Personal Visualization: Exploring Data in Everyday Life

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2 Organizer's Background

Charles Perin is currently a postdoc at the University of Calgary. His doctoral research, at the intersection of Human-Computer Interaction and Information Visualization, focused on exploring new interaction techniques for Information Visualization. He mostly published his work on interaction techniques at CHI [13, 15, 19] and Infovis [12, 14]. He is interested in i) designing new interaction techniques; and ii) information visualization application areas related to personal data visualization for everyone (e.g., sports monitoring, health improvement, individual decision-making).

Alice Thudt is currently a PhD student in Computational Media Design. She is pursuing her research at the InnoVis Group at the University of Calgary, Canada. Her research focuses on using information visualization to integrate people's personal data collections better into their everyday lives. Recent projects have explored visualizations for autobiographical storytelling [18] and the design of visualization techniques to reflect autobiographical memories [17]. She is further interested in democratizing the creation of visualization to a wider audience of non-experts [7].

Melanie Tory is an Associate Professor of Computer Science at the University of Victoria. Her visualization research applies to a wide variety of areas spanning natural sciences and engineering, business, and personal informatics. Recent projects have focused on visualizing personal home energy and fitness data and supporting collaboration around visualizations. Relevant papers include a characterization of personal visualization and personal visual analytics [5] an article on what motivates people to use visualizations in non-work contexts [16] and work on integrating personal data within digital calendars [6].

Wesley Willett is an Assistant Professor of Computer Science at the University of Calgary. His interests span information visualization, social computing, new media, and human computer interaction, and his research focuses on pairing data and interactivity to support collaboration, learning, and discovery. In particular, his work explores the intersection of visualization and computer-supported collaborative work and shows how communities, crowds, and novice users can work together build knowledge from data. Dr. Willett's recent work has explored how communities can collaborate to collect and analyze data [21, 25], how large groups of crowd workers can help process data sets [22, 24], and how visualization can help people better understand personal data like digital notes [23]. This work has earned a number of awards, including the Best Paper award at Pervasive 2010 and a Best Paper Honorable Mention at CHI 2011.

Sheelagh Carpendale is a Canada Research Chair in Information Visualization at the University of Calgary. Her research draws upon her combined backgrounds in computer science and visual arts, benefiting from the interdisciplinary cross-fertilization to enable the design of innovative, people-centred information technologies. By studying how people interact with information both in work and social practices, she works towards designing more natural, accessible and understandable interactive visual representations of data [8, 11, 20]. She combines information visualization, visual analytics and human-computer interaction with innovative new interaction techniques to better support the everyday practices of people who are viewing, representing, and interacting with information [2].

3 WORKSHOP OUTLINE

In this workshop we will discuss the emerging area of personal visualization. In this section we describe the proposed focus and motivation, the technical scope, and the main goals of the workshop.

3.1 Proposed Focus and Motivation

Individuals recently began to seek how they can explore and understand the data that affect their personal lives. This includes biometric personal data such as health-related data [11], self-monitoring, sports and performance understanding and improving; and personal data such as online social networks, energy consumption, web activity, and photo collections [17]. These personal data often involve large quantities of data. Popular devices for sports monitoring record measures such as heart-rate, speed, and pace at high frequency, resulting in massive amount of data that is difficult to make sense of. As another example, online social networks can consist of thousands of posts every day from hundreds of acquaintances/friends with various degrees of intimacy. These data are relevant to our personal lives, enabling us, as individuals, to explore and make sense of important, personally relevant information [10].

Such explorations of personal data are usually carried out on the web by non-visualization experts. Commercial products propose simple designs to import collected data, usually specific to a device and featuring simple charts such as bar charts and line graphs (e.g., fitbit[1] and garmin connect[2]). However, working with large amounts of data of particular types (e.g., multi-dimensional, temporal, cyclic, incomplete, and sometimes fuzzy) is a real challenge for individuals. While the area of quantified-self recently emerged and HCI communities have followed the trend (e.g., [1, 3, 9]), exploring ways of providing individuals with new devices and interfaces for collecting personal data, few visualization researchers have started to investigate personal visualization as an area of research.

