
Data Craft: Integrating Data into Daily Practices and Shared Reflections

Alice Thudt

University of Calgary
Calgary, AB, Canada
alice.thudt@gmail.com

Uta Hinrichs

University of St Andrews
St Andrews, Scotland, UK
uh3@st-andrews.ac.uk

Sheelagh Carpendale

University of Calgary
Calgary, AB, Canada
sheelagh@ucalgary.ca

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Abstract

We explore data craft as a means to create mementos that integrate data about personal and shared experiences into people's everyday lives. Digital mementos, e.g., in form of visualizations, aim to support personal and joint reminiscing by leveraging personal data archives. However, their digital nature can complicate value construction and integration with social and everyday practices. We propose to consider data craft—the manual crafting of functional objects that incorporate personal visualizations—as an opportunity to create meaningful physical objects. We suggest that the manual creation and habitual use of these objects adds to their perceived value and authenticity and can spark recollection based on digital traces of personal and shared experiences. We illustrate the concept of data craft through examples and reflect on the resulting objects as keepsakes and gifts that strengthen social relationships.

Author Keywords

Personal Visualization; Crafting; Data Physicalization

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

Introduction

Mementos and family heirlooms are among people's most cherished personal objects [2]. They signify

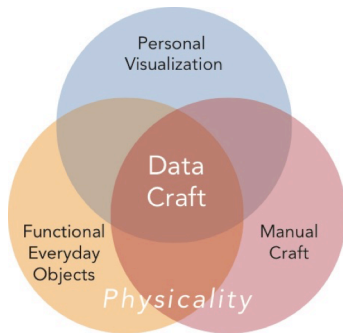


Figure 1. The defining characteristics of data craft.



Figure 2. Felted pillowcases by Kim Rees visualizing dreams and personal accomplishments [10] (Image courtesy of Kim Rees).



Figure 3. Conceptual knitting creates patterns from real world occurrences. This hat shows different events during the TV-show "Saved by the Bell" [4] (Image courtesy of Lee Meredith).

important relationships and aid people in the construction of meaning and identity through personal and joint reminiscing [2]. Access to unprecedented amounts of data about people's lives provides a potentially rich resource for reminiscing. However, sharing such data with others and deriving meaning from it is still a challenge [11]. For example, while people sometimes print digital photos, giving quantitative data (e.g., communication or location histories) a physical presence at home and making it accessible to all family members is more difficult. Previous research has highlighted *integration* with everyday practices and *discoverability* [5,8,9], *permanence* [7], and *authenticity* [6,7,9] as important qualities of physical mementos. However, we still lack means to create mementos from digital data that incorporate these characteristics.

We propose *data craft* as a way to create meaningful physical mementos based on digital records of personal and shared experiences. Data craft incorporates the qualities of physical mementos and invites reflection and reminiscing. In data craft, people create functional objects that incorporate visual representations of their digital records. This practice creates an association of the object with a memorable experience or a loved person. The habitual use of the crafted everyday objects integrates data and the memories it represents with people's existing practices. Their physicality allows these objects to become lasting gifts or family heirlooms that can be rediscovered and shared on a daily basis. The process of manual crafting can further add to the objects' perceived value and authenticity.

The Concept of Data Craft

Crafting has a long tradition of capturing personal, family, and cultural histories within functional objects

(see, e.g., quilting) [1,15]. To expand such reflective practices, we explore the concept of *data craft* as a way to incorporate data into crafting. Crafted everyday objects are enhanced with visualizations of personal data to facilitate reflection on otherwise hidden traces of people's experiences and relationships. We define data craft as a practice at the intersection of personal visualization and manual crafting to create physical and functional mementos (see Fig. 1).

Data craft includes traditional crafts such as felting (Fig. 2 [10]), knitting (Fig. 3 [4]) or pottery (Fig. 4 – 6). The concept (1) describes an approach to integrate people's digital data with their everyday activities and (2) contributes to the areas of personal visualization, physicalization, and digitally enhanced crafting. In the following, we define characteristics of data craft in relation to valued qualities of mementos. We then describe data pottery as an example case of data craft.

Making Abstract Personal Data Visible & Graspable

A key characteristic of data craft is the use of personal digital records such as activity logs, communication or location histories. Previous work on personal visualization and visual analytics has advocated for visual representations to make personal data accessible and interpretable [3]. Visualizations can promote reminiscing and storytelling while protecting the privacy of sensitive data [3,14]. Data craft takes personal visualizations into the physical realm, e.g., in form of decorations for functional objects. In this way data craft integrates personal visualizations directly with objects people encounter and share in their daily lives.

Enhancing Functional Everyday Objects

Data craft aims to integrate data with people's shared and personal practices by creating objects that serve

established functions. Previous work has shown that people often choose such mundane objects as mementos [8,9]. A mementos' frequent use by different family members adds to its accrued value [5,8,9]. Discoverability and permanence are valued qualities of physical mementos [5,7,8,9]: People often place physical mementos of shared experiences in visible locations where they can be easily accessed [5,8]. Their physicality allows them to become lasting parts of people's identities [7], and to be passed down multiple generations or given as gifts [8]. In contrast, people tend to experience digital data as individual possessions, as "more ephemeral", "unstable" [9], and prone to loss and fragmentation [7]. Data craft addresses this by integrating visualizations of this data with everyday objects. The resulting objects allow for spontaneous encounters and shared experiences with quantified data. The decorative visualizations can spark reminiscing and sharing memories of relationships and past events.

