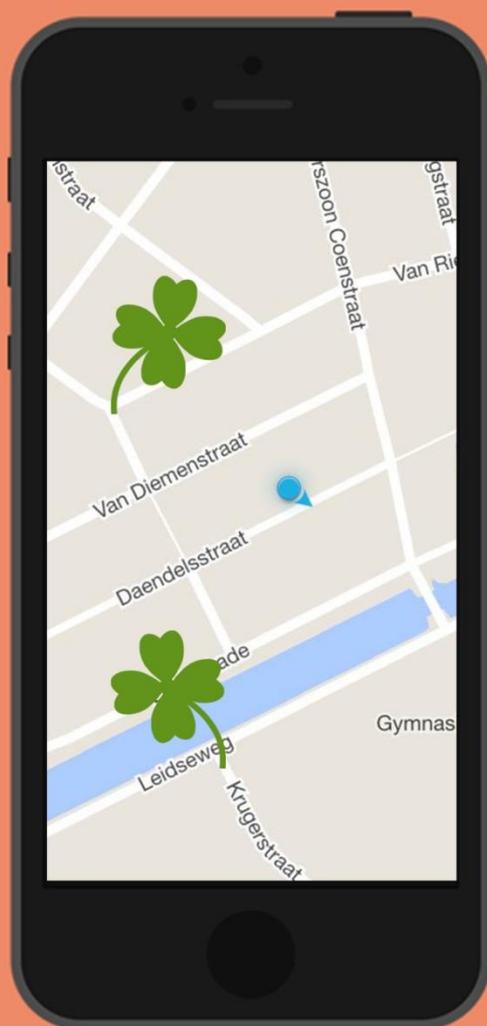


MOBILE MEDIATED LUCK



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CONSIDERING THE ROLE OF MOBILE MEDIATED SERENDIPITY
IN THE CONTEXT OF ALGORITHMIC PERSONALIZATION

INFORMATION

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ABSTRACT

This thesis critically assesses the politics of personalizing algorithms in respect to digital information retrieval. In this thesis the notion of serendipity is explored and investigated as an approach to contradict the boundaries that are subtly but forcefully applied by algorithmic ‘gatekeepers of information’. The concept that describes an unexpected and coincidental encounter with information containing personal relevance is considered difficult to mediate because of its natural properties of randomness and unexpectedness. Yet, in this thesis it is proposed that mobile media possess specific aspects that lend themselves for facilitating serendipity. Walter Benjamin’s concept of ‘the flâneur’ is explored to illustrate how mobile media facilitate a connection with the environment, consequently granting the user possibilities to explore his/her surroundings in a casual and undirected fashion. Next, the notion of serendipity and the related concept of ‘browsing’ are investigated to reconsider the notion of ‘pseudoserendipity’, which is connected to the intent to find a specific piece of relevant information, thus dismissing chance, as a workable concept for technological mediation. These concepts illustrate that the ability to connect with the physical environment, as well as the possibility to structure and visualize information in a comprehensible format, are considered key elements to reconsidering serendipitous discovery as a relevant approach to digital information retrieval. Yet, in spite of the promise of serendipity, in practice it seems a difficult endeavour to bypass algorithmic influence. A material object analysis of the location-based mobile application Highlight shows that, although technical affordances and design could theoretically enable a user to discover information in a serendipitous fashion, it is the intended or implied uses that designers stimulate through design choices which complicate this. These discoveries may only be achieved through acts of ‘counter’ or ‘critical’ user appropriation. This thesis therefore concludes that the mediation of serendipity can still be considered a relevant approach to the suggested issues of digital information retrieval. Through the development of mobile devices and functionalities, mediation of serendipitous discoveries seem to be, in part, accomplishable. Yet, because of the overwhelming presence of pervasive algorithms and their result-oriented connotation, mediation remains complicated. Therefore, it is suggested that the emphasis should not lie on the mediation of ‘true’ serendipity but on that of pseudoserendipity moving towards a ‘truer’ form of serendipity, precisely because of the dominating role algorithms already have in digital information retrieval.

KEYWORDS: SERENDIPITY – ALGORITHMS – PERSONALIZATION - MOBILE DEVICES - LOCATION-BASED APPLICATIONS - INFORMATION RETRIEVAL.

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CH.1 Introduction

In past years the mobile market has produced an abundance of location-based mobile applications [apps] that implicitly and explicitly promised to mediate serendipitous discoveries (Kim 2012; Lawler 2012; Rosenfeld 2014). Sonar, Roamz, Glancee and several other discontinued examples tried and failed to connect themselves to the romantic promise of serendipity; the promise of accidental discovery of relevant information without intentionally searching for it. However, to intentionally design the mediation of this random and unexpected experience can be considered paradoxical because of the ‘unplannable’ nature of serendipity. Instead, algorithms that are commonly supported by modern digital media gather user data to plan and deliver information that is accumulated from a sum of user data or algorithmically personalized relevance. Mobile media in particular are heavily subjected to different kinds of algorithms. For example, the mobile bookmarking application StumbleUpon translates generalized interests to bite-sized pieces of information, utilizing the notion of social discovery that suggests that if friends or peers like it, the individual will like it as well (StumbleUpon, Inc 2014). Even more personalized is Google’s ‘personal assistant’ Google Now (Google, Inc 2014). The app digs through the whole arsenal of personal sources like Gmail, news sites and user location to supply users with information they will supposedly find interesting or relevant without asking for it.

The keyword in this development of algorithms seems to be the *personalization* of information streams. This can be viewed as an efficient way to retrieve information of personal interest or relevance. However, where some information is presented as ‘more’ important/relevant/interesting, other information is inevitably left out. When the gatekeeper of what should be viewed as important information becomes an algorithm, this could potentially present a calculated and one-sided view of available information. Consequently, this could mean that certain opportunities to encounter information of personal relevance outside the frame set by algorithms are lost. A similar argument is made by internet activist Eli Pariser (2011a), who states that data-gathering algorithms and the consequential personalization shield and thus withhold users from information, ideas and opinions by constructing a *filter bubble*. These “algorithmic information gatekeepers” (Pariser 2011b), which are exclusive to digital media, could potentially foreshadow what professor in journalism Ted Gup calls “the end of serendipity” by giving their users ‘just what they need’ (1997 N.p.). Web-based services and applications affect and problematize the notion of serendipity by personalizing information for the users’ (or rather customers’) convenience. Nevertheless, serendipitous discoveries could be regarded as a potential opportunity for the user to be critical about the vast amount of algorithms that frame and personalize the relevance of information to an individual’s ideas and opinions.

On the other hand, in 2004 psychologist Barry Schwartz argued that we suffer from what is called “a paradox of choice”. This results in a state of being where too many choices can lead to paralysis (being overwhelmed by the vast amount of information) or anxiety of making the wrong choice (Schwartz 2004). It can be argued that digital media already provide their users with too much information to process, and thus personalization in some sense can be considered desirable. Yet, encountering information outside of what is deemed ‘relevant’ by algorithmic gatekeepers is still of importance (Pariser 2011b). Algorithmic personalization supports users to make sense of the overload of information, or reach something of relevance that is hard to find. Yet, people may be unknowingly shielded from information that might be personally relevant but is not seen as such by algorithmic information gatekeepers (Pariser 2011a p.4). Consequently, Pariser and Schwartz both formulate a position on digital information retrieval. Although Schwartz does not explicitly emphasize algorithms, his arguments are considered relevant to critically examine the politics of search engines and algorithms. These politics are already researched extensively in the fields of computer science/ethics and media studies (Introna & Nissenbaum 2006; Pariser 2011; Stalder & Mayer 2009). This thesis will be situated in this context by considering serendipitous discoveries in relation to software because of their potential to offer valuable insights located outside the boundaries that are subtly but forcefully applied by algorithms.

Algorithmic interference can be considered notably present within the context of mobile media/devices, meaning portable devices that have the possibility to maintain a constant connection to a network and that support multiple software applications actively or passively. These devices are considered to deliver a highly personalized experience of information (Bouneffouf et al., 2012; Liang 2012; Shin, Vaidya and Atluri, 2011), and can thus be thought of as central in the debate surrounding algorithmic politics. Mobile devices are portable and have the ability to continuously connect to a network, consequently connecting the individual’s location to traceable and personal user-data (Bouneffouf et al., 2012). As a consequence, personalization applies specifically to mobile devices because they are in fact on a person’s body and thus ‘in service of’ the individual user (Liang 2012 p.43). This potentially foreshadows an amplification of Pariser’s suggested issues concerning the filter bubble (2011). These issues can potentially create problematic consequences with respect to personal relevance of provided information and information retrieval/discovery in general. However, by means of connecting with location-based information, mobile devices also hold the potential to explore information that relates to the direct environment of the user in new ways. It is argued in this thesis that *serendipity*, or serendipitous discovery of information, can be considered a concept that could exist on this intersection of personalization and individual exploration.

Today, serendipity is often referred to as a ‘lucky encounter’ or ‘happy accident’ in different contexts, like science or daily life. Serendipity is one of the less researched concepts related to and

embedded in the realms of creativity, science and everyday life because of its 'unharnessable' nature of chance (De Rond 2005). Nevertheless, the concept of serendipity is a fluid one that has been described in many different variations, nuances and contexts. Words like "chance" (Van Andel 1994), "surprise" (Roberts 1989) and even "magic" (Ehrenfeld 2012) are used to characterize serendipity. Several studies from the fields of (computer) science, journalism and media studies have explored the concept of technology-mediated serendipity (e.g. Beale 2007; Leong et al. 2008; Liang 2012). It has already been highlighted that "designing for serendipity" can be considered an "oxymoron" (Maxwell et al. 2012 358). In other words, by seeing serendipity as a commodity or novelty to be exploited, the concept is stripped of its natural properties of unexpectedness and randomness.

In spite of this, it is argued in this thesis that precisely because of the mobility of mobile devices, serendipity *can* be considered applicable in modern media. Location-aware devices and services can mediate the act of 'leisurely exploring the environment' or being a "flâneur" by structuring information on a personal level (Benjamin 2006 [1986]). This grants the user the possibility to discover information in a semi-structured but random fashion, while maintaining his/her own role as a 'gatekeeper of relevance', as well as the option to actively engage with a discovery. Indeed, by actively involving the user in the process of the information discovery, mobile services can potentially take into account both the challenges of Pariser's filter bubble and Schwartz's paradox of choice. To search for relevance with a certain intention or calculation is considered as "pseudoserendipity" by scientist Robert Royston (1989). In this thesis however, pseudoserendipity is considered of particular relevance to the debate surrounding technology-mediated serendipity. As a consequence, this thesis aims to contribute new perspectives on both the mediation of serendipity and in particular its applicability in mobile media. Yet, the ability to make serendipitous encounters through mobile devices still depends on how the developers of an application intended the program to be used, as well as on how the user actually interacts with the software. As mentioned, many applications that are promoted to mediate the experience of serendipity are inscribed with a romantic promise of unexpected discovery of information that the user is in need of without even knowing it. However, due to the presumed paradoxical nature of mediated serendipity, it remains to be seen to what extent encounters in a natural and 'serendipitous' fashion can actually be mediated in practice by mobile media.

