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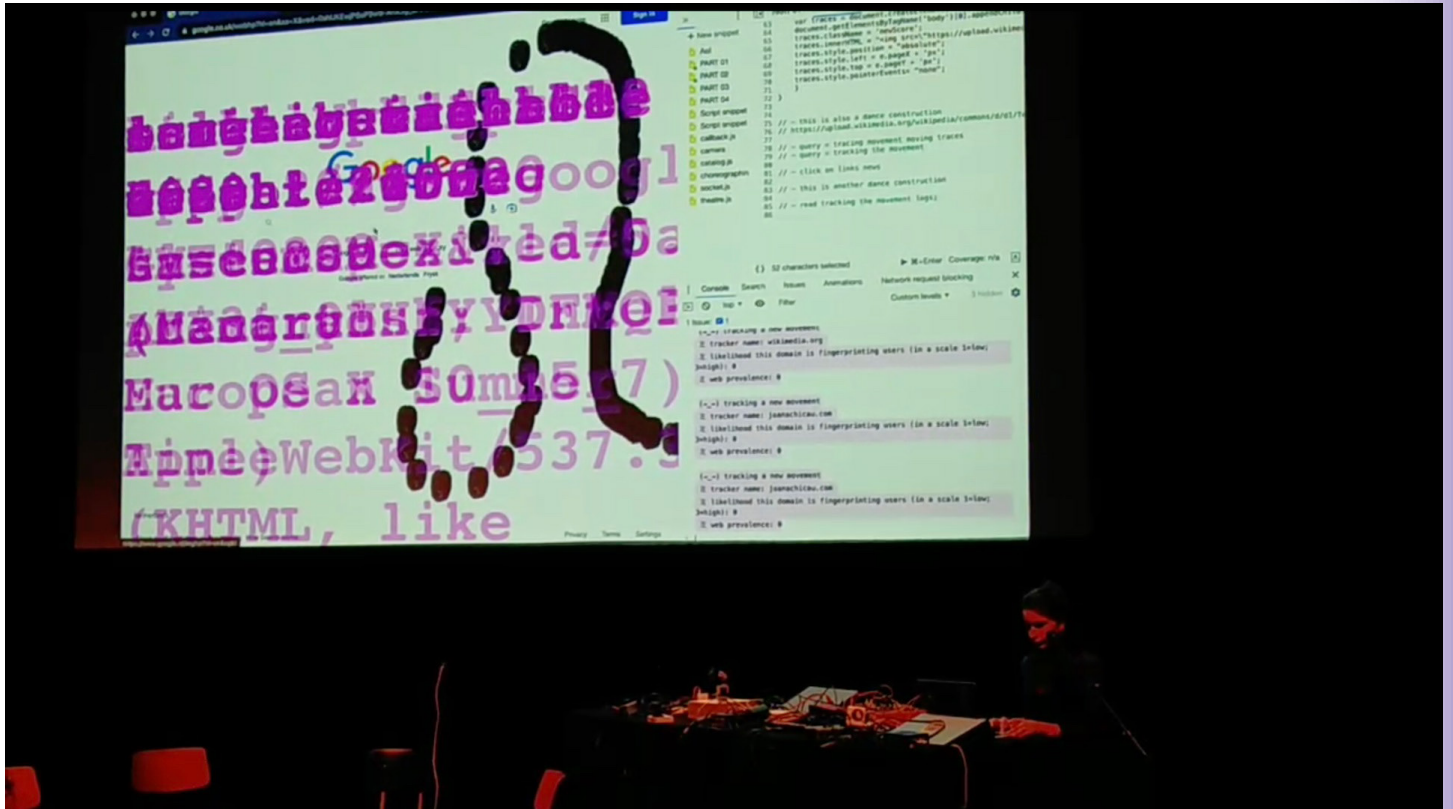2024.xCoAx.org

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Human-Computer Counter-Choreographies

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Human-Computer Counter-Choreographies is a live-coding performance that unveils the algorithms used to track users in web interfaces. The performance combines live coding and the manipulation of JavaScript code snippets, accompanied by voice narration from a choreographic perspective. The performance utilizes a modified version of the Duck Duck Go privacy extension, an open-source tool that monitors online trackers. This ongoing project translates each tracking request into audio and visual feedback. Throughout the performance, the audience is encouraged to participate in a sequence of choreographic prompts, where various aspects of online tracking, such as fingerprinting and profiling, are embodied through physical enactments.

Introduction

Algorithmic systems are often made opaque by design, with users being unaware of how much of their data is being gathered (Pold 2019) and for what purposes. Algorithmic systems in society have had various reported instances of causing harm and inequality (Klumbyte, Lücking, and Draude 2020). One example of these are online tracking algorithms which are present in most web services we access today (Kretschmer, Pennekamp, and Wehrle 2021). Surveillance capitalism (Zuboff 2015) has been the driving force of online tracking technologies from early days. The advertising sector is at the forefront collecting

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extensive datasets on users' online activities that enable prediction and influence behavior.

