Data and Generative AI as a Design Material

Co-creating abstract, irrational, and inspirational data representations for the home

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ABSTRACT

In this position paper, we illustrate a series of ongoing AI data engagements that intentionally refrain from "making sense" of data. These experiments focus on an ongoing dialogue between people, their data, and AI tools that act as collaborators in this entanglement. Our focus is to investigate opportunities for devices in the home that leverage data in more tactile, irrational, and evocative ways. We illustrate experiments around two provocations: (i) Making data in the home: Data Maker (ii) Living with data in the home: Data Frame.

CCS CONCEPTS

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

KEYWORDS

Personal Data; AI; Machine Learning; Metadata; Interaction Design; Research through Design.

1 Position Statement

In the current data economy, information about us is often appropriated in goal and outcome-oriented ways [1]. Work across the HCI community argues for alternative avenues to engage with data in ways that are ambiguous [4], soft [10], or slow [7]. As AI and Machine Learning (ML) have increasingly become accessible to HCI and design researchers, recent work has begun to investigate how AI can be better mobilized as a material for design (e.g., [2,3,8,9]). Aligned with these works, we recently published a paper that utilized novel applications of machine learning—presented as video sketches—in the context of people's personal data and AI tools that act as mediators of introspective prompts and resources [6]. With this position paper, we want to extend this work and build on to the various voices that expressed a desire for more co-creative engagements with AI and data.

Further, to embrace data engagements that move into irrational, mystical, and emotive ways of accessing the varying data accounts of us, our environments, and our inner worlds. In the context of this workshop, we ask: *How can data be liberated as a design material for creative, inspirational, and evocative engagements in the home? And what are the co-creative roles that generative AI tools play in mediating and co-creating resources with us and our data?* This paper presents design explorations that tangent these questions and aim to give insight into working with data to move beyond the rational. Next, we describe *Data Maker* and *Data Frame*.

2 The Data Maker

Data Maker is a scanning station that helps to create training data sets from scratch. The station invites users to utilize all kinds of analog materials and textures. Creating a data set usually involves tech-intensive steps: (i) scraping data manually or using scripts, (ii) cleaning vast archives, and (iii) pre-processing into a suitable format. We found that these processes can be tedious, lengthy, and disengaging. We also wanted to investigate how to create unique, in-situ data sets, focusing on one's own source materials rather than scraping and appropriating other artists' work without consent [11]. The Data Maker mounts a phone for taking pictures through a hole in the adjustable top plate. The Scanning surface is illuminated and tabloid size. The idea is to take photos in a 1:1 square format optimized for machine learning.

Figure 1: Scanning colorful card-stock paper with the Data Maker Prototype.

Creating data sets with the Data Maker evoked feelings of enacting generative design algorithms. Constantly changing the layout for each image felt as if being a human-random-function. Instead, we started with a simple layout, created interesting layerings, and spontaneously ripped the paper into small pieces. These could be easily tossed onto the surface before taking another image, making the process even more randomized.
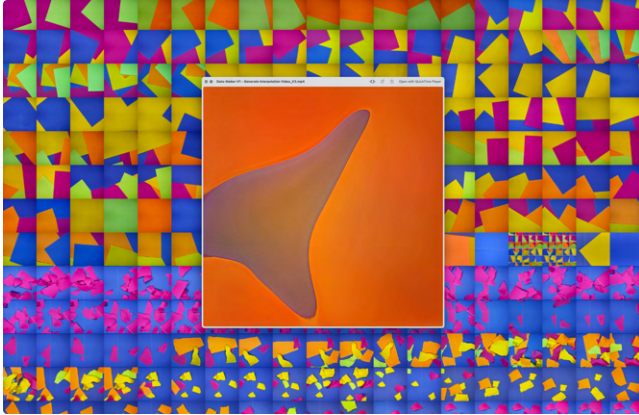
Figure 2: Data Maker In- and Output. **Background**: This archive contains 211 images in a 1:1 format. **Foreground**: Generated Machine Learning output.

Changing forms and materials more spontaneously led to a more organic output, a notion we doubt we would have arrived at with digital means, where processes can feel, at times, a bit sterile and contained. We further wondered if specific colors would appear more frequently than others, as there might be specific subconscious preferences in aesthetics that guide every move, all reasons for us to anticipate the machine output even more. We created multiple data sets in a short amount of time (40 minutes), featuring folded origami, personal sketches, and hands (as shown in Figure 3).