This issue will be explored through a case study of the mobile application Highlight (Math Camp, Inc 2014). This app uses the user's location to mediate personal encounters such as seeing friends, dating, casually browsing, networking and making new friends. The application has the ability to connect people that are in each other's direct environment and interest. It is an application that provides a combination of location-based and social features to get its user in touch with people in their vicinity who have installed the application as well. It is also associated with the romantic promise

of serendipitous discovery, which is described by its developers as a 'sixth sense about the world' that mediates connections which may be of personal interest and would otherwise never be discovered.¹ In summary, the aim of this thesis is to critically approach algorithmic personalization politics by exploring *to what extent location-based mobile services can allow its users the possibility to experience serendipitous discovery of information, consequently granting the ability to avoid algorithmic framing of relevance.*

Approach

To explore this question a literature exploration is a prerequisite to investigate two dominant and opposite borders of algorithmic politics: filtering, as well as structuring the intake of information through digital media. Respectively, these two aspects will be covered with the aid of the literature contributed by psychologist Barry Schwartz (2004) and internet activist Eli Pariser (2011), supported by various other scholars in the fields of algorithmic politics, mathematics and computer sciences (Bouneffouf et al., 2012; Liang 2012; Shin, Vaidya and Atluri, 2011; Stalder & Mayer 2009). In addition, the second chapter will illustrate further why mobile media are a context where questions of information retrieval are particularly relevant to explore. In the third chapter the mobility aspects of mobile media are explored. Through the works of media scholar Alex Gekker, who illustrates the connection between personalization of information through location, as well as philosopher Walter Benjamin's concept of 'the flâneur' (2006 [1983]), the power struggles that present in mobile media through mobility and location will be explored. The fourth chapter explores literature from various popular and scientific discourses surrounding the concept of 'serendipity', as well as the related concept of 'browsing' (Hildreth 1995), aiming to re-examine the meaning and applicability of serendipity in conjunction with digital media.

To further investigate the promise of serendipity, as well as the implications that algorithms included in digital (mobile) media have on the discovery of information, in the fifth chapter a case study will be conducted of the location-based mobile application Highlight (Math Camp, Inc 2014). To analyze concrete media objects as the primary object of study, this study will be conducted through a *material object analysis* perspective as suggested by Van den Bomen & Lehmann (2014 p.9). More specifically, the application will be approached through the concepts of *affordance*, *design* and *appropriation* as used by Schäfer, who used a similar perspective to analyze the participatory culture surrounding objects like the first Xbox (2011). By means of this approach answers will be sought to questions like: "what do [media objects] afford, what are the built-in assumptions about usage, how do they influence, create, change actions and interactions" (Van den Bomen & Lehmann 2014 p.10).

¹ <http://highlig.ht/about>

Observation, description and discourse analysis will be applied as practical methods to conduct a *formal analysis* on the affordances and design of both the device and the software (Bolter 2002; Hodder 2013). To analyze appropriation, experimental use that stretches the limits of Highlight's interface design will be described, thus diverging from its intended or implied use. It is acknowledged that appropriation plays an equally important role in analysing how users are capable of making serendipitous discoveries through mobile devices. However, in this thesis the emphasis is on the technological possibilities of mobile devices and software to mediate the experience of serendipity, rather than the ways users make the app their own. When researching appropriation, a rich result implies a considerable degree of interviews and phenomenological accounts. Therefore, the analysis on appropriation is conducted purely on the possibilities, rather than the actual way users appropriate Highlight. The methodological approach and methods will be discussed in further detail in the fifth chapter.

Finally, in the sixth and seventh chapters conclusions will be drawn on the applicability of serendipity in a mobile media context after which, drawing from the case study of Highlight, the promise of mediation of serendipity through mobile media will be reflected on.

CH.2 Algorithmic Politics

YouTube's recommended videos, Google's search results and Facebook's friend recommendations are all examples of algorithms that help users make sense of a vast amount of available information. Digital strategist Amy Webb (2013) describes how algorithms can be thought of as simple calculating machines that offer a solution to a problem based on the input data. These data are gathered by the same algorithms, from users that access the services that employ these 'machine learning constructs' (Keenoy & Levene 2005). Even more pervasive are the algorithms that users of mobile devices and services are subjected to. Mobile applications like the earlier mentioned social bookmarking application StumbleUpon (Toothman 2011) (a blatant plug towards the presumed coincidental nature of the discovery of information that SU supplies, as well as the fascination with this kind of information discovery) utilizes social discovery, which employs the principle that if friends and other people with a certain general interest likes 'it' the user will probably like it as well (Ibid.). Besides the application utilizes a simple mechanism through which the user can indicate if the given information is worth a 'thumbs-up' or 'down' (Ibid.). By way of these mechanisms the application is able to zoom in a bit more every time the user adds some information to its personal database of 'likes and dislikes'. As a result the app can bring its users a highly personalized stream of content that will be more and more relevant or 'spot-on' as time goes by. However, mobile devices and services employ algorithms that

can be considered even more pervasive and intrusive; they employ the physical geographical location of the user.

Through context-aware advertising and location-based recommendation engines, for example, personalization made possible by mobile devices can be considered more intrusive than ever (Ge et al. 2010; Liang 2012). Especially because mobile devices have the possibility to translate and quantify its user's geographic location to data, which can subsequently be utilized by third parties, they subject their users to algorithmic framing politics. These devices are also argued to be on the frontier of recommendation engines, a subclass of information filtering systems, because of their potential capabilities to dynamically adapt to situations (Bouneffouf et al. 2012; Ricci, Rokach & Shapira 2011). One example hereof is the context-aware recommender algorithm "Hybrid- ϵ -greedy" developed by machine-learning scientist Djallel Bouneffouf (2012). This system makes use of gps data and the users agenda to suggest him/her with suitable and relevant information depending on the situation he/she is in (2012 p.2). Other examples are collaborative filtering, which gathers preferences from a large amount of people to closely match this to an individual user and its supposed taste, and content based filtering, which does include earlier data-inputs (like product ratings) from the individual user (Ricci, Rokach & Shapira 2011).

These kinds of personalization politics have two sides; on the one hand it helps users to make sense of the information overload that web-based services offer, and on the other hand it also has the alarming potential to determine and suggest what is (or must be) considered relevant for/by the individual user. In this chapter the oscillation between 'making sense of an overload of information', and the subtle and hidden filtering of information will be examined. Algorithms will thus be approached as a neutral technology that are not inherently positive or negative in nature.

The Paradox of Choice

Schwartz and Ward state that one of the most pervasive contemporary dogmas is that of *choice* (2004). More choice translates into a feeling of freedom: "Choice is essential to *autonomy*, which is absolutely fundamental to wellbeing. Healthy people want and need to direct their own lives." (Ibid. p.86). According to Schwartz this dogma is deeply embedded in contemporary Western culture, and is closely associated with the many possibilities ranging from which retirement plan to choose to choosing 'who to be' (Ibid. p.88). However, unlimited choice does have a negative impact on the decision-making process. It becomes harder to make choices if people are exposed to a wide variety of options. People are constantly evaluating their choices which means they make a variety of comparisons assessing the current choice, like "what they hoped it would be, what they expected it would be or how other experiences measure up to the current one" (Ibid. p.96). According to Schwartz, there are two main consequences of this dogma that influence people in a negative way.

First, more choice paralyzes rather than liberates. This is due to the fact that every choice has positive and negative consequences that should all be taken into account. Secondly, many choices result in people being less happy with the choices they make because of the other options always lingering in the background (Schwartz 2004). Algorithms like recommendation engines tailor information specifically to the user. This means that algorithms in a sense support internet users in making sense of the abundance of information available to them by ‘arguing’ ahead that some pieces of information are, or can be considered, more relevant than others based on previous results. These “machine-learning constructs” frame the individual’s relevance to offer him/her more specific information that could be hard to find otherwise (Keenoy & Levene 2005). Therefore, algorithms arguably help individuals deal with the paradox of choice as proposed by Schwartz.

Algorithms can be seen as a very effective technology since they function *only* as they are designed. Especially within the fields of software studies, computer science and mathematics, algorithms and machine-learning are often researched (Bouneffouf et al., 2012; Keenoy & Levene 2005; Rogers 1987). Algorithms gather the user-generated data from an individual and specify, match or calculate a solution to the problem they are designed to solve. Furthermore, algorithms do not function without human interaction and are designed to enhance efficiency and usability of web services (Dunning 2013). Mathematician Hartley Rogers argues that, in essence, an algorithm is a list of mathematical ‘instructions’ that calculate a ‘function’, which in turn can be seen as a relation between a set of inputs that correspond with a set of outputs (Rogers 1987). In other words, an algorithm is a type roadmap, a set of rules which, when properly followed if they are applied to data, lead to a desired result which consequently makes them deterministic in nature (Rogers 1987). Algorithms, or “machine-learning constructs” create ‘packages’ on a personal level that can represent every parameter from romantic interests to movie taste (Keenoy & Levene 2005). The latter one is described in a case study written by senior editor Alexis Madrigal of literary-cultural magazine “The Atlantic” (2014). This analysis of the ‘on demand’ streaming platform Netflix shows how algorithms use gathered user data to form very specific personal subgenres like “Gritty Suspenseful Revenge Westerns” (Madrigal 2014). These personalized packages help people understand their own taste and offer them retrospection (Ibid.). In other words, they frame the individuals’ choices by offering them matter that has already been proven to be relevant. This can be considered a positive functionality if approached from the theory of *the paradox of choice* as addressed by Psychologists Barry Schwartz and Andrew Ward (2004).

Algorithms can be considered very effective in solving the problem they are designed to solve. As argued by Rogers (1987), algorithms are composed out of finite sets of instruction and can thus be seen as deterministic in nature. Taking this into account, algorithms that personalize and suggest information to users of the service it is included in, inevitably leave out information because it is

deemed irrelevant. Consequently, algorithms function in an editorial fashion, leaving out one thing and prescribing the next, without being able to anticipate on what is found relevant and only prescribing what should be relevant. It therefore seems there are certain questions of *control* in play. For example, can the criteria employed by algorithms be controlled by users of the services that contain them? Is it possible to know what parameters are included and excluded? How do algorithms and their designers know what is relevant for the individual today, but also tomorrow? The paradox of choice shows that filtering and personalizing information is desirable and maybe even needed. However, what consequences does omitting information have for knowledge, ideas and viewpoints?