Information visualization application areas and visual analytics tools tend to focus on data important to science, finance, business and government. Such tools are designed for experts (e.g., scientists, traders, and professionals trying to make sense of their data). Personal life related data brings a new context to both visualization and visual analytics, and with that new context come new research and design challenges [2]. The visualization community has started to consider the emerging and important case of personal visualization, i.e. individual's challenges for collecting, visualizing, and making sense of personal data. Personal visualization is not *just* about visualizing personal data, but also about visualizing data of personal interest (e.g., global warming, sport, neighborhood) and about creating a personal visualization representing non-personal data (e.g., personal artistic representations of country indicators).

Understanding individual's needs in the context of their personal data and designing appropriate tools to support visualization and analysis of this data is a crucial and emergent challenge. This should consider factors such as data collection challenges, casual visualization, attractive and enjoyable interfaces, sensemaking and storytelling strategies [18], statistical reasoning for non statistical experts, and engagement. In particular, such designs should carefully consider pleasure, gamification, and engagement with the data instead of efficiency to perform low-level functional tasks quickly and accurately. The main purpose of such data understanding is generating insights, and eventually making decisions to improve one's life, the ultimate purpose of visualization.

To summarize, personal visualization is still in its infancy in the research area of visualization while individuals gather more and more personal data and need to make sense of it. For these reasons, the workshop format during the VIS conference offers the ideal setting to gather the community and discuss open and important questions such as:

- How to connect to research areas such as personal informatics [1, 9] that focus on collecting personal data?
- How to provide individuals with ways of visualizing and making sense of large amounts of multi-dimensional, temporal, multi-variate data?
- How to apply the knowledge from the community to this new research topic? (e.g., uncertainty visualization, missing data, and storytelling).
- How to tackle the important challenge of sharing and privacy, crucial for personal data?
- Which application areas involve personal data? (e.g., health, well-being, environmental concerns, sport monitoring, photo collections, social networks).
- What are the differences between designing visualization for domain experts and for non-expert individuals?
- How does personal visualization relate to art? What are the particularities of e.g., data portraits [4, 26] and data sculptures [27]?
- How to assess the challenges of discoverability, gamification, engagement?
- How to evaluate tools for personal visualization? How to assess the impact on one's life?

3.2 Goals and Intended Results

The main objective of this workshop is to bring together people from academia and industry to discuss future perspectives in the area of personal visualization. This workshop has two main goals: 1) gather the community working on the topic of personal visualization, and 2) converge on a research agenda for the community.

Gather the community. Personal visualization exist on the web, on blogs, on personal websites. We hope authors of such visualizations "in the wild", both from academia and industry will attend the workshop. Other research areas such as personal informatics, HCI, design, and art contribute to personal visualization. Specialized industries also provide platforms on the web to visualize data collected by their wearable devices, usually using simple visualizations such as pie charts, bar charts, and line graphs. We intend to bring all these communities together and demonstrate that the visualization community plays a crucial role in personal data understanding and sensemaking and has the required expertise (e.g., storytelling, literacy, infographics, uncertainty) to make well suited and dedicated visualization tools, beyond standard charts.

Converge on a research agenda. The workshop is designed in such a way that we will identify the main challenges and opportunities for the visualization community. We will need to establish definitions, identify open challenges, and ultimately converge on a research agenda for the community. Such challenges include challenges about data (e.g., collection, storage, structure) and are related to research areas such as personal informatics and quantified-self; challenges about engagement, gamification, enjoyment, and aesthetics; and challenges in terms of visualization, with personal visualization having different purposes than scientific/industry visualization for experts. It raises numerous problems such as sharing and privacy, evaluating such visualizations for which time and error measurements do not always make sense, and designing appealing and easy to discover/learn tools for the general public.

We intend to use the workshop website we will create if the paper is accepted (see section 4.1) as a platform for researchers and professionals to exchange ideas, and to showcase the results from the workshop. We will also build a mailing list to keep people in touch. Finally, we will ask the authors if they are interested in organizing/contributing to a special issue of a journal to publish their work on the topic. A second objective is to gather interested people

[1] http://www.fitbit.com

[2] https://connect.garmin.com

in writing a group article summarizing the research agenda based on the challenges and perspectives identified during the workshop.

