Data Wayfaring through a Diversified Use of Temporal Metadata in Design Practices

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ABSTRACT

In the context of this workshop, we aim to reflect on both the strategies of using temporal metadata as a design material and the design complexities in the ideation process of our project, PhotoClock. With the massive proliferation of digital photos, new approaches are needed to enable people to engage with their vast photo archives over time and into the future. Hence, we feature PhotoClock — a mobile application that reconnects people with their personal memories through presenting photos previously taken at the 'clock time' of the present moment. In response to this workshop's themes, we propose potential topics surrounding the generative knowledge of: (i) interconnecting multiple memories in and across time, and (ii) reconnecting past to the present through the presence of temporal metadata.

CCS CONCEPTS

• Human-centered computing → Human computer interaction (HCI); Interaction design process and methods.

KEYWORDS

Temporality; Metadata; Research through Design; Digital Photos; Personal Informatics; Mobile Application; Interaction Design.

1 Position Statement

In the context of this workshop, we aim to reflect on both the strategies of using temporal metadata as a design material and the design complexities in the ideation process of our project, PhotoClock. Over the past few centuries, photos have been a key resource to support people's practices of self-reflection, identity construction, and contemplation of the future [4]. People's everyday photographic practices have been highly mediated by a variety of digital devices and online services. These technologies enable people to create personal digital photos faster than ever before [1]. Yet, the vast and still growing photo archives pose new challenges for the design and HCI communities. The digital archives grow larger and become increasingly invisible, lacking the material presence that might attract people to notice and engage with their digital belongings in an everyday context (e.g., [10]). Thus, HCI research has articulated the need for more diverse approaches to experience, explore, and live with people's digital photo archives over time. Here in this paper, we present PhotoClock, a mobile application that reconnects people with their personal memories through presenting photos previously taken at the 'clock time' of the present moment (See Figure 1).

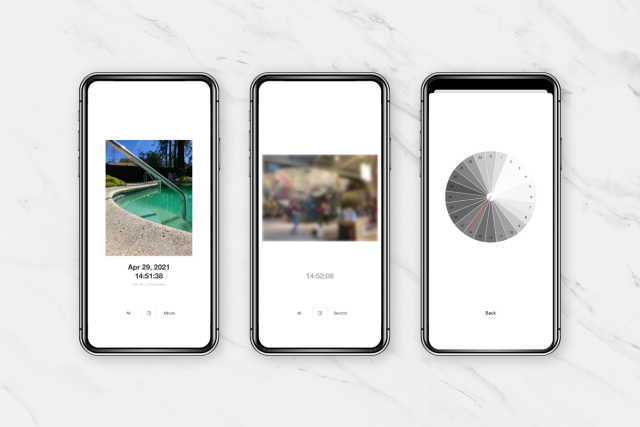

Figure 1: The user interface of PhotoClock. **Left:** All metadata are presented in the main page. **Middle:** When there was no photo taken at the current clock time in the past, the user sees a blurry version of the upcoming photo and it gets clearer as time goes by. **Right:** The Sunburst page shows how many photos were taken in this device throughout the 24 hours. The darker the color is, the more photos were taken within that particular hour.

Figure 2: PhotoClock users can put its widget on the home page of their phone as a subtle everyday trigger for reflection. It refreshes every hour and shows an image taken at the same hour of the day in the past.

At the workshop, we can aim to demonstrate how PhotoClock resurfaces photos in real time. We can also provide a download link before the workshop date for interested participants to view their own photos via PhotoClock on their iPhones, iPads, or Apple M1 computers over time (as shown in Figure 2).

