
Article:
Hopfgartner, F. orcid.org/0000-0003-0380-6088 and Joho, H. (2020) Guest editorial. Online Information Review, 44 (2). pp. 477-481. ISSN 1468-4527

https://doi.org/10.1108/OIR-04-2020-398

---

emerald PUBLISHING

Online Information F

Special Issue on Lifelogging Behaviour and Practice

Journal:	*Online Information Review*
Manuscript ID	OIR-12-2019-0401
Manuscript Type:	Editorial

SCHOLARONE™
Manuscripts

Special Issue on Lifelogging Behaviour and Practice

Frank Hopfgartner[1], Cathal Gurrin[2], and Hideo Joho[3]

[1] University of Sheffield, Sheffield, UK
[2] Dublin City University, Dublin, Ireland
[3] University of Tsukuba, Tsukuba, Japan

Abstract. Purpose: This paper provides an overview of the special issue on lifelogging behaviour and practice. Lifelogging refers to the automatic capturing and recording of one's life activities, e.g., using mobile Apps, Wearable devices and sensor platforms.
Societal Implications: Given the increased uptake of lifelogging devices, lifelogging is becoming a mainstream activity. Consequently, further research on the societal implications of lifelogging is required, e.g., focusing on issues related to privacy and information behaviour.
Value: This special issue provides an overview of several studies that illustrate how the information science research community can shed further light on lifelogging behaviour and practice.

Keywords: lifelogging · self-tracking · quantified self

1 Introduction

According to a recent market report, the number of global shipments of wearable devices has reached 225 million in 2019, and is expected to double in numbers within the next three years (Gartner, 2018). Commoditization of mobile devices and wearable devices has been rapidly increasing the population of *self-trackers*, or *lifeloggers*, in the last few years. Dodge and Kitchin (2007, p. 431) define a lifelog as "a form of pervasive computing consisting of a unified digital record of the totality of an individual's experiences, captured multimodally through digital sensors and stored permanently as a personal multimedia archive". Such a personal archive should be "searchable and recallable" (Ibid.), and thus, supporting use cases such as recollecting, reminiscing, retrieving information, reflecting, and remembering intentions (Sellen and Whittaker, 2010) should be supported. Furthermore, since lifelogging is expected to collect data throughout one's life, its prominent application domain may vary over generations (e.g., education for young people, productivity for professionals, and health care for elderly people). This gives great opportunities for information science researchers to study behaviour and practice of lifeloggers across a range of populations in our societies, as opposed to those of highly skilled professionals (Schön, 1983).

Research on lifelogging has heretofore been dominated by addressing the many technological challenges. such as the development of wearable sensor plat-

forms and the interpretation and aggregation of heterogeneous sensor data streams (Gurrin et al., 2014). However, a series of workshops has recently been organised to bridge the research agenda with quantitative and qualitative researchers in Information Science (e.g., (Joho et al., 2016a,b, 2017)). This special topic issue builds on this direction to increase our understanding on behavioural and social practice aspects of lifeloggers and their lifelogging activities.

2 Accepted Articles

Four manuscripts were accepted to be part of this special issue. In this section, we briefly summarise the work presented in these articles.

Ghosh and Singh (2018) conducted an experiment to study of phone logged data to predict users' privacy attitudes. As they point out, mobile phones have become omnipresent and the metadata created by the phones reveals a lot about users' habits and preferences. In fact, as recent revelations have shown[4], mobile phone metadata is often created without users' knowledge and with serious privacy implications. The authors approach this challenge by performing a mixed-method research methodology. They analyse mobile phone metadata, survey privacy attitudes and conduct semi-structured interviews. The main aim for this experiment is to study the interconnection between users' behaviour as captured by their phone and their self-reported privacy attitudes.

The study consisted of two phases and a total of 53 subjects took part in both phases. In the first phase, subjects were asked to install an App on their phones that collected logs of calls taken, text messages sent and received, and locations recorded over a period of ten weeks. In the second phase, the subjects were invited to take part in individual open-ended interview sessions. These interviews were based on the quantitative analysis of the metadata records that were made available to the researchers.

Their results suggest that a little more than half of their participants expressed moderate to high concerns for privacy. Exploring this further, they first focus on understanding whether long-term phone usage provides any clues to users' privacy attitudes. They also observe a correlation between the number of contacts that can be found on an individual's phone and their privacy attitudes. Furthermore, they explore how information sharing practices vary across online, mobile phone, and physical interactions. Finally, they study whether a machine learning algorithm can be trained to predict users' privacy attitudes based on logged phone metadata.

Pingo and Narayan (2019) introduce a study on the use of activity trackers. Activity trackers are of increasing importance with recent estimates suggesting that over 69.7 million activity trackers will be sold in 2023[5]. Amongst the main

[4] Twelve Million Phones, One Dataset, Zero Privacy http://nytimes.com/tracked – Accessed on 27 December 2019

[5] Wearable device shipment forecast worldwide by product category 2019 and 2023 https://www.statista.com/statistics/690731/wearables-worldwide-shipments-by-product-category/ – Accessed on 27 December 2019

questions they addressed was to find out the reasons why people use activity trackers, to what extent they think these trackers help them to improve their well-being, how people make sense of the data captured, and whether they have any privacy concerns regarding capturing of this personal data.