Manual Crafting

Previous research has explored digital fabrication to create physical representations of personal data for reflective purposes [12,13]. In contrast, data craft focuses on *manual creation processes*. In fact, in data craft reflection and reminiscing are not just supported by the resulting artifact, but also deeply engrained in the creation process of this artifact. Effort and personal investment add to the perceived value of crafted objects [2,15]. In data craft visual exploration and encoding become part of the crafting process. This engagement with data and associated memories makes data craft a deeply reflective activity. Previous studies found that people often choose idiosyncratic objects as mementos [9]. Typically, such objects are unique and

not reproducible [6,7,9]. The manual process of data craft leads to such unique and authentic artifacts.

The concept of data craft adds new perspectives to works in personal visualization and physicalization for shared reflection and storytelling, and it inspires new ways of engaging with data through traditional crafts.

Reflecting on Relationships through Data Pottery

Data pottery is one example of data craft where tableware is created in clay and then decorated with visual patterns based on personal data. Below we present three artifacts crafted by our first author Alice Thudt. We describe how these 'data pots' signify important relationships and shared experiences and invite joint reminiscing, reflection and social interaction.

PARENTS' CALL BOWLS: The two bowls shown in Figure 5 represent Alice's relationship with her parents based on their Skype call history since she moved away from home. Both bowls show calls on a three-year timeline: on one bowl, each call is depicted as a line; on the other bowl calls are shown as dots with one dot representing 5 minutes of call time. One bowl was intended as a gift to her parents and the other one to be kept by herself. The patterns highlight how Alice and her parents maintained close contact while apart. Cereal bowls are objects that they use every morning, which ensures daily encounters with the data and their meaning. As Alice states, her intention was for the bowls to act as a reminder to keep in touch with each other frequently.

LOVE TEAPOT: The teapot is a memento of Alice's relationship with her partner. It depicts text messages containing the word "love" that they exchanged since the beginning of their relationship (see Fig. 6). Each



Figure 5. Cereal bowls representing Skype-call history with parents.



Figure 6. Teapot visualizing instant messages containing the word "love".



Figure 7. Bowl showing route of a shared trip with a friend.

dotted line represents one year; one dot stands for 10 messages. The visualization shows the progression from a long-distance relationship where the couple often expressed their love through texts, to recent years when living together allowed them to communicate directly. Alice: "I chose a teapot for this memento because it is a shared object that allows us to have a cup of tea together while pondering the development of our relationship."

MORAY COASTAL TRAIL BOWL: The bowl shown in Figure 7 is a crafted souvenir of a shared trip with a friend. It shows destinations on a trail Alice and her friend hiked together in Scotland. The two glazes on the bowl mark the coastline they walked, while the white dots on the glaze line represent locations where they stopped to camp for a night. Alice: "This bowl resembles the shape of a bowl we used during the hike and thus creates additional associations with the memories of the trip. I crafted the bowl as a gift for my friend, to remind her of our joint adventure."

Below Alice further reflects on her data pottery practice and describes how she creates everyday tableware that reflect her relationships with friends and family to spark (shared) reminiscing.

Reflective Design and Crafting Process

"For me, crafting a 'data pot' is driven by the personal data that I want to turn into a memento and who I want to share it with. I decide on the associations and encounters I want to enable and take the personality of the pot's recipient into consideration. This influences the shape and function of the pot I make as well as how it visually reflects the data. Looking through my data records is part of a reflective process that often sparks memories or emotions. Trying to create patterns

that evoke associations with the events or people, I explore possible data visualizations digitally and through sketching. I do not include legends so the pots reveal their meaning only to insiders or through storytelling. My goal is to craft objects that value past experiences and create opportunities for meaningful interactions with the data, my loved ones and our shared stories. I decide on the form and function of each pot to evoke associations with a specific experience or person, to support activities that allow for episodes of reminiscing, or to encourage social interactions. As a final step, I shape the pot in clay and apply the visual pattern. This process is driven by my reflections on the data, my memories as well as the materials which influence my design."

Conclusion

Data craft allows people to create meaningful personal artifacts and shared mementos that can be used in daily from digital records. Both the manual crafting process and the resulting physical artifact create opportunities for reflection and sharing memories. Focusing on the creation of functional everyday objects, data craft shapes opportunities to integrate personal digital data into everyday life where they can be serendipitously re-encountered and used together. Manual crafting invites the crafter to reflect and connect with the memories present in the data and the emerging object and gives the objects authenticity and a personal touch. Data craft can be integrated into a range of traditional crafting practices; we have presented data pottery as one of them. Future work will investigate ways to support crafters in incorporating data into their creative process, explore other means of making and empirically study the impact of data craft on personal and shared reflection.

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Data Relationships: *At the workshop, Alice is interested in discussing the impact of data on long-distance relationships with family and friends. Sharing data streams with loved ones abroad can create opportunities to stay connected with family members, provide prompts to start conversations with friends and facilitate an ambient awareness of daily activities. Alice is particularly interested in the potential of visualizations to allow for shared experiences with data.*

Alice Thudt is a PhD candidate, pursuing her research at the InnoVis Group at the University of Calgary. She is interested in using visualization to create personally meaningful artefacts from personal data, visualizations for autobiographical storytelling and visual mementos.

Uta Hinrichs is a Lecturer at the University of St Andrews. Her work focuses on designing and studying the use and experience of interactive systems that facilitate the exploration of (cultural) data collections from academic, leisurely, and artistic perspectives.

Sheelagh Carpendale is a professor at the University of Calgary where she holds a Canada Research Chair in Information Visualization and the NSERC/AITF/SMART Industrial Research Chair in Interactive Technologies. Her research draws upon her backgrounds in computer science and art. By studying how people interact with information she works towards designing more natural and accessible data representations. She combines information visualization and HCI with innovative new interaction techniques to support everyday practices of people who are viewing, representing, and interacting with information.