Figure 3: Data Maker In- and Output. **Background**: This archive contained 769 images taken from the hands of one of the authors. The grime on the hands stemmed from the residue of construction-grade glue, which sparked the idea to create a data set of the hands in the first place.

Collectively, the experiments with the Data Maker revealed how liberating analog approaches to machine learning can be. We felt more inspired to explore new angles and arrived at crafty solutions. Further, this approach could be leveraged to teach machine learning literacy as it minimizes entry barriers (e.g., learning how to scrape images or data pre-processing). With the Data Maker, one starts at the origin of data, the birthplace of single instances that make up a big mass. The most insightful moment for us in this experiment was seeing all images appear in our photo roll (as shown in figure 4). Learning

how 769 images look juxtaposed to the usual everyday life photo roll was an unexpected and insightful perspective. This helped connect with the vastness of archives necessary for training machine learning models—yet barely scratching the surface in terms of size. It made us reflect on how our image training data sets usually sit in isolated folders, siloed away from visual and even temporal proximities to other archives. A takeaway for us was to foster a habit of merging image training data into the apple photo roll in order to have a grasp of the size and general 'texture' being able to see the big picture. Since then, we have also explored Figma as a convenient place to upload and view thousands of images in closer spatial relation.
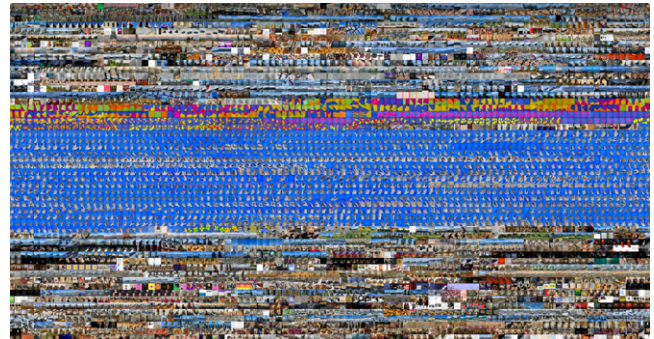

Figure 4: The generated Archives in relation to the regular day-to-day photo roll. Interesting here are also the patterns visible within each archive (e.g., sequences where hands got closer to the camera or a second hand appeared)

3 Data Frame

Data Frame is an application or device that displays artworks on a digital frame; this art is re-interpret and altered based on connected data archives in flux. The data Frame exists as a web prototype (as shown in Figure 5) and as a design concept for an actual device (as shown in Figure 6). At its core, Data Frame combines two primary data sources: (i) Music Listening History Data and (ii) Personal Artworks. Both Data sources are mixed through a Machine Learning style transfer model [5] (see figure 4).
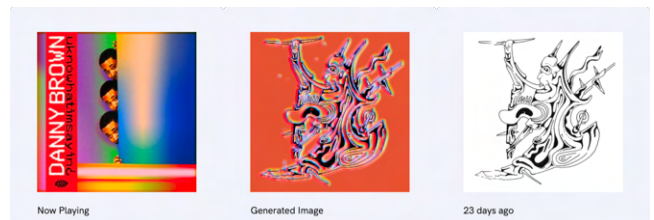

Figure 4: Data sources. **Left:** Music Listening History showing the song currently playing on one of the user's music platforms. **Middle:** Synthesized image based on artwork and tinted by the record cover art from the currently playing song. **Right:** Displays a painting from the user's art archive, in that case, a particular apple photos folder that can be updated at any time.
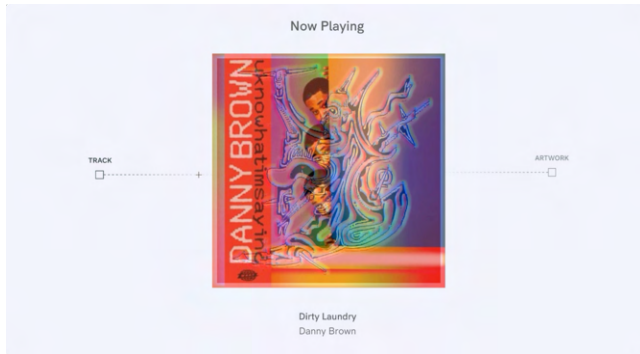
Figure 5: The Data Frame Web Prototype. The cursor is moving toward the left side of the frame. Thus, the actual cover art will gain in opacity and be visible.

