do the same. We are autobiographical characters that rewrite our own mind, each one of us responding differently to every situation, depending on the factors or if we ourselves have changed. We only respond to ourselves, not to a maker. Unlike robots, we have the capability to have a free will.

In short, the subjective judgements projected onto the collections one makes while interacting with *In My Mind's Eye*, originate in the ability of humans to be constantly reshaped by their environment and experiences: the ability to give apparently meaningless patterns a novel meaning.

The created collections represent creative, atypical connections; metaphorical patterns that are unique to each user. The outcome of *In My Mind's Eye*, therefore, is not the mere collection, but the exploration of the mind of the collector, and the peculiar meanings that different people are able to convey to the same images. On a larger scale, considering all the images that are part of the collections, we become able to outline global patterns that unite or separate the users.

6. REFERENCES

Atkinson, R.C. and Shiffrin, R.M., 1971. *The Control Processes of Short-term Memory*. Stanford: Stanford University.

Beltrán, E., 2011. *The World Explained*. Riso printed booklets, vinyl stickers on wall. Exhibited at: Parkzaal, Tropenmuseum, Amsterdam, The Netherlands, 9 December 2011 - 15 April 2012.

Cardigans, The., 1998. *Erase/Rewind*. [song lyrics] Stockholm: Stockholm Songs.

Dissel, M., 2011. *Man on a Beach, Posing*. 1920s photo album, dymo tape, photo frames on wall. Exhibited at: 'No Such Thing as Repetition' in Roodkapje, Rotterdam, The Netherlands, July 2 2012 - July 15 2012.

Freud, S., 2010. *The Interpretation of Dreams: The Complete and Definitive Text*. Translated from German and edited by J. Strachey. New York: Basic Books.

Hayles, N.K., 1999. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press.

Hollingworth, H.L., 1913. Characteristic Differences between Recall and Recognition. *The American Journal of Psychology*, 24(4) pp. 532-544.

Hoopes J.W., 2011. 11-11-11, Apophenia, and the Meaning of Life: Is that what it looks like it is?, *Psychology Today*, [online] Available at: <http://www.psychologytoday.com/blog/reality-check/201111/11-11-11-apophenia-and-the-meaning-life> [Accessed 19 April 2012].

Koffka, K., 1935. *Principles of Gestalt Psychology*. New York: Harcourt, Brace and Company.

Manovich, L., 1993. *The Engineering of Vision from Constructivism to Computers*. Ph. D. University of Rochester.

Mastin, L., 2010. *The Human Memory: Memory Recall/Retrieval*. [online] Available at: <http://www.human-memory.net/processes_recall.html> [Accessed 22 April 2012].

Miller, G. 2010. How Our Brains Make Memories, *Smithsonian Magazine*, [online] Available at: <http://www.smithsonianmag.com/science-nature/How-Our-Brains-Make-Memories.html> [Accessed 15 May 2012].

Mohs, R.C., 2007. How Human Memory Works, *HowStuffWorks.com*, [online] Available : <http://science.howstuffworks.com/environmental/life/inside-the-mind/human-memory.htm> [Accessed 10 May 2012].

Palmer, S.E., Brooks, J.L. and Nelson, R., 2003. When Does Grouping Happen? *Elsevier Acta Psychologica*, 114, pp. 311–330.

Reisberg, D. 2010. *Cognition: Exploring the Science of the Mind*. 4th ed. New York: W. W. Norton & Company, Inc.

Sebeok, T.A., 2001. *Signs: An Introduction to Semiotics*. 2nd ed. Toronto: University of Toronto Press Incorporated.

Sexton, M.D., 2008. *Playing, Beyond the Fields of Trauma: An Interdisciplinary and Multi-Media Approach to Reading Thanatos and Eros in Psychoanalysis, Literature, Science and Technology*. Ph. D. Emory University.

Shermer, M., 2008. Patternicity: Finding Meaningful Patterns in Meaningless Noise: Why the brain believes something is real when it is not, *Scientific American Magazine*, [online] Available at: <http://www.scientificamerican.com/article.cfm?id=patternicity-finding-meaningful-patterns> [Accessed 19 April 2012].

Thurschwell, P., 2001. *Sigmund Freud*. reprint. London: Routledge.

Turchin, V.F., 1977. *The Phenomenon of Science: a cybernetic approach to human evolution*. Translated by B. Frentz. New York: Columbia University Press.

Wilson, E. and Unruh, W., 2008. *The Art of Memetics: The Magic of Applying Memetics, Marketing, Masterminding, & Cybernetic Theory*. Self-published.

7. ACKNOWLEDGEMENTS

Thank you:

Steve Rushton
Laura Macchini
Aymeric Mansoux