
That's the Dog from my Wedding – Algorithms for Memory Shaping

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Abstract

Whether we consider a certain moment as an important event only partially depends on our own experience. Humans use media to record their experience. Narrations, books, photos, and videos are used to selectively capture and preserve events. Which moments we decide to capture and which aspects of an event we tell dictates how the event is remembered. Through the ongoing digital revolution and emerging wearables, every moment will soon be captured and what is considered an event or in particular what is considered an important event will soon be decided by algorithms. Through the example of photography we highlight this transformation. Using the example of memory aids we point out the ethical challenges if algorithms automatically dictate what an important event is and what we remember about it.

Author Keywords

Memory; algorithms; memory aid; photography; events; ethics; retrospective; Recall

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

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Introduction

An event is a *"a thing that happens or takes place, especially one of importance"*¹. From a philosophical point of view, events are objects in time or instantiations of properties in objects. From the perspective of an average human being, however, events are important things that took place at a certain moment in time or over a certain period in time. What constitutes as an event, thus, depends on what is considered important. This consideration of importance used to be subjective, highly personal and the combined outcome of our culture, socialization and the negotiation with others.

Major events are simply speaking just events with high importance. Social practices, tools and technologies constantly change what is considered as a major event, how events are perceived and how we can reflect on them. At least since the development of language events are preserved through narratives. Similarly, the invention of writing enabled to create preservable manifestations of events and the invention of video recording enabled an audio-visual replay the event.

Thus, events used to be products of our own being as well as the society and the context around us. In this paper we argue that this is about to change. What is considered an event or in particular what is considered an important event will soon be decided by algorithms. Using the example of photography we highlight this transformation and using the example of memory aids we try to point out the ethical challenges that come with it.

Processes of photo book production

Photography is a widely used tool to document events and share personal memories. Before the emergence of

digital photography most photos had to be printed to paper or reversal film. With the advent of digital photography the way people use photos changed dramatically [6]. The number of photos taken increased enormously and left the user with the problem of how to manage these collections and which ones to share with friends using which media. To deal with these massive datasets, several solutions for managing and searching collections have been proposed [2].

Imagining someone who wants to capture an important event, say the own wedding, through photos, there are basically two options: today, the most common approach is to hire a professional photographer. While the photographer might take a large number of photos she or he will carefully select only a few dozen or a hundred photos. Typically in addition, one asks the guests to share their photos after the event. Collecting photos from guests will likely result in thousands of photos that show all facets of the wedding. Far too many photos than anyone would like to look at. Again, just a fraction of the taken photos will be selected. In both cases, someone, a person, decides which photos will prominently be preserved and shared. This selection will become the event and this selection will dominate the way the event is remembered.

A popular means of capturing important moments is putting together a personal photo book. With the ongoing trend towards digital photography, photo books started to become considered as multimedia presentations [8]. Researchers have even started to develop tools to support the interaction with printed photo books (e.g. [3]). Due to the sheer number of digital photos researchers developed means to support the creation of digitally mastered photo books [1]. Using tools, such as CeWe color's SmileBook, creating a decent looking photobook

¹<http://www.oxforddictionaries.com/definition/english/event>

with a few dozen photos from some thousands of digital photos is doable in minutes. This is only possible because the selection process can be fully automatized. Blurry images and duplicates are filtered out, important persons are identified, and aesthetically pleasing content is selected². Already today, the way something personal as a wedding is remembered might at least partially be decided by algorithms developed by the multimedia community.

Digital memory aids

The automatic creation of photobooks is just one example of many where algorithms have not only started to decide how an event is remembered but also what constitutes as an event in the first place. On social networking site such as Facebook, algorithms decide what the users see in their news feed. Similarly, news organizations increasingly rely on software algorithms to predict readers content preferences in order to select what is shown [9].

In a research project that recently started³ we aim to go one step further. We are working on approaches to enhance human memory through digital memory aids. Similar to previous work [4], one direction is to develop a retrospective memory aid. We are currently implementing a system that collects data through different means including implicitly taken photos through wearable cameras, explicitly taken photos and videos, digital communication with others, and activity recognition. The collected data is automatically processed, enriched through external sources, and rated through algorithms. What has been identified as important to remember by the algorithms (e.g. new faces, new locations, gatherings

²Obviously users can change the outcome. However, for CeWe's software from 2008 that lacked today's convenience, Sandhaus et al. showed that 10% of all books are created in less than 13 min. [7].

³The EU funded project RECALL – Enhanced Human Memory

of known peers, ...) is presented to the user through different means. The content presentation of such memories on existing and new devices is another challenge we are looking at. In addition to enabling users to explicitly review a summary of their daily, weekly, or monthly experience we also aim to provide implicit means that are perceived implicitly.

In contrast to related fields, retrospective memory aids explicitly aim to influence what people remember and how they remember it. Algorithms will decide if a person, location, or event is worth remembering. Psychology showed that human memory is a selective and fragile thing. It is not only possible to change what people remember but even to implant false memories of events that never happened [5]. While intentional manipulation, e.g. by an authoritarian entity, is beyond the scope of this manuscript, it seems obvious to the authors that retrospective memory aid will soon become widely available and they will implement automatic means that to manipulate humans' memory.

I know what you did last summer

In the following we highlight some of risks that we would face if retrospective memory aids become pervasive.

Privacy and security: A system that collects every detail of a users' behaviour and experiences can gain fundamental knowledge. In particular if information about a number of persons can be combined it even becomes possible to infer information about persons that do not use the system. Besides obvious privacy implication, such system can also lead to security breaches. As a simple example; often used questions to reset passwords such as what is the name of your pet become easy to answer.

Transparency: Current recommender and social media

systems provide the user with a selection of content. Which factors influences the selection and how they are weighted typically remains completely unclear. To enable users and society to assess if the system behaves as intended and to facilitate trust in the system it is necessary to make the system's behaviour transparent for the user. For recommender systems, research showed that explaining to the user why a recommendation was made increases acceptance of the recommendations and the information Google provides about why an ads is displays is a first step in this direction.

Legally incapable: A user group that could benefit most from a memory augmentation are older adults and people with dementia. These users might be, however, legally incapable. This raises the ethical challenge that a user of a potentially harmful system is not in the position to understand the the implications.

Dependency: As with other technologies, users can become dependent on retrospective memory aids. Pocket calculators greatly increased our mathematic abilities but their introduction in schools decreased pupils basic math skills. Similarly, it can be expected that users will need retrospective memory aids to remeber even basic things from their live. If technology fails the users' memory fails. This risk could be considered a much severe than for any previous technology.

Summary

What is considered an event or a major event used to mainly depend on our own experience as well as the society and the context around us. We currently see a development in research and industry that has the potential to change this. Algorithms are already in place that change how events are perceived retropectively. This

might even lead to a point where algorithms decide if an event takes place in the first place⁴.

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⁴Considering that matching algorithms on online dating websites influence weddings, algorithms already influence the probability that some major life events take place.