4 Participants and Call for Participation

This workshop proposal is for a half-day workshop. As VIS workshops are open to all attendees, the final size of the workshop is difficult to predict. We expect a final size of about 40–80 attendees with 15–20 accepted position papers / posters / demos. In order to be invited to speak at the workshop, participants will have to first send one of the following contributions:

1. **Position papers** will be 4–6 pages length papers about a challenge for personal visualization. We will encourage, but not restrict, authors to contribute to one of the identified topics of personal visualization. Position papers should clearly identify one challenge and discuss implications for the visualization community.

2. **Posters/Demos** will be 2 pages length papers accompanied with either a A0 poster and/or an interactive demonstration. Posters and demos should present author's work on the topic of personal visualization. We expect authors to submit either i) tools they built for themselves, for relatives, or for communities they are involved in (mainly for demonstrations); or ii) design ideas and early sketches (mainly for posters).

Workshop presenters will be selected to represent the different aspects of personal visualization that we enumerated above. We will favor diversity in order to cover the topic widely. We will select participants according to a number of criteria, which include: originality of the submission, complementary nature of research background, and quality of previous publications related to the workshop topic.

4.1 Participants and Timeline

To achieve a diversity of participants, we will actively advertise the workshop to people with backgrounds in information visualization, visual analytics, HCI, interface design, cognitive psychology, and art. In addition to publishing it on relevant web pages, this includes e-mail to related mailing lists as well as personal e-mails to people known by the organizers to be working in the field or interested in the area. We will contact industries in related areas (e.g., sport monitoring devices) that demonstrated us their interest in visualization.

If the workshop is accepted, we will set up a website containing the call for participation, the timeline, and the schedule. We will also create a twitter account. We will advertise as soon as the workshop proposal is accepted. We expect to include researchers from the community with a strong interest in personal visualization to help review submissions.

The submissions will be made publicly available on the workshop website as soon as possible. We will encourage both the authors and the attendees to have a look at these submissions before the workshop.

Additionally, we will contact several persons from outside the research community we are connected with, whose work on personal visualization is recognized. We will i) ask them if they are interested in attending the workshop, and ii) ask them the permission to showcase they work, in the form of printed posters. This exhibit-like showcase will add value to the workshop and we hope it will demonstrate the importance of this new research area from outside the community and give an external eye on the topic.

This workshop highly encourages the active participation of attendees, with the first part of the workshop consisting of presentations, the second part consisting of poster viewing, interactive demonstrations, and a showcase during an extended coffee break, and the last part consisting of group discussions about identified discussion topics involving the audience.

The tentative schedule for the workshop is:

1. **Introduction** (15–20 min) from the workshop organizers.

2. **Part I** (1h) Short presentations from the authors (exact time to be determined according to the number of submissions). Authors of position papers do a 4–8 minutes presentation and authors of demos/posters do a 2-4 minutes presentation, as they will showcase their work during the break. Initial presentations are short, similar to a fast forward session. This fast-paced introduction allows attendees to get a quick overview of the richness of the ideas but leaves the remainder of the available time to discussions and activities. Speakers will be asked to raise 1–2 interesting discussion topics at the end of their presentation. We will collect these discussion topics for **Part III**.

3. **Part II** (40min–1h) Extended coffee break during which posters/demos authors showcase their work, and during which attendees will also have time to look at the exhibition.

4. **Part III** (1h-1h30) Group discussions involving both the audience and the authors. The workshop organizers will select the best / most recurrent discussion topics from the presentations in **Part I**, and organize discussion groups based on these topics. Each group will brainstorm and then give a short (2–3 minutes) summary of their discussion.

5. **Wrap-up** (15–30 min) conclusion and discussion of the outcomes of the workshop.

4.2 Requested Facilities

For this workshop we will need a room with a projection surface in the front for the initial fast forward presentations. We will need a desk in the front for speaker presentations, group presentations, and organizer's introduction / conclusion. Because we intend to break the audience into discussion groups during **Part III**, we would need a room with several round or square tables arranged in a way that is suitable for small group discussion. The tables and chairs should be movable.

We will also need space and several desks (number to be determined) for participants to set up their demonstration on the side of the room. We will not provide additional screens or projectors to the demonstration authors. Similarly, we will need space and poster boards (number to be determined) to hang out posters during the workshop.

Finally, and optionally, it may be interesting for all attendees of the conference to be able to showcase the posters and the exhibit permanently during the conference. If there is an empty space somewhere in the building, it would be an opportunity for the authors to showcase their work on the topic.

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