The Filter Bubble

Similar questions of control prompted internet activist Eli Pariser (2011a) to investigate algorithms' alarming potential to be editorial, suggestive and personalized. He coins the concept of the *filter bubble* to describe how algorithms guess what kind of information the user wants to see based on past search behaviour (2011a p.8). As a result, the users will become disconnected from information that does not strife with their pre-formed preferences and are thus potentially disconnected from serendipitous discoveries:

Conventional information searching and filtering can lock users into predefined loops based on previous searches and user profiles, where new, seemingly unrelated data may pass us by.
(Pariser 2011a p.9)

Digital media are spawning 'algorithmic gatekeepers' that do not employ the ethics that human editors have. Algorithms thus curate the world for us by deciding what people 'want' to see. This is where one encounters an interesting crossroads. On the one hand, there is the ease of use, convenience and even the need to filter information. Users arguably *need* gatekeepers to make sense of it all, and encounter more in the line of what has already been proven to be relevant. It also enhances user experience because it offers information that was hard to locate at first. On the other hand, people are 'targeted' as consumers. Algorithms become more sophisticated to subtly direct information at the individual on a personal level. Furthermore, as digital culture and network theory scholars Stalder and Mayer argue: "[personalizing algorithms] lock the users into a path-dependency that cannot adequately reflect their personal life story, but reinforces those aspects that the search engines are capable of capturing, interpreted through assumptions built into the personalizing algorithms" (2009 n.p.). They also state that, although there are ways around these algorithms, these precautions are rendered "burdensome" because of the lack of direct negative consequences personalization has" (Ibid. n.p.).

Pariser argues that as this personalization will inevitably develop, these gatekeepers should look further than what is *deemed* relevant. People should also be enriched with information that “is uncomfortable, important or displays other points of view” (Pariser 2011a p.91). There are of course still many different sources that display an opposite point of view, or difficult but important matters. However, Pariser argues that web-based services are getting increasingly personalized and suggestive. This arguably poses a threat on serendipitous experiences and discoveries by denying information outside of a person’s frame of relevance. This frame of relevance, then, is not controlled by the individual himself/herself, but is determined by the editorial nature of filtering algorithms. Taking this argument of Pariser into account, it can be argued that this sort of relevance is ‘made-up’ of the sum of a person’s data, thus becoming something that can be measured. It is a relevance that has been defined *a priori* and does not leave much room for considering new, ‘out-of-the-box’ information. Indeed, in this sense algorithms are *defining* relevance more than providing things that already *are* of relevance. Finally, an algorithm is inherently untransparent (Stalder & Mayer 2009 n.p.). A person does not know what his or her bubble looks like, but more importantly, he or she does not know which information is being filtered out (Pariser 2011a p.22).

Stalder and Mayer define the products of multinational Google as a prime example of filtering and personalizing (Stalder & Mayer 2009 p.99). Thinking of Google as a mere search engine would be naive. For example, it comprises productivity software like Gmail and Google drive, social networking by way of Google+ and desktop and mobile web mapping software through Google maps. In addition, there is a long list of other acquisitions and mergers of companies that are now part of the monolith. The Google search engine personalizes information for the user by setting up a “knowledge profile” to “accumulate the expansive knowledge about its users that has made it so powerful and attractive to advertising partners” (Stalder & Mayer 2009 p.103). Just like Pariser (2011a), Stalder and Mayer (2009) argue that personalization can shape a person’s look on the world by presenting him/her “with a view shaped by criteria not his or her own” (Ibid. p.113). This ‘shaped’ look on the world, be it information, situations or viewpoints, inherently challenge serendipitous discovery of personal relevance. In the context of Google, media scholar Geert Lovink (2009) uses the term “Googlization” to critically explore how Google’s services play an editorial role in traditional industries:

. . . For the French, Balzac's collected works are the epiphany of French language and culture, for Google they are abstract data junk, a raw resource whose sole purpose it is to make profit (Lovink 2009 n.p.).

By referring to what happens if third parties intrude into the search for information, this quote accurately illustrates some of the consequences that algorithmic interference carries. Taking it a step

further it can be argued that the editorial nature of data-gathering algorithms cannot give an accurate approximation of what is relevant, as they only learn from specific sets of data they are designed to gather, like search behaviour (Keenoy & Levene 2005). How third parties threat information is, next to the influence algorithms can have on a personal level, an important aspect to consider. A main interest of businesses can be summarized as 'making profit'. It thus is already argued that the implementation of algorithms will become (or is already) a very obvious development (Pariser 2011, Lovink 2009). It can be considered advantageous for companies and businesses to target their customers on a more personal level, diminishing the paradox of choice, but magnifying the filter bubble issues. Algorithms can only deliver what is *deemed* relevant based on this narrow frame of gathered data. As a consequence, they thus provide people with what *should be* considered relevant, rather than giving what the individual considers to *be* relevant.

Thinking Further About Information Discovery

Through the challenges set forth by Schwartz's theory, he can be considered an advocate for the interference of algorithms. Algorithmic personalization of content organizes, manages and supports the predetermination of a certain hierarchy of personally relevant information, thus corresponding and dealing with Schwartz's thoughts on the abundance of choice people are subjected to. Yet, Pariser partly refutes this argument by claiming that algorithmic interference also displays the alteration of what is found to be important on a personal level, as well as individual dispositions, as an inherent consequence. Algorithmic personalization helps users deal with an overload of information, or reach otherwise hard to find information that is of personal relevance. However, users may be unconsciously shielded from information that could certainly be relevant, just not according to these algorithmic information gatekeepers. These two positions on algorithmic politics can be seen as an oscillation because of their simultaneous applicability from a user's perspective. It is undeniable that algorithmic interference is influencing the way people receive information. Pariser (2011) deconstructs the almost 'Kafkaesque' ways algorithms can be applied, thus presenting a warning about possible consequences for the way people interact with information. For this reason it can be seen as valuable to investigate new ways to encounter and interact with information, with a more 'user-controlled' relationship towards algorithms. Lovink (2008) also stresses the importance of investigating new and creative ways to relate to information that is mediated by digital media:

I argue that we need to invent new ways to interact with information, new ways to represent it, and new ways to make sense of it. Stop searching. Start questioning. Rather than trying to

defend ourselves against "information glut", we can approach this situation creatively as the opportunity to invent new forms appropriate for our information-rich world

(Lovink 2008 N.p.).

Understanding of information and the change in perceived relevance through *filtering* can be considered two sides of the same coin. These two aspects seem to be especially present in mobile devices and their services. As argued, users of mobile devices and services are likely to be subjected to personalization and intrusive ways of recommendation algorithms because of the potential these devices have for dynamic context-awareness (Bouneffouf et al., 2012). This potentially foreshadows an amplification of Pariser's suggested issues concerning the filter bubble (2011). These issues can potentially create problematic consequences in respect to personal relevance, the critical judgement of given information and information retrieval/discovery in general. On the other hand, it can be argued that mobile services help users understand certain situations better and make situations comprehensible, intermediating information that would otherwise go unseen. In the next chapter, location, mobility and the involved power struggles will be explored to discover how mobile media relate to, and enable forms of information discovery, exploration and retrieval.

Ch.3 The Mobility of the Medium

Mobile media are defined by their core feature or affordance: being mobile. Moreover, most mobile media have the possibility to continually maintain a network connection enabling them to be a constant receiver but also a continuous transmitter. On the one hand this means that users have access to a goldmine of situational and contextual information. On the other hand it also means that pervasive data gathering algorithms have another parameter to gather, interpret and translate into presumably important information: user-location. Media and performance studies PhD Alex Gekker (2014) provides Google Maps as an example of how location, among other sources of user-data, can influence information flows and user-behaviour:

Google Maps (GM) 'sees' me in a different way when it 'knows' who I am and what it doesn't. Needless to say that as my Gmail is constantly opened on other tab [sic], the chances that I will use GM without being logged-in are miniscule. Google's business model is built on delivering exceptional and free user experience, in return for providing traceable data, and they do it well (Gekker 2014)

Gekker continues to stress the importance of Google subjecting its users to a business model like this. The profound influence it can have on user behaviour, in combination with the “seemingly objective place-holders for spatial knowledge” can be considered problematic by being subtly but forcefully applying boundaries on information streams (Gekker 2014 n.p.). Although Gekker illustrates this example using his laptop, it can be argued that traceable data is even more relevant in the context of mobile devices. In the case of mobile media, the way information is presented through location has the potential to be real time. As mentioned, mobile devices are thought of as (potentially) highly personalized and pervasive. Developments in technologies, such as the global positioning system (GPS) and radio frequency identification (RFID), have worked to catalyze and personalize mobile services (Shin, Vaidya and Atluri, 2011). For example, Google Now (Google, Inc 2014), Google’s personal assistant application, ‘learns’ from location to estimate if the user needs certain information before he or she actually asks for it or knows it is relevant to his or her own context. A simple example is memorizing the user’s daily commute to possibly warn him or her about traffic jams and recommend an alternative route. In this fashion, a mobile device can make note of events in the user’s physical surroundings and mediate this information (Schiller and Voisard 2004), or, in the case of Google Now, mediate information that relates to a user’s location. In a very pervasive and calculating manner Google Now prescribes certain information that is supposedly ‘better’ than something else which, for example, could bring about behavioural change in the search for information and consequent actions.

Geographical data in particular brings about specific power struggles between businesses who try to influence information, and ‘customers’ or users who try to discover relevant information for themselves. The subtle integration of filtering algorithms ensures that information based on location is predominantly personalized to fit the users’ needs. In view of the previous chapter, this cannot simply be labelled as either a ‘good’ or a ‘bad’ development. There seems to be, however, a constant tension between the notions of information *discovery* and the *intention* to find specific information. The latter concept will be further explored in the next chapter. In view of the way Google influences its users with personalized or rather ‘targeted’ information, filter bubbles as described by Pariser are a very prominent concept in mobile media. Yet, *location* can also be viewed as a usable concept to break free from these algorithmic boundaries, at least in part or in particular situations. Philosopher Walter Benjamin’s (2006 [1983]) perspective of the flâneur as a ‘casual stroller through a public space’ explores and inspects urban space without searching for anything in particular can serve as a concept to grasp the mediation of information exploration based on a person’s location.