The author focuses on the algorithms that are commonly found in everyday web environments, such as the online tracking algorithms described above. Central to this focus is the understanding of embodiment as physical engagement grounded in and emerging out of everyday experience (Dourish 2001). Body-centered approaches provide further understanding of the actions we perform and the computational systems we interact with (Klemmer, Hartmann, and Takayama 2006), which can promote system's transparency. For instance, Experiential AI (Hemment et al. 2019) uses felt experience to make algorithmic mechanisms more understandable. Graspable AI (Ghajargar et al. 2022) proposes the use of physical artefacts and material manifestations as a relational way for understanding and interpreting algorithmic systems.

The proposed performance is part of a practice-based PhD focused on the development of methodologies that comprise embodied and choreographic techniques to inform the design of web-based tools driven by transparency and legibility. It draws from a body of work that explores how choreographic approaches provide alternative insights on how algorithmic systems configure web environments (Chicau 2022).

Regarding choreography, this research practice is highly influenced by André Lepecki's writings on choreography as a control mechanism and the need to question how we can assert our freedom of movement and agency in societies that are intricately, even if subtly, controlled (Martin 2015). Another influence is the theatre practitioner Augusto Boal, known for the method Theatre of the Oppressed (Teatro do Oprimido) developed in the 80's. Boal understood theatre as a rehearsal for eve-ryday life, not an end in of itself but the beginning of social transformation that supported the de-alienation of the body and mind towards disrupting the repetitiveness of daily tasks (Boal, 2019). American choreographer Yvonne Rainer who took inspiration from observing individual pedestrians and crowds in the streets of New York City. She would transpose the movement observed from the streets into the theatre and opened new possibilities for performing the self and sociability (Wood, 2007). While Boal focused on class struggle and justice and Rainer in feminism and identity politics, both turned the theatre inside out and believed in the transformative potential of performance in real life.

Embodied methods and choreographic approaches are used to guide this research practice and provide new insights for designing web environments with the goal of empowering its end users. Its aim is to question and challenge the opaque algorithmic models prevalent in surveillance capitalism and advocate for algorithmic transparency and legibility.

Performance Description

Human-Computer Counter-Choreographies is a live-coding performance that exposes user-tracking algorithms in web interfaces. The performance interweaves live coding and manipulation of JavaScript snippets with voice narration, choreography and physical enactments. This performance uses a custom version of the open-source Duck Duck Go privacy extension that tracks online trackers. This tool has been

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changed to map each tracking request to audio and visual feedback. Additional custom web programming scripts are used and modified throughout the performance to draw the audience's attention to different aspects of online tracking, such as fingerprinting.

Fig.1 Audience view of the performance *Human-Computer Counter-Choreographies* (Beta) by Joana Chicau. Photographs by Creative Coding Utrecht (left) and Ulysses Popple (right) at the International Conference for Live Coding (ICLC 2023).
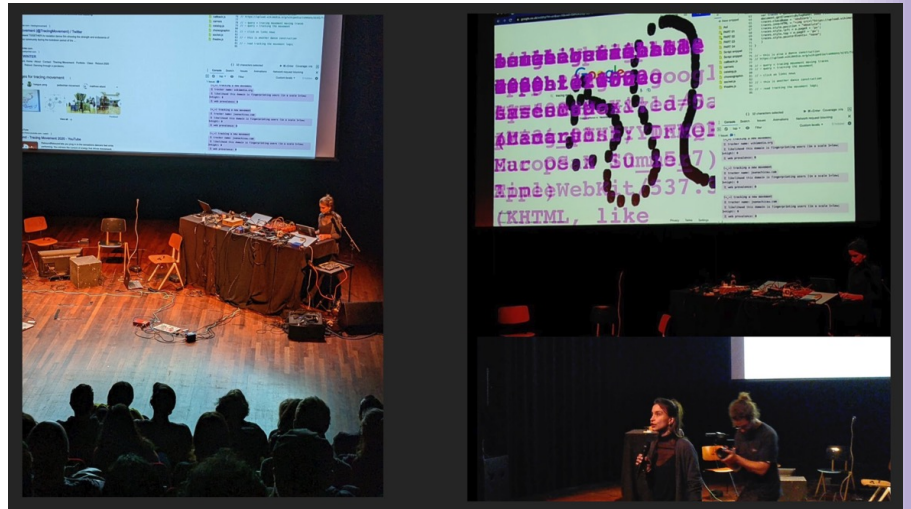
As shown in figure 1, during the performance a browser window is projected in the performance space. The window is divided in two: on one side it displays the websites being navigated and on the other side the web developer tools. The latter shows the programming scripts written for the performance that are altered and called at given times. The web console also shows message logs with information on the various online trackers that accumulate as the performance unfolds.

