Ecphoria Player: Exploring, Revisiting, & Living-with a Lifetime of Digital Music

Alireza Mogharrab
School of Interactive Arts + Technology
Simon Fraser University
Surrey, British Columbia, Canada
amogharr@sfu.ca

William Odom
School of Interactive Arts + Technology
Simon Fraser University
Surrey, British Columbia, Canada
wodom@sfu.ca

Final published version appears in DIS '18 Companion: Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems. 2018. p. 189-194

doi: 10.1145/3197391.3205434
https://doi.org/10.1145/3197391.3205434

Abstract
With the massive adoption of music streaming services globally, metadata is being generated that captures people's music listening histories in more precise detail than ever before. These archives offer a valuable and overlooked resource for designing new ways of supporting people in experiencing the music they have listened to over the course of their lives. Yet, little research has demonstrated how metadata can be applied as a material in design practice. We propose the Ecphoria Player, a device that leverages music listening history metadata to support experiences of exploring and living with music from one's past. We report on our design decisions, rationale, and implications for future design researchers.

Keywords
Digital Music; Metadata; Temporality; Design Research.

Introduction and Background
Since the early 20th century, people's practices of collecting, possessing, and listening to music have played important roles in supporting self-reflection [3,11], self- presentation [24,27], and socially

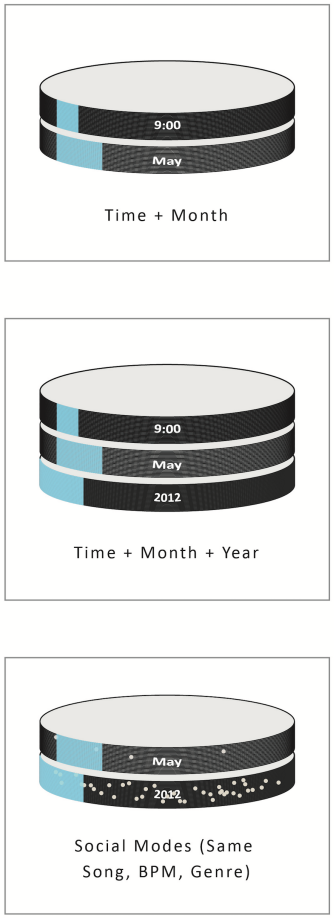

Figure 1. Modular components of the Ecphoria Player. The top and middle represent easily interchangeable timeframe modes. The bottom illustrates social modes in which two people's archives are combined (the dots represent overlapping similarities in terms of similar songs, music genres, or BPM).

connecting with others [5,20]. We now live in a world populated by digital systems and services that have enabled people to create personal archives of digital music at scales larger than ever before. Digital music remains one of the most enduring and evolving forms of personal digital content [12]. For example, users of the music service Spotify listen to over fifty-five million hours of music daily and over one trillion songs are streamed annually through digital music services [13].

These huge collections pose new challenges for the HCI community. As personal digital music archives grow larger, they become progressively invisible, lacking the material presence that might enable people to casually notice and engage with them [15]. Internet-enabled digital music applications, such as Spotify, also strongly emphasize the recommendation and acquisition of new music. While this is valuable, it can also inhibit people's capacity to 'look back' and explore past tastes [13].

As a byproduct of people's interactions with their online digital music, a standardized, readily accessible forms of metadata are now generated that captures exactly what music people listened to and when in more precise detail than ever previously possible [13,26,28]. Yet, the productive application of metadata like this has largely been overlooked and unexplored in design [8,15]. Yet, specific examples demonstrating how such rich and unique engagements with personal data can be supported through the creation of new design artifacts are sparse.

How might rich, emergent, and ongoing experiences be supported with people's archives of digital music as they age over time? What opportunities exist for leveraging metadata as a resource for designing new ways of experiencing the trajectory of digital music one has listened to across their life? To explore these questions, we propose the Ecphoria Player, a modular, interactive music player that leverages a user's (or multiple users') archive(s) of listening history metadata to embody the lifetime of digital music they had previously listened to. On a conceptual level, several related approaches including ludic design [6], reflective design [23], and slow technology [9,18] shaped our design led inquiry. Methodologically, our work builds on a trajectory of research in DIS and HCI that emphasize the development of new knowledge through design proposals and practice (e.g., [1,5,10,21,22,25]).