Flânerie, Mobility & Information Discovery

Walking down the street, discovering the things that are inside the space around you. In an anthropological context this is called *flânerie*. The concept coined by poet Charles Baudelaire but expanded upon by literary critic and philosopher Walter Benjamin describes a man strolling, observing, discovering and experiencing without haste (2006 [1983]). It is mainly linked to the city as a place to casually and unforcefully discover. Historian and philosopher Michel de Certeau describes the flâneur as follows: “they are walkers, *Wandersmanner*, whose bodies follow the thicks and thins of an urban “text” they write without being able to read it” (De Certeau & Giard 1998 [1984] p.93). De Certeau suggests that the faster one moves, the narrower his/her perspective is. Wandering and observing provides possibilities to make new discoveries and see new perspectives. It can be argued that mobile devices, which are portable as well as connected with a network and make use of the geographic location of the user, make it so that the city can be experienced in a different manner. Users now “write”, for example by sharing their location, but also “read” the urban space by being able to access certain types of information, for instance traffic or places acquaintances previously recommended, in an easy and comprehensible manner. Location-based media applications do precisely this. They allow for users to ‘write’ on, and ‘read’ from their direct (or indirect) environment thus partially experiencing it in a mediated manner, while at the same time diminishing the need to stroll or even observe. Exploring (urban) space in this sense holds a particular randomness which is mostly omitted within digital media to amplify efficiency and usability. Through a casual exploration of space (certainly exploration is not bound to an urban context in particular) geographical location as well as its present ‘inhabitants’ shift, thus creating the potential to discover or encounter something or someone that a user would not necessarily notice without the service. It can thus be argued that the *connection to the environment* that devices include and location-based applications make use of, can be considered an important feature of mobile devices to allow for unfiltered exploration and discovery of information.

Digital media often employ mechanisms that *enhance* usability which means that mechanisms of randomness are mostly omitted. However a mobile device can, simply by its user acting as a flâneur that explores space without searching for a particular piece of information, mediate or translate information that was not specifically searched for. The mobile music discovery application Shazam can serve as an example of how a mobile medium can be a mediator between the user and the randomness of its physical environment (Shazam Entertainment Limited 2014). This application identifies music that is playing in the surroundings of the user. In a matter of seconds it records a snippet of the music and provides the user with the name of the song, lyrics and additional information like albums, planned performances and so on. Shazam (which has a nearly infinite library

of songs) can thus serve as a tool to bypass the boundaries set by algorithmic interference, and instead serves as a tool to mediate the exploration of space and discovery of information.

This chapter illustrates the tension that mobile media hold concerning the discovery of information, emphasizing this particular perspective of mobility in contrast to the potential for more pervasive personalization. On the one hand, mobility provides various new ways to receive tailored and personalized information which is considered relevant according to the sum of user-data gathered and translated by algorithms. On the other hand geographical location can also serve as a factor that enables the user to bypass the same algorithmic boundaries users are often subjected to. A concept that could exist on this intersection is *serendipity*, or a serendipitous way to discover information. It is a notion that relates closely to discovery, however, is considered hard to mediate because of its fluid and unexpected nature. In the next chapter it is explored how serendipity lends itself, to an extent, to be mediated especially through mobile media. Within this thesis serendipity is operated as a specific approach to algorithmic politics in relation to information retrieval and discovery.

Ch.4 Defining Serendipity

In the previous chapter the problem of algorithmic personalization is framed as a development that is both desirable *and* problematic. Users are getting ‘just what they need’ based on what information algorithms gather from their own use of media. While this enhances usability and efficiency, this also makes unexpected and random information outside an individual’s filter bubble harder to encounter. It can however be argued that because of the filtering and shielding practices of algorithms, opportunities for serendipitous encounters can still be considered desirable in software, if only to contradict the personalization and algorithmic framing of relevance.

The term ‘serendipity’ was introduced by writer Horace Walpole after he read the fairy tale of “The Three Princes of Serendip” in the late 18th century (Liang 2012 p.42). The three princesses were, as he described, “always making discoveries, by accident and sagacity, of things they were not in quest of” (Liang 2012 p.42). Consultant of the Oxford English Dictionary Richard Boyle provides well-known practical examples:

History supports the more nuanced meaning through significant examples of accidental and sagacious discovery. There is Columbus’s discovery of America, Alexander Fleming’s discovery of penicillin and Alfred Nobel’s discovery of dynamite

(Boyle 2009 n.p.)

A thorough overview of how serendipity is represented in relation to bordering concepts is provided by information sciences scholar Nelleke Aders (2011 p.19-20), however, it is clear that the definition of serendipity changes from context to context. Many of the contemporary descriptions in popular culture focus heavily on the encounter 'being lucky' and 'being unexpected' (Ehrenfeld 2012; Perez 2012). In Walpole's original definition, however, serendipity is composed of two phases: discovery and understanding. In other words, it is not an experience that simply *happens* to an individual. He or she still needs to connect the dots to determine if the information is useful and therefore relevant. These two phases are arguably integrally connected to one another. This is noteworthy because it stresses the complexity of the concept. Perhaps the most accessible and comprehensive definition comes from Pek van Anandel who holds a PhD on the subject of serendipity in different contexts. He defines serendipity as "the art of making an unsought finding" (1994 p.631). Scientist Royston Roberts (1989) states that serendipity represents the faculty of making fortunate and unexpected discoveries by accident. Roberts describes serendipitous discovery as something that "requires a degree of genius, but also some lucky element for that genius to act on" (1989 p. 68). Both these authors describe serendipity as an experience that is not passive, but demands a certain engagement with the encounter. Although both Roberts, as well as Van Anandel argue from a scientific perspective, which can potentially be perceived as a biased understanding of serendipity, it must be noted that scientific descriptions of the notion remain closest to the original definition as proposed by Walpole. Accounts set in, for example, daily life and technology tend to focus on 'accident' or 'sagacity' (coming from the Latin word 'sagax' or 'wise', means having or showing keen mental discernment and good judgment.²) instead of both in an equal fashion. For this reason, this thesis draws heavily from scientific accounts of serendipity to develop a theoretical framework.

Further exploring the concept, cognitive, mobility and network researchers Sun et al. (2013) describe what are, according to them, the two core principles of serendipity. First, they argue that "unexpectedness" lies at the core of serendipity, which is a surprising discovery in nature (Ibid. p.3). Secondly, the discovery has to contain a certain "usefulness", which implies that "an unexpected discovery is classified as serendipitous only if it is considered to be pleasant, interesting, or useful" (Sun et al. 2013 3). Yet, they disregard the sagacity that is needed to experience serendipity and thus describe it as a solely passive experience. Van Anandel (1992) stresses that discoveries, especially unexpected discoveries, are never really made by chance. In fact a key role is reserved for intellectual preparation and the intensity of observation and investigation (Ibid.). Van Anandel writes from a scientific perspective. However, encountering something in an unexpected fashion, as well as being intellectually prepared are two parts of serendipitous discovery that can be considered integral to all

² <http://www.merriam-webster.com/dictionary/sagacity> - last accessed on 02 07 — 2014

different contexts. There must always be a certain 'build-up' or preparation of the human mind to act on the lucky encounter because it is seen as relevant (Ibid. p.634). It can thus be argued that serendipity is a more complex experience than one that is solely passive. A comprehensive definition of the concept must therefore include this 'aha' or 'eureka' experience as an integral part of serendipitous discoveries.

Van Andel describes three 'forms' serendipity: "positive, negative and pseudoserendipity" (Van Andel 1994 p.639). The first form he describes as "a surprising fact or relation followed by a correct abduction" (Ibid. p.639). Abduction in this contexts means "the first starting of a hypothesis and the entertaining of it, whether as a simple interrogation or with any degree of confidence" (Ibid. p.636). In other words, a serendipitous discovery needs a certain reflective or investigative response. The second form, negative serendipity, does simply imply that the surprising fact or relation is encountered, but is not acted or reflected upon by the individual. Pseudoserendipity lastly, as already described by Roberts (1989), implies a certain calculation and intention. This intention is fuelled by an already predetermined idea of what the individual is searching for, encountering it in a surprising or accidental manner. Ultimately, this exposition of serendipity describes that a certain reflection or investigation of the discovered information is needed to explain its relevance. To investigate the relevance of encountered information, the individual must examine previously encountered problems, wishes or questions. Consequently, it can be argued that there is always a certain *intention* in the exploration of information even without it having a clear emphasis on particular knowledge. Although Robert's definition of pseudoserendipity is defined by a calculated intent to discover a specific piece of information and finding it in a surprising or accidental fashion (1989), intention born out of prior or preceding events can be considered more general and implicit to the individual who does not have a clear goal, need or even motivation to discover a specific piece of information.

Serendipitous discoveries can still be considered an unintended experience that cannot be planned or fabricated. Information discovered in a serendipitous fashion can therefore be labelled as *unexpected*. *Usefulness* or a positive outcome is also an appropriate label because if a serendipitous experience was not experienced as fortunate, it should be marked as "zemblanity" as a consequence of the opposite nature of this term (Boyle 2009 n.p.). The antonym of serendipity suggested by novelist William Boyd describes "the faculty of making unhappy, unlucky and expected discoveries by design" (Ibid.). Sun et al. also argue that serendipity by design or calculation does not exist, thus calling it "unserendipitous" (Sun et al. 2013 p.2). Yet, as shown in the previous paragraphs serendipity is not entirely based on chance or luck, but also a mental preparation or a mental 'search', synthesis into insight or an implicit *intention*. This implicit intention can be reflected by the action of 'browsing' through different types of information, a concept that is often brought in relation with serendipity (Hildreth 1995).

A Related Concept: Browsing

The concept of serendipity corresponds particularly well with Benjamin's idea of the flâneur (Benjamin 2006 [1983]). The flâneur's exploration of (urban) space in an unforced and casual fashion shows similarities with the unforced and random nature of serendipity. The act of flânerie essentially focuses on the discovery of *any* interesting information, rather than something specific. By means of this exploration the person in question has the ability to engage with a discovery or to move on to other things without this discovery being blemished by calculation or personal intent to find specific information. It is with the introduction of a medium that the boundaries of flânerie blur. In conjunction with a medium like a mobile device the casual exploration of space has the potential to become biased towards particular information, while otherwise noteworthy information is left out. While mediated, the user's act of flânerie becomes dependant on the bias of software and the potential (un)specificity it offers by indicating environmental information. A helpful and related concept that is also close to the notion of serendipity is 'browsing' (Hildreth 1995). The concept represents a wide range of informal and unplanned information behaviour (Rice, McCreadie et al. 2001). Economist Clifford Hildreth considers it to be "a family of information seeking activities" (1995). Browsing covers the whole spectrum from idly scanning information to a targeted search. Because of this, browsing can be considered a useful concept to approach the serendipitous retrieval of information.