The programming functions created for this performance are named after choreographic concepts. This practice of adding syntax and meaning to the standard syntax of functional or procedural programming is referred to as Esoteric Programming (Temkin 2022). In addition to the choreographic concepts, comments have been added between lines of code to explain or highlight different parts and help the audience follow through the narrative. The code that follows presents snippets from different parts of the performance to exemplify the aspects above:

> *// user's browser and device data commonly used in fingerprinting*
> *datapoints= setInterval(accumulation, 200);*
> *// prompts inspired by user metrics used in web analytics*
> *audience.innerHTML= 'please STAND UP if your age: 25 to 34';*
> *// another dance construction: cursor tracking*
> *window.addEventListener('mousemove', moving, false);*

The text after the forward slashes '//' display comments which are not run by the computer but are used to introduce each line of code that follow, with functions named after choreographic concepts.

While code is being triggered and the interface modified, the author invites the audience to engage with choreographic prompts that introduce aspects of online tracking, such as fingerprinting and profiling through a series of physical enactments. These same prompts

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are embedded in the code and overlayed on the webpage for the audience to read.

To differentiate the custom code functionalities and overlaid text in the interface, a pink color theme (hex code #af3eff) is used to style these. As shown in figure 1, the tracking logs are listed with pink background in the webconsole and the text added to the webpages uses the same color value. In addition, a flashing pink background animation accompanies the sound of a metronome triggered by each tracking request.

The voice of the performer present throughout the piece, plays an important role in connecting the different elements of the performance: from the algorithms to the bodies – tying them in a fluid narrative.

By intersecting the tools described above with embodiment, choreography and improvisational approaches from live-coding practices, this performance invites participants to reflect upon, engage with and challenge user-interface paradigms.

Related Work

Various organisations have been working on software products that enhance user privacy when browsing the web. Examples include the already mentioned work by Duck Duck Go and the Tor browser (2006) that provides crypto-based privacy-enhancing technologies (PETs). Still on the industry side, London-based studio Normally created Cabin (2020), a privacy-first and carbon-conscious web analytics tool. Unlike most web analytics tools it does not use cookies nor shares data with third parties or ad networks.

To empower communities and individuals to become more resilient in their digital presences, Tactical Tech, a non-profit and non-governmental organisation, has been creating and distributing educational resources. One example is The Data Detox Kit (2016), a toolkit that provides step-by-step guidance in reducing one's online traces. Artists and technologists have also been responding to concerns about online algorithmic surveillance with various artworks and tools. Examples include the piece Listening Back (Guffond 2023) an add-on for the Chrome and Firefox browsers that maps internet cookies to different sounds, creating a melody while browsing. The GoogleTeller (Hubert 2022) a tool that makes audible each packet or tracker request sent to a Google service. The plug-in Safebook (Grosser 2019) which removes all content from Facebook leaving the interface as an empty grid of white, gray and blue circles and squares. The same artist created Demetricator (Grosser 2017) which removes all the metrics from the Twitter feed. Both interventions question the quantifying nature and anxiety-inducing character of these platforms.

Dance performance and choreography have also been adopted as a way of critically engaging with technological apparatus. One example is the initiative Cryptodance (2016) that hosts events with the intent to collectively reflect on issues of privacy, safety and surveillance through embodiment and dance. Another example is the artwork Score for Performing User (Lee McCarthy 2022), a series of instructions-based exercises that invite users to reflect on their identities and question issues around privacy, ethics, and justice in online environments.

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In the live-coding scene, various authors have been exploring the integration of embodiment, dance and choreography. Kate Sicchio researches the intersection of code and choreography through both choreographic devices and programming languages, which can be seen in work such as Hacking Cho-reography (2012). More recently, in Codes for a Dance (Sicchio and McLean 2023) the authors interact with two robots on stage through a series of gestures that influence the soundscape. Marije Balmaan's work has also explored the use of gestures, such as The Machine is Learning (2021) a theatrical piece whereby a machine is trained to detect gestures being performed yet it repeatedly fails to do so accurately.

To add another recent example, the live-coding environment CO/DA captures the motion data from dancers and can be programmed to generate audio feedback on-the-fly (Françoise, Fdili Alaoui, and Candau 2022). To add to the diversity of approaches, the research project MosAIck (Wilson, Elizabeth et al. 2023) connects live-coding practices with dance mediated through e-textile sensors.

While not a comprehensive review, the references above provide pointers that help situate this research within browser-based, net art, tactical media, dance, choreography and live-coding. The work proposed herein is the first to explore the intersection of these areas of practice.

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