In their qualitative research study, the authors conducted 21 one-on-one interviews with users of wearable fitness trackers. Interviews took between 45 minutes to one hour. During this time, the subjects were also asked to demonstrate how they interacted with their tracking device(s). The interview responses were open-coded manually using thematic analysis.

Their main findings are that users see fitness trackers as "companion tools" that help them to monitor body signals, which they then use to make decisions on their health and fitness. They conclude that the trackers give users a feeling of gratitude and a sense of control over their own health and physical well-being. A main motivation for using an activity tracker that was reported by all subjects is to keep track of their weight and support weight loss through daily step counting. Other motivations such as heart rate and sleep quality monitoring was of varying importance for participants of this study.

While participants acknowledged ease of use activity trackers and easy interpretation of the data, they were aware of accuracy issues of this data. Interestingly, some participants emphasised that they used activity trackers as memory aide, e.g., by reflecting on the data recorded and trying to match records with individual's activities throughout the day. All participants expressed privacy concerns and lack of trust in how their data might be used by third parties.

The issue of data privacy is also explored by Gupta et al. (2019), who study this in the wider context of visual lifelogging (using automatic capture wearable cameras) where data does not only contain personal information but might also reveal information about people surrounding the lifelogger. As part of their study, they asked 25 participants to capture a visual lifelog using a wearable camera over the period of two days. After this, the participants were asked to segment their data into three categories, namely: (1) Only for me, i.e., these images are not to be shared with anyone; (2) Family and Friends, i.e., these images can be shared with family and friends; and (3) public, i.e., these images can be shared with anyone. Finally, the authors conducted individual interviews with participants to understand their privacy concerns w.r.t. sharing this data with different groups of users.

The participants were categorised as either being researchers at a higher education institution, professionals working in an non-academic industry or organisation, or others, including undergraduate university students or home-makers. Data collection was not evenly distributed; while researchers collected a relatively large amount of data with a higher need for increased privacy, professionals recorded the smallest amount of data. Participants belonging to the other (last of three) group were most willing to share their content with anyone.

The findings of their study reveal various reasons that motivate users to opt for the diverse levels of privacy. Content that should not be shared – labelled as "Only me" in this study – contained personal information such as credit card

details, emails or personal communication, social media data, bills, and similar data. Moreover, it contained information about individual's environments, professional roles (e.g., meetings with colleagues), personal identifiable information, or dietary routines. Content that individuals were willing to share with their family and friends included family moments, information about personal lifestyle (e.g., meeting friends), use of laptops, and similar content. The least sensitive content that individuals are willing to share with the public mainly included non-personal images, e.g., showing outdoor activities, driving the car, etc. After summarising the findings of their final interview phase, the authors suggest principles for sharing visual lifelog data.

Also focusing on visual lifeloggging, Lee and Ryu (2019) compare how people create meaning from images taken automatically or manually. Moreover, they explore changes over time in the interpretative stance of images taken and discuss how lifelogging can support users in interpreting their own past. They approach these questions by conducting a longitudinal between-subjects user study over the period of 200 days. Forty participants with a similar daily life routine were recruited to take part in this study.

The experiment started with a five day image collection phase during which participants were asked to frequently take images. While one half of the subjects were asked to use a mobile phone camera to take these images, the other half was given a lifelogging camera which took these images automatically. Participants were reminded every day to take their cameras with them and to select five to ten images that depicted an accurate representation of their day's activities.

In order to assess users' interpretation of these images, participants were asked to participate in three semi-structured interviews which took place on Day 8, Day 50, and Day 200 of the study. At the beginning of each interview, participants were asked to select the most meaningful images of their collection. In the succeeding interview, they then were asked to describe what these images depicted and why they were of importance to them.

Their findings suggest that those participants who manually took images were able to give a semantic meaning to a images. The authors argue that is mainly due to the fact that these users had to make the conscious decision to take an image, which helped them to remember the semantic value that motivated them. This was not observed by the participants using the lifelogging camera since they did not experience the same need to take a picture. Furthermore, following the framework introduced by Shatford (1986) for the analysis of the perception and interpretation of images, the authors noticed a shift over time on how users of the lifelogging camera created meaning from the images taken.

3 Next Steps

Thanks to the increasing availability of lifelogging devices to the general public, an increasing share of the population will sooner or later start tracking diverse aspects of their daily life activities. While research on lifelogging has mainly been driven by technological advances, e.g., studying methods on how to interpret raw

sensor data, this special issue can be seen as a snapshot on research on lifelogging from an information science perspective.