Hildreth argues for three broad categories of browsing behaviour, namely: unfocused, semi-directed and specific browsing (1995 p.4). The first category involves a great factor of randomness and can therefore also be called *serendipitous browsing*. The second category corresponds to a browser who does not know which information he or she is searching for, but does have specific sources of information that are addressed regularly to increase success. The third category corresponds to a browser who has a specific purpose or knows what information he or she is searching for, but does not have a search strategy in mind. More recently browsing has been described as a 'serendipitous activity' by cognitive psychologists De Bruijn and Spence (2001). They present three types of browsing based on the parameters of conscious / unconscious and targeted / non-targeted: *involuntary*, *opportunistic* and *search* browsing (De Bruijn & Spence 2001). Involuntary browsing corresponds with an unconscious and non-targeted search, and represents the situation in which someone can encounter something that seems interesting. Opportunistic browsing represents a conscious but non-targeted search. It relates to the constant monitoring and filtering of information that people do on a daily basis. Search browsing represents a conscious and targeted search toward a specific piece of information. In combination, these categories give a comprehensive overview of mediated and/or non-mediated browsing. Consequently, several parallels can be found between the types of serendipity and browsing discussed above. Serendipitous discovery can be considered the result of a

specific type of browsing; namely that of the involuntary and unfocused variety. It is the type of browsing people are used to doing every day in different contexts and is therefore similar to the unexpected and random nature of 'true' serendipity. Semi-directed and opportunistic browsing correspond well with the concept of pseudoserendipity because of the conscious wish to discover something without targeting specific information. Lastly, specific or search browsing appears to be the equivalent of non-serendipity because of its conscious search for specific information.

Because browsing is often related to digital information retrieval (e.g. searching Google or clicking on hyperlinks), it can be considered to be heavily influenced by algorithmic influences in the context of this thesis. If an algorithm influences the possibilities for browsing by providing filtered information, it becomes difficult to escape a search-oriented type of browsing. Consequently, if this filtering is not known to the individual that is browsing, algorithms influence the way he or she perceives the discovered information. Again, the 'untransparency' of algorithms that Stalder and Mayer illustrate is considered particularly important to this argument (2009). However, in combination with the previously discussed notion of *flânerie*, browsing can be used to reconsider pseudoserendipity as an alternative approach to digital information discovery by mediating the randomness and unexpectedness of the physical environment.

Mediation and the Reconsideration of Pseudoserendipity

Earlier in this thesis it has been discussed how the *intention* to find specific information is frequently used as an argument against the mediation of serendipity. It is argued that intention detracts from a serendipitous discovery being a *chance* encounter. Yet, it is also illustrated that serendipity is not (entirely) based on chance encounters, but requires sagacious insight on the part of the user. Mediation of serendipity thus cannot be considered shackled just by the very *notion of intention*, but *the intent* to find specific predetermined information. It is important to make this distinction because in the context of this thesis 'pseudoserendipity' can therefore be reconsidered as a useful concept for a contemporary approach to serendipity, because calculation, intention, and consequently mediation to a certain extent do not necessarily mean 'unserendipity'. It can be argued that the previously explored factors of mobility and exploration could assist in making the concept of serendipity applicable in a contemporary context. Especially mobile media which show, among other things, a specific purpose to structure (environmental) information into a comprehensible format could potentially lend themselves to mediating serendipity because of the supposed randomness and unexpectedness that the use of user location entails. The *intention* involved in pseudoserendipity is mainly used by Van AnDEL and Roberts to describe the search for information that can already be considered relevant, merely encountering it in a 'surprising' fashion. However, a less deterministic view of intention can also be applied from a digital media perspective. Van AnDEL uses Roberts'

concept of pseudoserendipity to argue that “computers cannot think for themselves”, thus rendering them unable to produce findings of true ‘meaning’ based on user needs, wishes and various dispositions (Van Andel 1994 p.633). This suggests that pseudoserendipity as put forward by Roberts does not fully take into account the possibility for the user to consider discoveries and, consequently, produce and assess his or her own opinion on the encountered information. Also, both authors could not take into account the possibilities mobile media were to include by integrating location as a factor.

As discussed, serendipity as a concept relates particularly well with the concepts of *browsing* and the *flâneur* (Benjamin 2006 [1983]). To a certain extent contemporary mobile media show the same capabilities to harness serendipity not by prescribing information but by making notice of certain pieces of information that otherwise would remain unseen or by translating discovered information into a comprehensible format. Furthermore, by visualizing and structuring information that is discovered through the casual exploration of an environment, mobile media can potentially act as tools to facilitate the act of *browsing* in a semi-guided fashion (Hildreth 1995, De Bruijn and Spence 2001). The earlier discussed music identification service Shazam can again serve as an illustration (Shazam Entertainment Limited 2014). Although a user can use the application to actively search his or her surroundings for a particular song, it can be assumed that a user who has installed the application has a *general* intention to discover and identify music that he/she randomly encounters in the environment. In this sense an application facilitates a specific kind of exploration and discovery through *flânerie* and involuntary or opportunistic browsing. Focus on a particular kind of information (e.g. music or people) still can be considered a relatively broad spectrum, but also manages to deal with the filter bubble and paradox of choice issues. In combination, *flânerie* and browsing can potentially provide a mediated serendipitous experience that remains relatively true to its principles of unexpectedness and randomness. Algorithmic interference can then be considered less prescriptive and more focused toward the aid of the individual user’s own estimation of relevance and meaning. However, algorithms are, and will remain, a dominant aspect of information retrieval through digital media (Cormen 2009). For this reason it is valuable to explore how mobile media applications that are labelled as ‘serendipity machines’, deal with algorithmic filter bubble issues and the paradox of choice, and consequently to what extent serendipitous discovery of information can really be mediated through mobile devices.

This chapter illustrates that serendipity is a complex concept that is composed of different experiences. After making a serendipitous discovery, a user should be able to understand and translate the encountered information and place it within his or her own frame of relevance and context, ultimately experiencing the discovered information to have a clear and positive consequence. By way of data-gathering algorithms, digital media are becoming highly calculating, suggestive and personalized, thus challenging serendipitous discovery. This is highlighted in the discussion

surrounding 'the loss of serendipity' in which the personalizing capabilities of digital media are accused of affecting the individual's information intake (Gup 1997; McKeen 2006). Yet, as argued in this chapter, serendipity can to an extent be considered applicable to mobile media and grant the potential to mediate the experience of serendipity by structuring encountered information with little algorithmic bias. Then, to call designing serendipity an oxymoron would seem to be a narrow engagement with the concept and its various descriptions. In the next chapter a case study will be conducted to explore the practical applicability of serendipitous discovery of information through mobile media.

Ch. 5 Analysis

This research will be conducted through a case study of the location-based mobile media application Highlight (Math, Inc 2014). This app uses location to mediate personal encounters ranging from seeing friends, dating, casually browsing or making new friends. The application, aired in 2012 and updated to a 2.0 version in 2013, has the ability to connect people that are in the direct environment of each other and can be of interest. It is an application that integrates a combination of location-based and social features to get its users in touch with people in their vicinity who have the installed application as well.

Highlight's functionalities can be applied for a certain number of suggested purposes like dating and networking. However, the user is not bound to any of these predetermined options. The Highlight developers focus mainly on the apps' ability to quietly run in the background.³ This way the application notifies the user automatically if a supposedly 'interesting' person crosses his/her path. Users will be notified of encounters and are immediately made aware of why this encounter could be interesting, presenting an array of possible shared interests like social network connections, music taste or even a common hometown, ultimately giving the user an opportunity for a conversation starter through a chat functionality. According to the developers, Highlight operates as its users' 'sixth sense about the world', showing them potential connections that are based on their own interests.⁴

Methodological Approach and Methods

A case study of the mobile application Highlight must illustrate to what extent location-based mobile services can allow its users the possibility to experience serendipitous discovery in practice, as well as what built-in design 'assumptions' the app includes and how these influence its promise for serendipitous discovery of information. As a general approach to analyze a media object media

³⁴ <http://highlig.ht/about>

scholars Van den Bomen and Lehmann propose a *material object analysis* (2014). Objects that are analyzed with this approach are considered “concrete *material* things, which implies that they have to be delineated, described, and analyzed as such” (Ibid. p.9). The authors argue that a material object is distinguishable in two basic levels of materiality, namely *technologic* and *representational* levels (Ibid. p.10). ‘Technology’ refers to “material construction/mechanism, hardware, software, network infrastructure”, whereas ‘representation’ refers to “material modalities such as text, image, or sound, and with material semiotic and communicative effects” (Ibid. p.11). Within the context of this case study this is a helpful dichotomy to understand and structure the different levels and how they are intertwined. The smartphone/hardware and application/software can both be seen as technology, but also as a representation through sound and images which in turn plays a role in conveying the designers ideas of how something should and should not be used.

It can be argued that media scholar Schäfer uses the same material object perspective to analyze and deconstruct how participation cultures surrounding certain material objects transform cultural production (2011 p.11). However, Schäfer is specifically searching for the meaning and consequence of technologies for participation cultures. According to Schäfer “the actual social use of software, software-based products and Internet technologies can be analyzed according to three procedures that shape technology: affordance, design and appropriation.” (Ibid. p.19).

. . . [A]ffordance, appropriation and design are interdependent. Affordance exists in both, namely the specific material features used for design, and in the design process, which also constitutes affordance. Design is the formalization of anticipated user activities through the use of certain materials or technologies and the shaping of these into artefacts that constitute the designated affordances.

(Schäfer 2011 p.20)

Schäfer analyzes these technological qualities through the deconstruction of several case and their surrounding participation cultures studies like the participation/hacking culture surrounding the Xbox console (Ibid. p.55). Making use of Bruno Latours actor-network theory Schäfer untangles a tight web of “semantic connections between discourses and technological design in the dispositif of participation” in order to map the various actors involved with the affordances, design and appropriation of consumer goods (Ibid. p.17). He describes how technology affords certain acts of participation, how it is inscribed or designed with a predetermined meaning by its developers, but as well how technology is also open to the interpretation of the user (Ibid.p.20). However, differentiating from Schäfers semiotic perspective, *affordance*, *design* and *appropriation* will serve as the three guiding concepts for this analysis which is focused on the potential of a technological artefact, rather

than the meaning for a specific (grassroot) group or culture. Based on the Highlight application installed on an Iphone 4S (a smartphone that can be considered common and shares both external and internal similarities towards other commonly used smartphones like the Samsung Galaxy and the HTC Desire series) the affordances granted by the technology (namely the smartphone and the application) will be deconstructed, after which elements of its interface design are explored to reconstruct implied types of use facilitated and prescribed in the design. Without denying differences in specificity different models might possess, the observations can be seen as indicative of general trends found in the whole category of 'smartphones'.