The Data Frame overlays all three images in different levels of opacity. Therefore, interacting with it will dynamically change which of the three appearances is shown with more opacity. Data Frame is also envisioned as a tangible device that could be deployed in one's home, merging into the environment. If data around us is constantly in flux, how can we represent it ambiguously and subtly? For each song, the data frame will slowly change its tint based on the newest music that is playing. If a user adds a new photo or scans to their artists-archive, this will change the main artwork yet remain in the same color schemes based on the present song.

Figure 5: Data Frame as a device in the home. **Left:** As a new artwork gets updated, it will be displayed on the frame and tinted based on the song last played. **Right:** This illustration shows how the painting would change its tint each time a new song is initiated.

Other visual modes for Data Frame could include displaying a particular song's record cover, yet with a twist. For example, the record cover could be re-interpreted by AI based on the song's lyrics. It could be dynamically animated based on all vocals, specific verses, or only the hook. In this example, the lyrics change the original Palm tree into a *"big book"* (as shown in Figure 6), and in the following line, it would move into a giant eye with a piercing gaze based on the lyrics," *And now you're giving me the look, look"* This approach would leverage another layer of music meta-data as material to design with, through Data Frame. The last mode we want to illustrate with Data Frame is a potential connection of informing content based on

behavioral data. For example, a user might have watched two episodes of "The Mandalorian" on Disney+. Thus, their Data Frame would weave in visual themes from the show into the presented artwork (as shown in Figure 6).
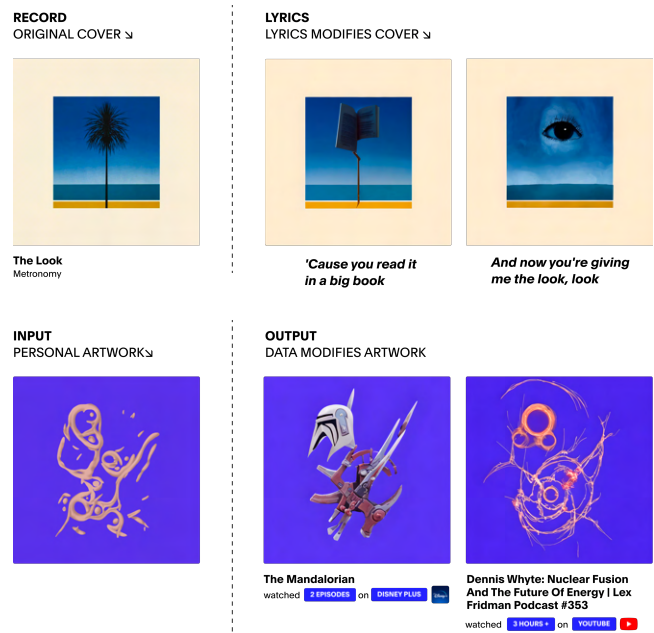

Figure 6: Data Frame Modes. **Top:** Cover re-interpreted by lyrics and verse by verse. **Down:** Personal artwork re-interpreted based on the show "The Mandalorian" and a YouTube podcast about Fusion energy. This AI generator is also trained on a unique set of 224 drawings, so even when visual themes derivate, they will still look and feel in line with the user's style and aesthetics.

Indeed, it would need to be determined how much control people desire when interacting with a Data Frame and what data streams they would feel comfortable seeing enacted. People might find it too invasive and want options to dim the frame, dial it back, or freeze favorite compositions. In short, there are more opportunities for design to engage with the Data Frame and craft valuable interactions that help people modulate and tailor these various depicted material properties of the data we illustrated. We enjoyed the anticipation building up when we "fed" the frame as an ongoing exchange between an AI system, data, and us. Thus, curating art for the frame became a dynamic in itself. We started to think less about how the art would stand alone, but if it is good "food" for the system and how it would be interpreted and changed through data.

3 Conclusion

In this position paper, we illustrate a series of ongoing AI data engagements that intentionally refrain from "making sense" of data. This ongoing work is a humble step towards exploring how data can be used for irrational engagements and illuminating AI systems' co-creative roles as they get more entangled in our everyday practices and environments.

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