Differing from algorithm-centric studies, the main focus of these studies is on how people engage with lifelogging tools. Ghosh and Singh (2018) present a study on users' privacy perception and compare it to their use of their mobile phones. Pingo and Narayan (2019) focus on peoples' use of and interaction with activity trackers. They also identify users' privacy as an important aspect that drives users' behaviour. Both Gupta et al. (2019) and Lee and Ryu (2019) concentrate on visual lifelogging, i.e., the use of cameras to automatically create a collection of images depicting one's everyday activities. While Lee and Ryu (2019) explore the opportunities of lifelogging camera as a memory aide, Gupta et al. (2019) explore users' concerns when asked to share visual lifelogging materials.

While these papers in our issue demonstrate promising diversity in behavioural and societal studies of lifelogging activities and technologies, this research area is still in an early stage. Continuous research is essential to understand how rapid development of wearable devices and lifelogging technologies can affect people's mind, health, and lifestyle. It is safe to assume that young generations will have some form of lifelog data archive gathered since their birth. How can we leverage such a unique and vast resource to enhance ordinary and special activities in our life is an important research question in our society.

A challenge in lifelogging research is to obtain large-scale realistic lifelog data. Authors in this special issue made creative effort to collect as much data as possible for their studies. For those who are interested in accessing to lifelogging data for research, the NTCIR Lifelog collections (such as that described in Gurrin et al. (2016)) might be a good starting point[6]. These collections include all-day lifelog archives from a number of wearers over periods of time ranging from weeks to months. The archives include passive capture images using wearable cameras, associated personal biometric data and physical activity data, locations visited, and logs of media accesses. These datasets are meant to support not only quantitative approach but also qualitative research by offering opportunities to formulate initial research questions from real lifelogger's data.

[6] NTCIR-Lifelog Test Collections of Lifelog Data http://ntcir-lifelog.computing.dcu.ie/ – Accessed on 27 December 2019

Bibliography

M. Dodge and R. Kitchin. Outlines of a world coming into existence: Pervasive computing and the ethics of forgetting. *Environment and Planning B: Planning and Design*, 34(3):431–445, 2007. https://doi.org/10.1068/b32041t.

Gartner. Gartner says worldwide wearable device sales to grow 26 percent in 2019, 11 2018. URL https://www.gartner.com/en/newsroom/press-releases/2018-11-29-gartner-says-worldwide-wearable-device-sales-to-grow-.

I. Ghosh and V. Singh. Phones, privacy, and predictions: A study of phone logged data to predict privacy attitudes of individuals. *Online Information Review*, 2018. https://doi.org/10.1108/OIR-03-2018-0112.

R. Gupta, M. Crane, and C. Gurrin. Considerations on privacy in the era of digitally logged lives. *Online Information Review*, 2019.

C. Gurrin, A. F. Smeaton, and A. R. Doherty. Lifelogging: Personal big data, foundations and trends in information retrieval. *Foundations and Trends in Information Retrieval*, 8(1):1–125, 2014.

C. Gurrin, H. Joho, F. Hopfgartner, L. Zhou, and R. Albatal. Ntcir lifelog: The first test collection for lifelog research. In *Proceedings of the 39th International ACM SIGIR Conference on Research and Development in Information Retrieval*, SIGIR '16, page 705–708, New York, NY, USA, 2016. Association for Computing Machinery. ISBN 9781450340694. https://doi.org/10.1145/2911451.2914680. URL https://doi.org/10.1145/2911451.2914680.

H. Joho, C. Gurrin, J. Heinstroem, and M. Matsubayashi. Information practices meet lifelogging technologies: Towards a successful multimethod research framework. *Proceedings of the Association for Information Science and Technology*, 53(1):1–4, 2016a. https://doi.org/10.1002/pra2.2016.14505301005.

H. Joho, C. Gurrin, and F. Hopfgartner. Interaction and engagement for information research and learning with lifelogging devices. In *iConference'16: Proceedings of the Annual Conference of the iSchools organization, Philadelphia, PA, USA*. IDEALS, 2016b. https://doi.org/10.9776/16604.

H. Joho, C. Gurrin, and F. Hopfgartner. Second interaction and engagement on information research and learning with lifelogging devices. In *iConference'17: Proceedings of the Annual Conference of the iSchools organization, Wuhan, China*. IDEALS, 2017. https://doi.org/10.9776/17507.

A. Lee and H. Ryu. Comparison of the change in interpretative stances of lifelog photos versus manually captured photos over time. *Online Information Review*, 2019. https://doi.org/10.1108/OIR-03-2018-0108.

Z. Pingo and B. Narayan. My smartwatch told me to see a sleep doctor: A study of activity tracker use. *Online Information Review*, 2019. https://doi.org/10.1108/OIR-04-2018-0115.

D. Schön. *The reflective practitioner: how professionals think in action*. Basic Books, 1983.

A. J. Sellen and S. Whittaker. Beyond total capture: A constructive critique of lifelogging. *Commun. ACM*, 53(5):70–77, May 2010. ISSN 0001-0782. https://doi.org/10.1145/1735223.1735243.

S. Shatford. Analyzing the subject of a picture: A theoretical approach. *Cataloging & Classification Quarterly*, 6:39–62, 1986.