The Design of the Ecphoria Player

The term *Ecphoria* refers to the experience of recalling a memory that had previously been forgotten, often prompted by sensory input – in our case music that was listened to previously in one's life. The Ecphoria Player works by linking to its user's Last.FM online account. Last.FM [28] is a free web-based application that runs across a user's personal computer and devices that generates precise records of each song she has listened to in terms of the time and date, as well as the artist, song, album, genre, and beats-per-minute (BPM) (e.g., if listed through iTunes, Winamp, Spotify, Youtube, etc.). In existence since 2002, Last.FM offers deep, unprecedented access to its users' music listening histories. We developed a Python script that generates daily updated database of a user's entire metadata history of listening instances (also see [15] for more details on the technical backend we developed the Ecphoria Player on top of). We then implemented a Modpidy music server on a Raspberry Pi, and , via the Spotify API, used it to push a specific listening paired with a unique Spotify ID to a Spotify account dedicated

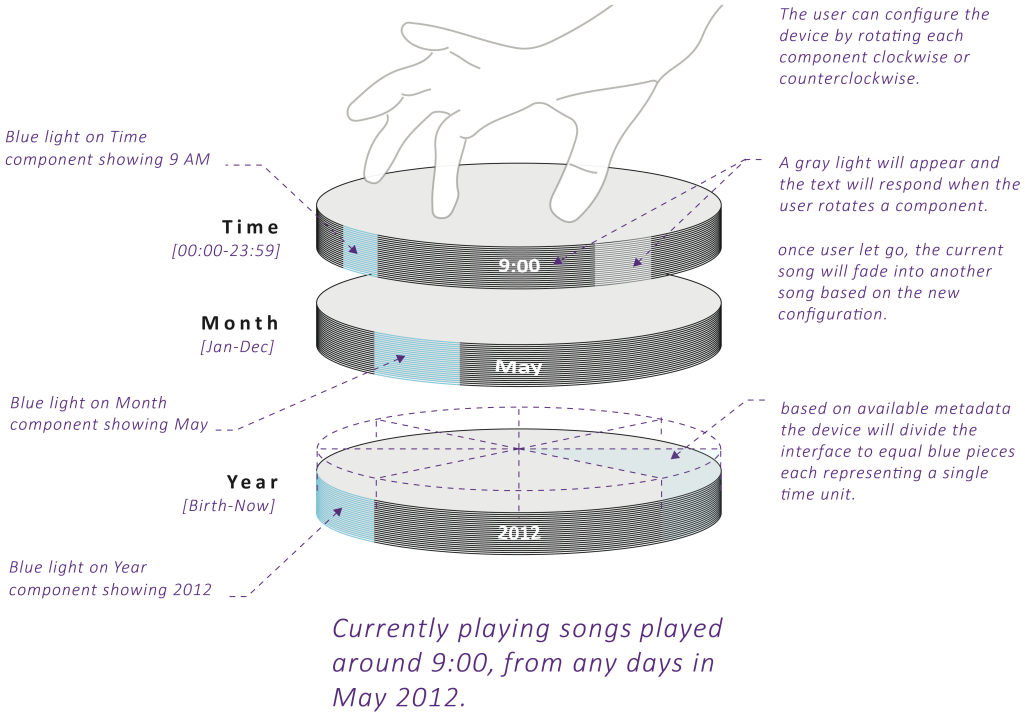

Figure 2. Ecphoria Player Form and Interaction Design

to the Ecphoria Player to subsequently play the song. By using a dedicated Spotify account, we avoided creating a feedback loop in which older entries were introduced into a user's actual Last.FM account. The system in software form is fully functional and we implemented the player on a Raspberry Pi to support our longer-term goal of creating a tangibly interactive version. Next, we describe key decisions shaping Ecphoria Player's interaction design and elements of its user experience.

Form and Interaction Design

The Ecphoria Player uses the exacting precision offered by a user's Last.FM metadata to enable her to explore, revisit, and listen to music from her past through different combinations of three 'timeframe' modes that are represented by three different modular cylindrical components—*Time, Month,* and *Year* (see Figures 1 & 2). The device turns on when at least two components are connected (i.e., placed on top of each other and linked by an internal magnet in the centre of each cylindrical components). It then begins playing the song based on the cylinder(s)' last rotational position. The Ecphoria player remembers the latest position when it is turned off by disconnecting them.

The user interface is a LED display wrapped around each component's outside edge, allocating where in time each component is using a blue light and text. Although the textual information is always displayed in a fixed location, the blue light moves around the cylinder as time goes forward simulating a seek bar (See Figure 3). Importantly, the Ecphoria Player leverages the precise metadata of each unique listening instance to enable a novel interaction design, its interface remains quite minimal. It offers very little information about the specific song being played or the overall archive itself. This decision aims to open up the possibility for a rich range of experiences to emerge. Such minimal feedback could trigger a user to reflect on when she had originally listened to the song; to contemplate the emotional texture evoked by the timbre of songs listened during different seasons over the years, or different times of the day; to inquisitively shift between timeframe modes as a song plays.