In this thesis observation, description and tinkering will be used to conduct a *formal analysis* on two levels: technical and representational (Bolter 2002; Hodder 2013; Van den Bomen and Lehman 2014). Close observation, description and a critical engagement with the application should expose the technological (physical and software) capabilities that afford serendipitous discovery to be mediated through the facilitation of *flânerie* and browsing. A formal analysis serves the purpose to describe how and on which levels the artefact affords certain (inter)actions on a *technical level*, and will be conducted in the context of exploration. This means that the focus of the analysis will lie specifically on how the physical artefact affords the exploration and discovery of information to take place. Software affordances will be focused on the Highlight application and will be analyzed through the determination of which elements can be distinguished in the interface (textual, graphical, sound, movement etc.) and what kinds of interaction the interface affords user. Furthermore, analysis of design will be conducted on a *representational level* through an exploration of the "interface representation" which is in this study focussed on the "the subtle ways of channeling user activities by stimulating certain activities and averting others" (Ibid. p.12). This analysis must expose how the design of the application steers the user towards a particular dominant way of using the application through identifying which visible and invisible design features can be identified that channel user activities (Van den Bomen & Lehman 2014). Finally, appropriation, a translation of the Latin word *appropriare* or "to make one's own",⁵ "refers to what users do with a designer's object" (2011 p.56). An often used way to distinguish design from appropriation is to label the first as "design-for-use" and the second as "design-in-use" (Folcher 2003; Wakkary & Maestri 2007). Where design prescribes certain ways an artefact is intended to be used, appropriation describes how it is also subject to the interpretation of the user. Generally, analysis concerning the appropriation of an artefact includes extensive empirical and social studies which are conducted through methods of observation and interviews (Folcher 2003; Giffeths & Light 2008; Wirth Von Pape & Karnowski 2008). Because of the specific nature of this research and the emphasis on the technological promise of serendipity, the

⁵ <http://www.merriam-webster.com/dictionary/appropriate> - last accessed on 02 - 07 - 2014

focus will lie on a representation/illustration of possibilities for appropriation, rather than on how users actually appropriate the Highlight application for information discovery and exploration. Through a description of experimental engagement with Highlight's interface, the boundaries of its intended use are stretched and tinkered with in ways that diverge from the designs intended or implied use. Differences between results will be illustrated when the application is used in a 'critical' fashion, rather than the implied one. This section emphasizes possibilities granted by Highlight's interface for exploring the environment with little algorithmic bias.

It is important to note that this research is, as are most qualitative studies, interpretive in nature. The chosen case is in some sense representative of the broad field of digital media wherein serendipitous experiences could occur, but does not cover every aspect of it. Therefore this case will be framed as a sample that serves as an illustration instead of evidence in its own right. A variety of diverse cases would make this research more generalizable. However, it can be argued that an in depth analysis of a single case could allow for a more critical reflection of how serendipity is represented within mobile media. It can also be argued that generalization should not be the primary goal of research like this. It serves to gain a better understanding of the phenomenon and can potentially make a valuable contribution by potentially being able to rethink the role of software and information discovery (Silverman 2005).

'Exploration' Affordances

The concept of *affordance* is often understood as an interaction between an object or environment, and an organism which is afforded an opportunity for a specific action (Norman 2013). While psychologist William Gibson (1977) originally introduced the concept as "all latent action possibilities in the environment, regardless of an individual's ability to recognize them" (p. 174), this thesis utilizes cognitive scientist Donald Norman's addition that focuses on human-technology interaction. Affordances then describe the specificities of technology, or as Norman describes "the very aspects that channel consumers' use: the fundamental properties that determine how an object could be used" (Norman 1999 p.40). It thus describes the basic qualities of the designed object and the possibilities it possesses. An artefact or environment 'affords' a certain practise, a popular example being a park bench that can be used for sitting, but also for sleeping (Norman 1988). Technologies like smartphones are already often analyzed in different contexts. The affordances of mobile media are already discussed in great length in, among others, the fields of computer science and mobile learning (Cook 2010; Lai et al. 2007; Pering, Ballagas & Want 2005). For example, educational technology researchers Thomas Cochrane and Roger Bateman (2010) have provided a comprehensive account of smartphone affordances that impact the context of a mobile learning environment. On a *technical*

level this analysis emphasizes the material qualities for *exploration* that a smartphone and the Highlight software afford.

Device Affordances

Firstly, the device affords *portability/mobility* and thus suggests both static and dynamic use. Through its relatively small size and weight the device is small enough to carry and use without having to stop moving. It enhances flexibility, and it does not obstruct the user to continuously carry it with him/her. This affordance can be thought of as closely connected to the act of being a flâneur as described by Walter Benjamin (2006 [1983]). Mediation of this casual exploration of an environment would require a device that does not obstruct or bind the user, as well as affording use in a dynamic context. Closely related to portability/mobility is the smartphones affordance of being able to *access (web or environmental) information* through its being networked. This includes both dynamic use through a connection to a 3- or 4G network, as well as (semi-) static use through a WiFi network that is bound to one geographical place. The capability of a continuous connection to a network creates the possibility to engage with encountered information by seeking out additional knowledge or to engage with the environment itself through other networks in the vicinity. In particular this quality to interact with the environment can be considered key for the exploration of information through the acts of flânerie and browsing. Through portability, as well as the possibilities to connect to a network, the user can consider seeking out additional information through different types of browsing or as De Certeau suggest, 'write' on the environment (De Certeau 1998 [1984] p.93).

Besides its network abilities affording users to 'read' information, a smartphone also affords the user to 'write' information through its capability to define its own geographical location. Through GPS the user is afforded with the action to passively or actively 'write' on its environment through actions like geo tagging (the act of adding GPS coordinates to media), sharing location with a network of individuals or tagging a location with a media message to add to an information database (for example Foursquare's geographical reviews and annotations). These capabilities, however, also grant the additional affordance of *surveillance*. This affordance can also be considered closely linked to exploration and discovery through built-in tracking and recording mechanisms and the possibilities (as well as issues) this might open up for users. Also, through the combination of contemporary smartphones having far reaching GPS capabilities and making available a multitude of software applications, it suggests many different media practices. The *availability of applications* means that a smartphone can be considered an addition to a range of actions, including environmental exploration. By engaging with, and visualizing the informational contents of an environment in different fashions, various applications show various different contexts and contents of the direct and indirect surroundings of the user. Sporadically, smartphones can act as 'eyes and ears' by way of their image,

video and sound capturing capabilities. Besides the more obvious application of opting as an 'extended memory' (e.g. taking pictures or making voice memos), in particular occasions smartphones can serve as an ambient receiver of information. The earlier mentioned music identification software Shazam is an example in which information from the direct environment is translated into other, more detailed information to engage further with (Shazam Entertainment Limited 2014).

In sum, the design of these devices emphasize their 'convergence' with other forms of media, location and exploration/discovery. Smartphones afford portability, access to web information, engagement with the environment, availability of applications and the use of additional 'eyes and ears' to specifically engage with exploration. Through the capabilities that smartphones possess, the act of flânerie can be considered an action that lends itself well to being mediated. Furthermore, these capabilities can be considered a useful support in the act of browsing.

Interface Affordances

Software affordances can be considered closely connected to the affordances of the platform it is executed on. Yet, it often can be argued that while platform affordances provide the *potential* to act out certain (inter)actions, software grants the *ability* to actively interact with the possibilities devices afford. Highlight makes use of the earlier described device affordances to grant a new set of interface design affordances. First and foremost the application affords a *direct link with people* who also have the application installed on their smartphone. It is possible to research an individual based on his or her profile and update stream (which can include social/business networks and media messages), but also engage and communicate with the individual in a personal chat (See: *image 1*). On a map people relative to the users location who have the application activated are shown in real time – meaning the map does not only visualize where people where or are, but also where people are moving. These capabilities lend themselves especially to the discussed act of *opportunistic* browsing. Yet, Highlights interface does afford a more specific *exploration of people* through the specification of several profile parameters (See: *image 2*).

Users are able to add a list of personal words he or she would like to find in another person's profile. As a result, this affords the user not only to define the way he/she is interested in using the app, but also which topics /hobbies/sports will be considered interesting. Consequently, *search* browsing can be considered an option as well. In addition, the app supports a range of preconceived ways to define the users intention, which can be seen by other users. This is done by giving the user the opportunity to indicate their intention when using the application (dating/networking/casually browsing), consequently indicating which kind of people they would like to encounter. In this fashion, Highlight affords a specified randomness by connecting to the randomness of the environment, as well as being connected to a filter mechanism.

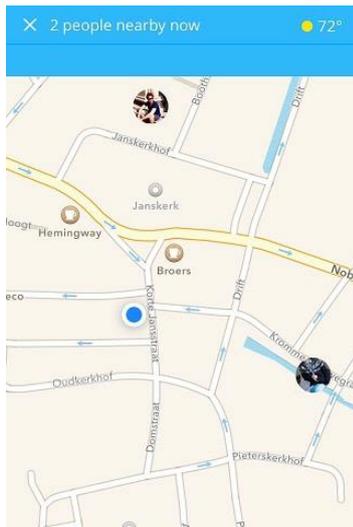


Image 1: The Real Time Map

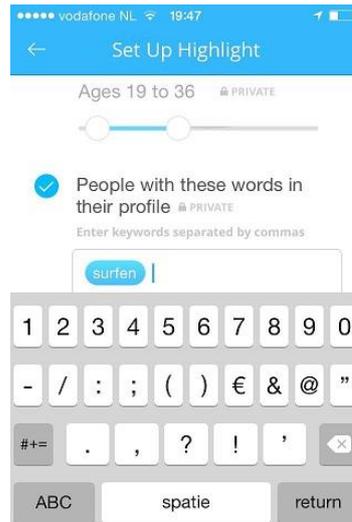


Image 2: Highlight Parameters

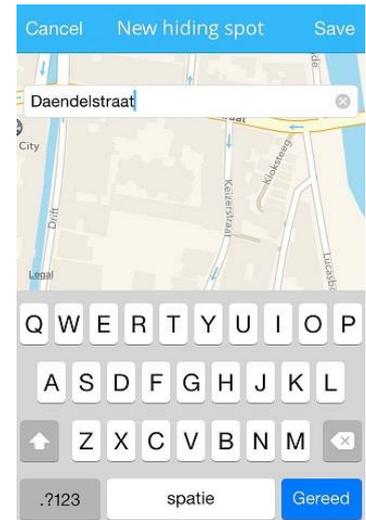


Image 3: Hiding Spot

Source: Highlight application, Math Camp, Inc 2014

In the context of exploration, one of Highlights primary affordances can thus be considered that of discovering people (through specific or general criteria) who have the application installed as well and are or were in the users direct environment. However, *surveillance* can also be considered a very significant affordance granted by Highlight's design. Precisely because of the opportunity to follow a person step-by-step Highlight is very susceptible towards affording possibilities to *spy* on individuals. Furthermore, a less prominent affordance is that of tagging media to the location of the user, consequently adding it to the update stream of the user. The "what is happening around you" option is a way to extend the users profile, thus making it an option to relate to other exploring people and their interests, rather than actively contributing to the users own exploration. Another affordance which can be considered more passive to the act of exploration is the creation of so-called hiding spots (See: *image 3*). These hiding spots afford the user with the possibility to define certain areas wherein they cannot be seen. However, while the user cannot be seen, they can see other people that are located within their hiding spot, amplifying possibilities for 'spying' and surveillance.