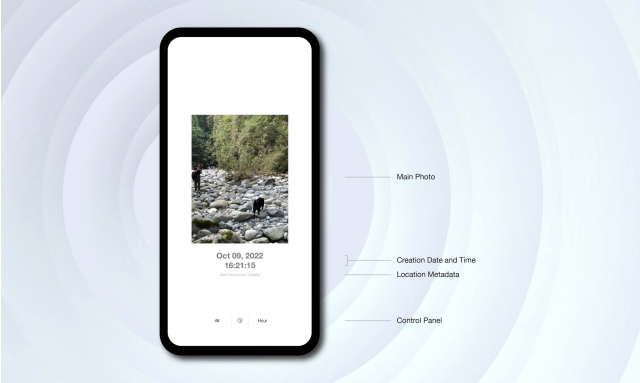

Figure 3: Using the current clock time, the PhotoClock app finds a photo taken around the same time of day in the past and presents it alongside with the temporal and location metadata to its user. The Control Panel displays the current selected filter and pacing mode.

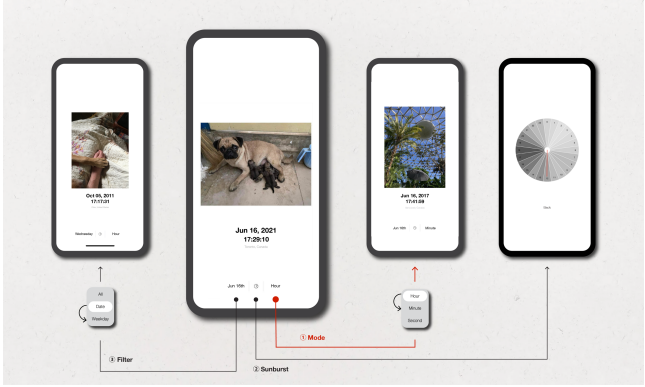

Figure 4: Three buttons for the PhotoClock interaction: ① The main button on the right toggles between the three pacing modes (Hour, Minute, and Second). ② The middle button with a pie chart icon on it is an entry to the Sunburst page. ③ The left button toggles between the three selection filters (All, Date, and Weekday).

2 PhotoClock Design

Leveraging temporal metadata, PhotoClock allows people to explore and interact with their digital photo archives through three pacing modes (Hour, Minute, and Second). Each of them presents photos in a specific length and movement of time which is tied to the current clock time. For example, Hour mode displays one photo per hour drawn randomly from a stack of photos taken at the current hour (e.g., 5:00-5:59pm) in the past. This photo will remain present until it turns 6pm, at which PhotoClock will randomly select one photo from the 6:00-6:59pm stack, and so on. The process is ongoing, slowly changing with each hour indefinitely. If a user were to change the mode from Hour to Minute, a new random photo selection will occur (See Figure 3). If the photo being displayed during the Hour setting at 5pm was taken at 5:29:10pm but in real time the clock time is 5:41pm, and the user changes the mode to Minute, a new photo will be selected from the 5:41pm stack in the Minute mode (i.e., from all photos taken at 5:41pm across time). If the Second mode is selected, then the app will pick a new photo every second (e.g., at 5:41:45pm, 5:41:46pm, 5:41:47pm).

Meanwhile, PhotoClock allows its users to apply selection filters (All, Date, and Weekday). *All* means that the system does not apply any filter, so all of the user's photos would be considered by the system. The *Date* filter only show photos taken around this time of day on a specific date, such as all photos taken on July 7th throughout the years. The *Weekday* filter filters photos from a specific day of week such as Sundays.

Offering a minimum degree of control, the PhotoClock design opens possibilities for people to encounter a wide range of unknown, forgotten, or discrete memories captured in different points in time through the presence of their digital photos. While its interaction design is relatively minimal and subtle, it takes time to understand and offers potential to catalyze various open-ended experiences in relation to curiosity, contemplation, and perception of memories interconnected through time.

3 Conclusion

As a response to this workshop's themes, we would like to propose potential discussion topics surrounding the generative knowledge of data-driven design practices in relation to time.

3.1 Interconnecting Memories across Time

Through PhotoClock, we aim to contribute to growing calls in the design and HCI communities to create design exemplars capable of: (a) forming relations to and interpretations of our growing amounts of personal digital data [5], and (b) expressing more diverse perspectives on temporality through design [8]. Our description of the PhotoClock project helps make a concrete approach to making use of the 'time of day' part of temporal metadata as a design tactic to interconnect multiple personal memories across different days, months, and years to present one's life patterns. It offers rich discoveries of unknown life patterns and curious exploration of one's digital photo archive.