The user can change timeframe modes by rotating each cylindrical component. When the user rotates a component, the current song keeps playing until the user lets go; then, the song will fade into another song

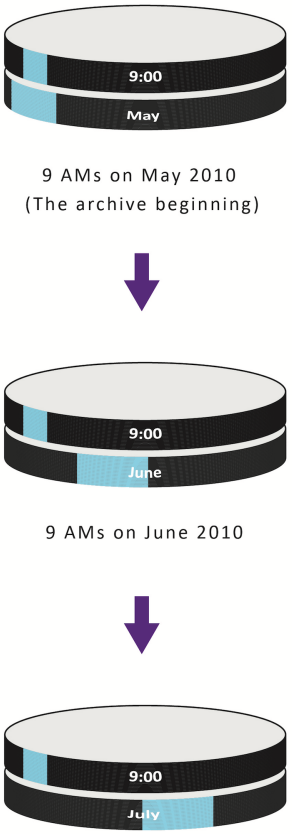

Figure 3. In this *Time* + *Month* configuration, all songs ever listened to a 9:00 are played per month. After this cycle completes, the player will then play all songs previously listened to at 9:01, and so on.

which is selected based on this new condition. Similarly, when the user adds the third component to the other two components, the song will fade into another song instance based on this new configuration. In each possible combination, song instances are selected based on the smaller time component(s) and they will be played moving forward in time based on the largest time component connected. Once all song instances have been played in any of these configurations, the Ecphoria player will stop until a new configuration is set. Consider the following combinations and how they organize the collection:

- *Month* + *Year* plays song instances from a specific Month over Years forward (e.g., song instances from the month of May on the year which has been set in the device moving forward to the year after and so on.)
- *Time* + *Month* plays song instances from a specific Time of day over Months forward (e.g., song instances from 09:00 on a Month which has been set in the device moving forward to the Month after and so on.)
- *Time* + *Year* plays song instances from a specific Time of day over Years forward (e.g., song instances from 09:00 on a Year which has been set in the device moving forward to the Year after and so on.)
- *Time* + *Month* + Year plays song instances from a specific Time of day and Month over Years forward. (e.g., song instances from 09:00 and a Month on a Year which has been set in the device moving forward to the Year after and so on.)
- *Social Modes* offers the ability to use timeframe modes as well as other Last.FM metadata (e.g., similar songs, music genres, or tempo) to combine two (or more) users' archives to explore overlapping similarities (See Figure 1.). The use of metadata to this end offers promise to support experiences of sharing and exploring one-to-one social relationships—key practices that have been highlighted as key challenges for the design of digital possessions [7, 15, 19].

Discussion and Conclusion

Through grounding our design led research in the proposal of the Ecphoria Player, our work takes a modest step toward responding to growing calls in DIS and HCI communities to design technologies capable of: (a) supporting reflective, interpretive, and meaningful experiences over time [4,5,6,9,18,23] and (b) opening new possibilities for forming relations to our personal data in everyday life on individual and social levels [2,7,8,15,19].

We envision that an extensive study of the Ecphoria Player could provide us with insights into how the design shaped people's experiences of exploring, revisiting, sharing, and living-with their (and their loved ones') histories of digital music. To date, we have developed a robust, functional software system to implement the Ecphoria Player. Our future work involves transforming the Ecphoria Player design proposal into a tangible device and producing a small batch of research product [16] versions to investigate people's experiences of use over long periods of time.

Acknowledgements

This research is supported by The Social Sciences and Humanities Research Council of Canada (SSHRC) and the Natural Sciences and Engineering Research Council of Canada (NSERC).