While the affordances granted by a mobile device can be considered closely connected to opportunistic browsing and a flâneur fashion of environmental exploration in general, in the interface affordances of Highlight a more specific application of this type of exploration can be recognized. The interface/software affordances grant the possibility to search/browse for specific discoveries. However, not only the affordances to specify information exploration - thus filtering out certain encounters and adding the intention to emphasize particular information above other information - but also the inherent randomness of a connection to the users environment makes it so that

discoveries are potentially made in a predominantly pseudoserendipitous fashion. These *technical* qualities are utilized by the *representational* design which steers towards an intended use, prescribed by the developers in the design of the interface. Next, the design of the interface will therefore be analyzed to uncover visible and invisible design features that channel user activities.

Prescribing Design

Next to its qualities or affordances, the *design* of hardware and software are both inscribed with the designers' presumption of dominant usage. For example, the designed portability of smartphones can be considered inscribed with this type of usage over stationary (read: bound to only one place) use. Software is inscribed with its designers' presumptions of what dominant usage should look like and thus steers towards a specific type of use. Design describes the "creation and shaping of artefacts" in which the intended use of an artefact is inscribed or: "design is the formalization of anticipated user activities through the use of certain materials or technologies . . ." (Schäfer 2011 p.20). The design is submissive to the material or platform affordances, but does also create new affordances, meanings and consequently new ways to be socially appropriated by the user (Ibid.). In other words, design prescribes the intended activities, but facilitates other meanings and uses as well. The emphasis in this section will lie on the question which *intended use* of the Highlight application is inscribed in its design, and can thus be considered the designers' perceived dominant way of use. It will be explored on a *representational level* which interface design aspects steer to or avert particular uses.

Highlight's functionalities can be applied for a certain number of suggested purposes like dating and networking, however, the user is not bound to any of these predetermined options. As mentioned earlier, one quality of Highlight's interface is the definition of a set of parameters which the user can utilize to discover people more specifically (See: *image 4 and 5*). While user-controlled, the parameters seem to be in service of the passive nature of the application, diminishing the need for active engagement while delivering personalized results to the user. The Highlight developers focus mainly on the app's ability to quietly run in the background.⁶ This way the application notifies the user automatically if a supposedly 'interesting' person crosses their path. Users will get notified of encounters and are immediately made aware of why this encounter could be interesting, presenting an array of possible shared interests like social network connections, music taste or even a shared hometown, ultimately giving the user an opportunity for a conversation starter. According to the developers, Highlight operates as its users' 'sixth sense about the world', showing them potential connections that are based on their own interest.⁷ Although the application can be used in an active

⁶ <http://highlig.ht/about> - last accessed on 02 - 07 - 2014

⁷ Ibid.

fashion through a personal and determined search of people in the users direct surroundings by making use of the real time map, it can be considered a dominant and prescribed way to make use of Highlight in a passive manner. The first time a user engages with the application this is made clear through a tutorial explaining how the application works, emphasizing its passive qualities. Additionally, the first message the user receives is from the Highlight support team which stresses that the application works ‘better’ if the person allows for push notifications in their phone’s settings (See: *image 6*). Additionally, if the user does not want to passively let the app do its work, he or she is steered towards a search-oriented form of browsing. The presented information a user can browse through is tailored towards a certain preconceived idea of what is relevant. This type of usage thus restricts the user from making ‘accidental’ discoveries made through opportunistic and involuntary browsing.

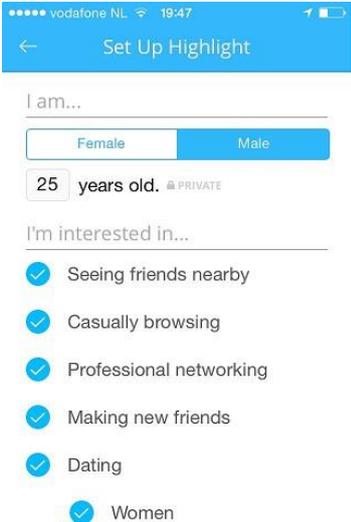


Image 4: Set Up of the App

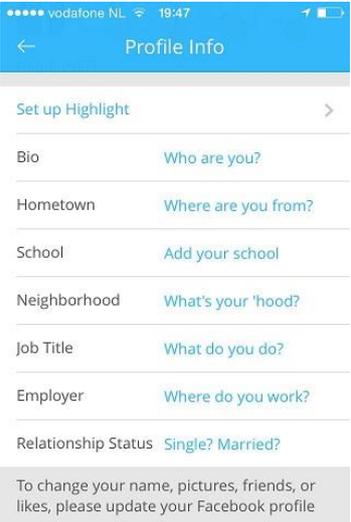


Image 5: Personal Profile

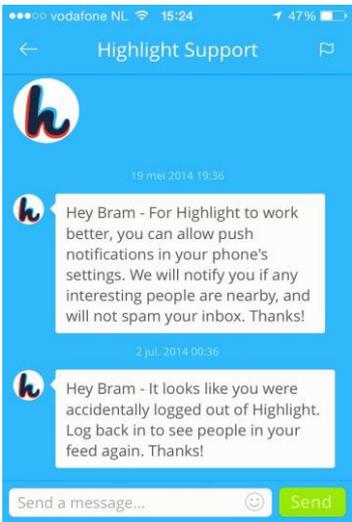


Image 6: Passive Use Message

Source: Highlight application, Math Camp, Inc 2014

A second element that can be considered closely related to directing the user to passively make use of Highlight are the different calculating filters that are applied by the app if it is used in its passive state. According to “Wired” journalist Kyle VanHemert (2013), the application considers what should interesting be for the user to a degree. In its passive state the app will calculate which people are interesting enough based on past and present location, speed of travel (walking, cycling or riding the bus will influence which people Highlight will notify the user of) and the frequency in which people are encountered. The app estimates how interesting a person could be for the user based on the user’s present and past locations, and will communicate potentially interesting people to the user by way of

push-messages. For example, if a person's roommate seems interesting to the user by way of similar interests, music taste and so on, Highlight will filter this individual out of the stream of encounters for it will probably not be interesting to the user. The application applies both user-controlled mechanisms as well as software imposed filters to increase efficiency, ease of use and possible 'relevance'. In other words, even within the set frame of interest that the user specifies, Highlight will in its passive state filter out certain encounters, which means that the user is subjected to algorithmic filtering politics.

As a consequence of the design suggestions to engage with Highlight through interface options as well as the filters that are subtly applied, a user will encounter predominantly personally interesting/relevant people. One argument that supports these aspects of Highlight's design is to counter acts of surveillance that can arguably be considered closely linked to the application and its possibilities to actively search the environment. Ultimately, this intended use should provide the user with the promised unexpected encounters by making use of several affordances granted by the device as well as the software. The emphasis lies on the mobility and environmental connectivity of the medium, encouraging the user to passively make use of the app to connect to people in their direct environment, which changes as they move through it. However, taking into account Pariser's filter bubble it can be argued that, if the user plays by the 'rules' that are set out for him/her, it shows to be a challenge to escape algorithmic politics and make serendipitous discoveries using Highlight. The app's intended use steers towards a passive use of the app wherein its algorithms show a type of 'agency'⁸ to filter and propose encounters without consideration of the user and thereby reducing the paradox of choice as proposed by Schwartz, but enlarging filter bubble issues. Highlight's interface design steers towards a passive, or otherwise search-oriented fashion to engage with the application. However, intended use must not be considered something set in stone. Users often do not play by the rules or change the way something is supposed to be. This is called appropriation, and can be seen as the 'design *in use*' in contrast to the designers 'design *for use*'. The next section will explore possibilities for appropriation in the context of exploration.

Possibilities for Divergent Use

According to Schäfer *appropriation* "refers to what users do with a designer's object" (2008 p.56). Where design prescribes certain ways an artefact is intended to be used, appropriation describes how they are also subject to interpretation of the user. How an artefact is appropriated is often submissive to affordances and design of the artefact. Norman's earlier mentioned example of the park bench

⁸ "In sociology and philosophy, agency is the capacity of an agent (a person or other entity, human or any living being in general, or soul-consciousness in religion) to act in a world" [http://en.wikipedia.org/wiki/Agency_\(philosophy\)](http://en.wikipedia.org/wiki/Agency_(philosophy)) - last accessed on 01 – 10 - 2014

showed that this artefact, next to its intended use of being sat on, can be appropriated to serve as a 'bed'. However, the addition of armrests in its design serves to prevent this particular appropriation. Digital media work in a comparable fashion. As shown in the previous paragraph, design prescribes a specific kind of use, however, a user is not bound to this. It is important to mention that, while not emphasized in this thesis, software can be subjected to more far-reaching ways of appropriation because of its 'in-materiality'. According to Schäfer an affordance specifically bound to software is that of 'modularity' (Schäfer 2011 p.67). Precisely because of this affordance which enables users to 'write' on the 'text' of the software, it is open to being taken apart and being set back together in different fashions. Consequently, it has to be considered that software has many more appropriations, even in the context of exploration. The emphasis in this section lies on direct ways to appropriate Highlight divergently without having knowledge about rewriting software.

In order to research how Highlight's filters can be bypassed an experiment is conducted, stretching the design and critically making use of the app. The researcher experimentally appropriated Highlight in an active 'spying' fashion to actively search for interesting information.

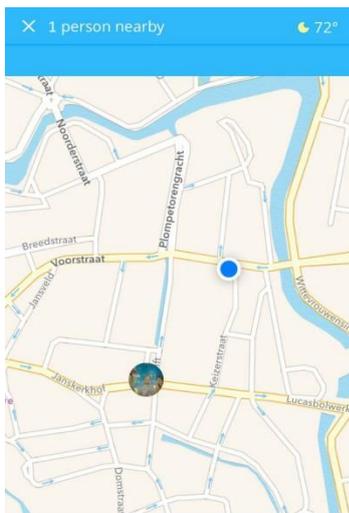


Image 7: Specific criteria

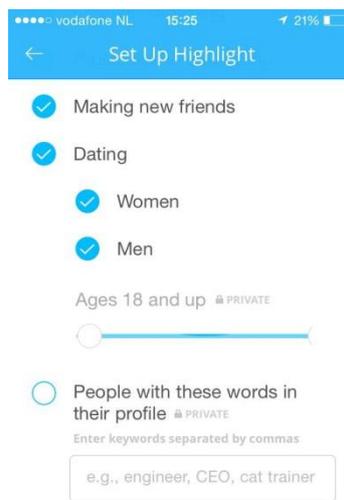


Image 8: Broad Personal Profile

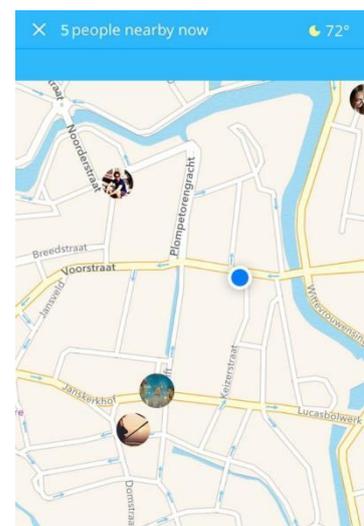


Image 9: General criteria

Source: Highlight application, Math Camp, Inc 2014

Applying more general criteria resulted in a direct change with respect to the visualized surroundings of the user. In contrast to the specific criteria that are implied to be used for a more efficient and usable experience of the application, an active engagement signifies less insight of direct personal relevant individual, but more insight in people moving through one's direct surroundings (See: image 7 and 9). On several occasions this casual but active form of browsing the environment delivered

interesting encounters with a real possibility for relevance. These discoveries happened by way of randomly clicking on people to 'spy' on their profile. On several occasions they were employed by very interesting businesses and this lowered the threshold to reach out to them for a little more information. Of course, opportunities to discover interesting businesses are very relevant to a student who is about to graduate. Yet, there was no real intention to search for this specific kind of information. It however applied some sense of urgency to interact with the 'discovered' person because of the information or connection they represented. Although these kinds of discoveries can be labelled as serendipitous, it must be noted that this kind of use can be considered far from what is intended. In fact, the fact that the design has to be appropriated in a completely other fashion than what it prescribes does challenge and even problematize serendipitous discovery to happen when used 'normally'.