3.2 Reconnecting Past Moments to the Present

Another interesting topic is related to ways of mobilizing and supporting the practice of *data wayfaring* [9] where people navigate their lived experience through using a variety of personal data. In the case of PhotoClock, we created a never-ending connection between the present time and numerous past moments depicted in digital photo forms as time continues to move forward. In this workshop, we aim to further discuss and understand more strategies and tools of utilizing temporal metadata and recreating meanings out of personal data in a broader level, and what benefits and limitations should be considered when designing experiences with personal data.

Collectively, we aim to unpack and critically reflect on the PhotoClock in a generative way to inspire future design-oriented research that inquiries into the temporal expression of personal or social data. Throughout the years, our research team has accumulated publications about data and temporality [3,6,7]. One of the works will be presented in CHI2023 and all workshop

participants are welcome to attend [2]. Ultimately, we hope our reflexive description and implications of our design artifacts could provoke ideas for longer-term human-data relations as people live and grow with their digital possessions over time.

REFERENCES

[1] Matic Broz. 2022. How Many Photos Are There? (2023) 50+ Photos Statistics. Retrieved January 14, 2023 from https://photutorial.com/photos-statistics/

[2] Amy Yo Sue Chen, William Odom, Carman Neustaedter, Ce Zhong, and Henry Lin. Exploring Memory-Oriented Interactions with Digital Photos In and Across Time: A Field Study of Chronoscope [to be published in CHI'23].

[3] Amy Yo Sue Chen, William Odom, Ce Zhong, Henry Lin, and Tal Amram. 2019. Chronoscope: Designing Temporally Diverse Interactions with Personal Digital Photo Collections. In *Proceedings of the 2019 on Designing Interactive Systems Conference*, ACM, New York, USA, 799–812. DOI:https://doi.org/10.1145/3322276.3322301

[4] Mihaly Csikszentmihalyi and Eugene Halton. 1981. *The Meaning of Things: Domestic Symbols and the Self.* Cambridge University Press.

[5] Chris Elsden, Mark Selby, Abigail Durrant, and David Kirk. 2016. Fitter, Happier, More Productive: What to Ask of a Data-driven Life. *interactions* 23, 5 (August 2016), 45–45. DOI:https://doi.org/10.1145/2975388

[6] William Odom, Ron Wakkary, Ishac Bertran, Matthew Harkness, Garnet Hertz, Jeroen Hol, Henry Lin, Bram Naus, Perry Tan, and Pepijn Verburg. 2018. Attending to Slowness and Temporality with Olly and Slow Game: A Design Inquiry Into Supporting Longer-Term Relations with Everyday Computational Objects. In *Proceedings of the 2018 CHI Conference*, ACM, New York, USA, 77:1-77:13. DOI:https://doi.org/10.1145/3173574.3173651

[7] William Odom, MinYoung Yoo, Henry Lin, Tijs Duel, Tal Amram, and Amy Yo Sue Chen. 2020. Exploring the Reflective Potentialities of Personal Data with Different Temporal Modalities: A Field Study of Olo Radio. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference* (DIS '20), Association for Computing Machinery, New York, NY, USA, 283–295. DOI:https://doi.org/10.1145/3357236.3395438

[8] Larissa Pschetz and Michelle Bastian. 2018. Temporal Design: Rethinking time in design. *Design Studies* 56, (May 2018), 169–184. DOI:https://doi.org/10.1016/j.destud.2017.10.007

[9] John Rooksby, Mattias Rost, Alistair Morrison, and Matthew Chalmers. 2014. Personal Tracking As Lived Informatics. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '14), ACM, New York, NY, USA, 1163–1172. DOI:https://doi.org/10.1145/2556288.2557039

[10] Steve Whittaker, Ofer Bergman, and Paul Clough. 2010. Easy on That Trigger Dad: A Study of Long Term Family Photo Retrieval. *Personal Ubiquitous Comput.* 14, 1, 31–43. DOI:https://doi.org/10.1007/s00779-009-0218-7