References

1. Jeffrey Bardzell, Shaowen Bardzell, and Lone Koefoed Hansen. 2015. Immodest Proposals: Research Through Design and Knowledge. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (CHI '15). ACM, New York, NY, USA, 2093-2102.
2. Barry Brown and Abigail Sellen. 2006. Sharing and listening to music. In *Consuming music together*. Springer, 37–56.
3. Tia DeNora. 1999. Music as a technology of the self. *Poetics* 27, 1: 31–56.
4. 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: 45–48.
5. William Gaver and Heather Martin. 2000. Alternatives: exploring information appliances through conceptual design proposals. In *Proceedings of the SIGCHI conference on Human Factors in Computing Systems*, pp. 209-216. ACM.
6. William W. Gaver, John Bowers, Andrew Boucher, Hans Gellerson, Sarah Pennington, Albrecht Schmidt, Anthony Steed, Nicholas Villars, and Brendan Walker. 2004. The drift table: designing for ludic engagement. In *CHI'04 extended abstracts on Human factors in computing systems*, 885–900.
7. Jane Gruning and Siân Lindley. 2016. Things We Own Together: Sharing Possessions at Home. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (CHI '16). ACM, 1176-1186.
8. Rebecca Gulotta, Alex Sciuto, Aisling Kelliher, and Jodi Forlizzi. 2015. Curatorial agents: How systems shape our understanding of personal and familial digital information. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 3453–3462.
9. Lars Hallnäs and Johan Redström. 2001. Slow Technology – Designing for Reflection. *Personal Ubiquitous Comput.* 5, no. 3 (January 2001): 201–212.
10. Lars Hallnäs and Johan Redström. 2002. Abstract information appliances: methodological exercises in conceptual design of computational things." In *Proceedings of the 4th conference on Designing interactive systems: processes, practices, methods, and techniques*, pp. 105-116. ACM.
11. David Hesmondhalgh. 2008. Towards a critical understanding of music, emotion and self- identity. *Consumption, markets and culture* 11, 4: 329–343.
12. Mark Katz. 2010. Capturing sound: how technology has changed music. Univ of California Press.
13. Mark Levy and Klaas Bosteels. 2010. Music recommendation and the long tail. In *Proceedings of the workshop on music recommendation and discovery*, 55–58.
14. Hugh McIntyre 2015. One Trillion Songs Have Been Streamed In 2015. How Much Larger Can This Get? *Forbes Magazine*. Published on August 13 2015. http://onforb.es/1J1Lbjz
15. William Odom, Tijs Duel. 2018. On the Design of OLO Radio: Investigating Metadata as a Design Material. In *Proceedings of SIGCHI Conference on Human Factors in Computing Systems*. Montreal, Canada. CHI '18. ACM Press.
16. William Odom, Ron Wakkary, Youn-kyung Lim, Audrey Desjardins, Bart Hengeveld, and Richard Banks. 2016. From research prototype to research product. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, 2549-2561. ACM.
17. William Odom, John Zimmerman, and Jodi Forlizzi. 2014. Placelessness, spacelessness, and formlessness: experiential qualities of virtual possessions. In *Proceedings of the 2014 conference on Designing interactive systems*, 985–994.

18. William Odom, Mark Selby, Abigail Sellen, David Kirk, Richard Banks, and Tim Regan. 2012. Photobox: on the design of a slow technology. In *Proceedings of the Designing Interactive Systems Conference*, 665-668. DIS '12. ACM.
19. William Odom, John Zimmerman, Jodi Forlizzi, Hanjin Choi, Stephanie Meier, and Angela Park. 2012. Investigating the presence, form and behavior of virtual possessions in the context of a teen bedroom. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, p. 327-336. ACM.
20. Kenton O'Hara and Barry Brown. 2006. Consuming music together: social and collaborative aspects of music consumption technologies. Springer Science & Business Media.
21. James Pierce and Eric Paulos. 2014. Counterfunctional things: exploring possibilities in designing digital limitations. In *Proceedings of the 2014 conference on Designing interactive systems*, pp. 375-384. ACM.
22. James Pierce. 2014. On the presentation and production of design research artifacts in HCI. In *Proceedings of the 2014 conference on Designing interactive systems*, pp. 735-744. ACM.
23. Phoebe Sengers, Kirsten Boehner, Shay David, and Joseph'Jofish' Kaye. 2005. Reflective design. In *Proceedings of the 4th decennial conference on Critical computing: between sense and sensibility*, 49– 58.
24. Avi Shankar. 2000. Lost in music? Subjective personal introspection and popular music consumption. *Qualitative Market Research: An International Journal* 3, 1: 27–37.
25. Erik Stolterman and Mikael Wiberg. 2010. Concept-driven interaction design research. *Human–Computer Interaction*25, no. 2: 95-118.
26. Douglas Turnbull, Luke Barrington, and Gert RG Lanckriet. 2008. Five Approaches to Collecting Tags for Music. In *ISMIR*, 225–230.
27. Amy Voida, Rebecca E. Grinter, Nicolas Ducheneaut, W. Keith Edwards, and Mark W. Newman. 2005. Listening in: practices surrounding iTunes music sharing. In *Proceedings of the SIGCHI conference on Human factors in computing systems*, 191–200.
28. Last.FM. 2018. Retrieved from https://www.last.fm/home