Highlight can be appropriated as a tool that mediates the environment through a combination of flânerie and opportunistic browsing. Yet, it is only through an act of 'counter-use' that the possibility for mediating serendipitous discoveries seeps through. Through this kind of engagement Highlight can be viewed as a tool to mediate flânerie, specifically focused on the exploration and discovery of interesting/relevant people in the direct environment of the user. Yet, rather than 'true' serendipity, this kind of use represents pseudoserendipity because of the intention to discover. It can be argued that it is impossible to break away from opportunistic browsing and engaging in an 'involuntary' fashion. The act of engaging with an application that holds the purpose of discovering *people*, does force the user in that specific direction. However, through this specific purpose the intention to discover and explore and the possibility to browse in an unbiased manner fuses to bring a mediated pseudoserendipitous experience. Through appropriation the user can (partially) shed the algorithmic interference that Highlight entails, consequently maintaining the possibility to mediate discovery while personally weighing of every available piece of 'information' as relevant or not.

Summary

To recapitulate, while the affordances of smartphones, as well as the abilities of mobile software connect the user to the environment and enable them to explore it casually, it can still be considered hard to encounter serendipitous discoveries. Highlight's main functionality of exploring the environment for people that can be considered interesting or even relevant operates on the basis of a sum of gathered user data (location, social network profiles and Highlight profile setup). In Highlight's case *intended use* challenges and complicates the possibility to encounter information in a serendipitous fashion. If the user engages with the application in its intended passive manner, algorithmic filtering is applied. This means that the user will not and cannot know which encounters

are not brought to his/her attention, thus remaining in a filter bubble. It takes forms of ‘counter’ or ‘critical’ use to appropriate the application as a ‘generator’ of serendipitous encounters. As a result, Highlight’s intended use can be considered problematic from the perspective of serendipitous exploration because of its tendency towards filtering and prescribing politics. Yet, considering the abilities of devices and software to enable serendipity as an approach towards information discovery, mobile media can still be considered important and relevant to mediate serendipitous discovery precisely because of this pervasiveness of algorithmic politics these media hold.

Ch.6 Conclusion

The algorithms that contemporary digital media contain serve but also limit their users. Besides being tools that help users make sense of an overload of information provided by digital media, algorithms show alarming potential to subtly but forcefully apply boundaries in an editorial fashion. Essentially, the interest that businesses show in algorithms can be reduced to the simple wish to target their customers in a more specific and personal fashion. In this thesis mobile devices and applications are recognized as media that pull algorithmic personalization to a yet more personal level, but also as artefacts that afford a casual exploration of the environment and the discovery of its included information. The notion of serendipity has been used in this thesis to critically approach and explore a potential bypass to the politics of these editorial ‘gatekeepers of information’ (Pariser 2011b). While mediation of serendipity is considered a difficult endeavour, the notion of pseudoserendipity is re-explored in the context of mobile media to argue that it is a concept that makes the mediation of serendipity possible. To reconsider the concept of pseudoserendipity, the notion of *intention* has been reconsidered as something that is always connected to the discovery of personally relevant information, but is not necessarily connected to the *intent* to discover a specific piece of information. Through this understanding of pseudoserendipity, the notion has been situated *between* the presumed randomness and unexpectedness of ‘true’ serendipity and the tailoring and personalization politics of algorithms. This means that both Pariser’s filter bubble issues and Schwartz’s paradox of choice are included in a pseudoserendipitous approach on digital information retrieval.

It has been shown that serendipity can, in part, be mediated by mobile media. The explored notions of *flânerie* and the different types of browsing show possibilities to make use of the capabilities of these media to theoretically achieve this mediation. However, while the romantic promise of serendipity is more than ever connected to mobile devices and applications by their developers, it has been shown that in practice countering algorithmic politics is complicated *precisely* by the developers’ wish to provide users with personal relevance. Critically examining the case of Highlight through its affordances, design and appropriation has illustrated how mediating

serendipitous discoveries can be a possibility through aspects of mobility and elements of design, although it appears to be a difficult endeavour to bypass algorithmic intrusion in practice. Furthermore, Highlight steers its user towards a search-oriented engagement with respect to browsing through the encountered information, consequently diminishing possibilities that lie outside these algorithmic boundaries. This does not necessarily mean that it is impossible to mediate serendipitous encounters through Highlight. To achieve this, a user is forced to critically engage with the application and negate its intended use to appropriate a form of 'counter use'. This is due to the fact that users who engage with the application through its intended use are very much subjected to algorithmic intrusion and filtering. Through this appropriation of Highlight, the user can make use of the app's capabilities for flânerie and opportunistic browsing to mediate potentially relevant and unbiased information. In the specific case of Highlight, it can be argued that filtering is applied to enable a more result-oriented, efficient and usable experience for the user. Arguably, this case can therefore serve as a more general illustration concerning the implementation of algorithms in digital media. Due to the already 'untransparent' operation of algorithms, Stalder and Mayer argue that there is little motivation to counter their interference in information retrieval even though measures can be taken fairly easily (2009). It can be considered problematic that in mobile media only 'critical' or 'counter' measures could potentially diminish algorithmic influence, resulting in even more obscurity concerning these information gatekeepers.

Although today there are several applications that implicitly or explicitly include the promise of serendipity, it can still be considered problematic to bypass algorithmic framing, which diminishes the chance to mediate serendipity as such. A more explicit tendency towards the 'serendipitous' qualities that mobile devices and software offer would potentially affect the feeling of algorithmic interference being inevitable and thus a 'necessary evil'. Openly granting users the *option* to engage with information in a less biased fashion, without losing the comprehensible and efficient qualities digital media and their algorithms possess, could imply new approaches towards information consumption. From a utopian perspective this option could consequently shift power relations between companies and information 'customers'. Some reservations are in order though. Due to time limitations and the single (biased) case study this thesis ultimately serves as an illustration rather than as evidence in its own right. A more complete understanding can be developed by analysing the appropriation of mobile devices and applications for serendipitous encounters in more depth. Such research should include empirical studies, interviews and phenomenological accounts to acquire a more integral understanding of how these media could potentially be appropriated. In this thesis the emphasis lies on a more technological perspective on mediated serendipity. Further analysis of these topics should include studies such as mentioned above, and would consequently result in a richer outcome.

Finally, Highlight served as an interesting illustration of the wish to include the ‘magical’ and ‘ungraspable’ experience of serendipity in contemporary technology. Through the development of mobile devices and functionalities, mediation of the experience seems to be closer than ever to being, in part, accomplishable. However, Highlight also illustrates the dominant mindset about technology, which reflects efficiency and pragmatism. This is discussed by Stalder and Mayer (2009) who argue that the lack of direct negative consequences linked to algorithmic personalization greatly diminishes critical thinking. The filter bubble issues Pariser suggests do not apply to the internet as a whole. Platforms like the ‘idea spreading’ TED.com and viral content distributor Upworthy.com can be considered places where conflicting opinions and non-personalized information can be encountered. Also, mobile applications like Shazam show that mobile media can do this. Indeed, these filter bubble issues illustrate the negative consequences of algorithmic interference that are already recognizable today. Mobile devices in particular are subjected to the most intrusive algorithms to date, translating the user's geographical location into context-aware recommendations. To be sure, algorithms like the briefly mentioned “hybrid- ϵ -greedy” (Bouneffouf et al., 2012) can be considered a valuable support for information retrieval. However, algorithms like these also tamper with the information people receive, imposing a certain ‘one-sidedness’ on retrieved information. Therefore, if personalized media technologies slip into more and more facets of our lives, it is crucial to continuously question the fine line between algorithmically generated information supply and the space to freely shape and cherish one's own thinking and thoughts.

Ch. 7 Reflecting on the Promise of Mediated Serendipity

In this thesis it has been discussed how the *intention* to find specific information is frequently used as an argument against the mediation of serendipity. This thesis therefore argues that, in order to obtain a realistic view of mediated serendipity, pseudoserendipity must be considered a workable concept. Especially within the context of mobile media the mediation of serendipity can be considered to be again relevant. Mobile media and the connection and visualization of environmental information they offer are considered closely connected to serendipity, exploration and the discovery of personally relevant information. Pseudoserendipity in particular can be considered a relevant concept to (partially) mediate serendipity through mobile media. Roberts and Van Andel argued that pseudoserendipity was closely related to finding specific information and could therefore not be considered as ‘true’ serendipity. Yet, this specificity is arguably broadened by the new forms of randomness the environment as a source of information possesses. Through *flânerie* and the possibility for opportunistic types of browsing rather than search browsing this environmental information can possibly be encountered in an unbiased fashion. In case of algorithmic interference

the possibility for serendipity can be considered closely related to which forms of browsing are made possible because different types of browsing will be more or less influenced by algorithms. With the addition of new hardware and software affordances supplied by mobile media, the concept of pseudoserendipity defines an approach that can be considered *more* reasonable and relevant to Walpole's original concept of serendipity than the pursuit of mediating 'true' serendipity. Yet, algorithmic politics are deeply embedded in contemporary media and media practices. Pseudoserendipity, while showing a more specific kind of intention, can still be considered a useful concept to counter the boundaries set by algorithms. There are several contemporary examples of mobile media applications that approach the exploration and discovery of information differently, such as music identification software Shazam or dating application Tinder (Tinder, Inc 2014). These apps make use of their affordances and the randomness of the environment. However, as shown through the analysis of Highlight, to bypass algorithmic interference can be considered difficult *precisely* because of the developers' intention to supply the user with personal relevance. It can thus be speculated that not the mediation of 'true' serendipity, but pseudoserendipity - moving towards a 'truer' form of serendipity - must be the focus of designers' efforts.

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