TAS Hub Artist-in-Residence Case Study

GROUPTHINK: Telepresence & agency in the Internet of Neurons

Abstract / Description

Please frame this in terms of research engagement possibilities/how this work can be used for research, for example as a point of reflection, or to breach, to explore, re-imagine or offer an experimental perspective. Ideally it can be used as part of a use case scenario or as a provocation for a use case scenario.

Live performers often describe “playing to the audience” as shifts in emphasis, timing and even content according to perceived audience reactions. Traditional staging allows the transmission of physiological signals through the audience's eyes, skin, odor, breathing, vocalizations and motions such as dancing, stamping and clapping, some of which are audible. The Internet and other mass media broaden access to live performance, but they efface traditional channels for “liveness,” which we specify as physiological feedback loops that bind performers and audience through shared agency. During online events, contemporary performers enjoy text and icon-based feedback, but current technology limits expression of physiological reactions by remote audiences. Looking to a future Internet of Neurons where humans and AI co-create via neurophysiological interfaces, GROUPTHINK examines the possibility of re-establishing audience agency during live performance by using hemodynamic sensors while exploring the potential of AI as a creative collaborator.

GROUPTHINK enacts a liminal moment in the development of engineering. Technology has always groped at biology, but now it aims for convergence. There are several vectors for the merger of technology and biology, and within most lies a complex merger of previously separate domains within and outside engineering. AI is the enabling factor, as it is possible to conceive, but not realise, advances in bioengineering which enable physiological interfaces with networks, individuals, collectives and computing resources, notably AI itself. GROUPTHINK dissects this historically liminal moment by posing a near future scenario in a plausible artistic context. Media are a product, but they invoke an active process - mediation - which severs the value associated with live experience which itself is a marker of authenticity. Uniqueness, dialogue and participation are form the framework of live interaction. They build trust, or more accurately, they develop the dynamics where trust resides.

Where is the risk/vulnerability?

Though designed for complete user anonymity, the software could have been used to identify users and collect detailed information about their metabolic responses to stimuli, proximal and general health. In a less controlled settings, these techniques could be used to manipulate emotions to optimise marketing or for various kinds of authoritarian surveillance from workplace management to political conformity.

Where is the user choice? What are the standout characteristics of this work, its merits in context of TAS research and limitations?

The artwork is a provocation which mixes entertainment with intrusive technologies which require strong ethical and legal codes to be socially beneficial. After user's choose to participate - the 'opt-in' which signifies legal consent - their participation is largely involuntary and largely opaque, unless they possess biomedical, psychological and technical knowledge. The entertainment value and glib messaging - 'Make art with your hearts' - masks scenarios which would likely be dystopian without regulation and even restraint by organisations with the capacity to deploy the technologies on a mass level.

The scenario laid out in GROUPTHINK reflects the contemporary condition. In societies which value freedom, consent may be relatively meaningless because the average citizen will never have the training to understand the web of conditions which underlie the experience. In authoritarian societies and societies transitioning from democracy to

authoritarianism, the technologies can be used to undermine the liberty to hide one's thoughts and freely opine if not act.

It is perhaps fortunate that the technologies used in GROUPTHINK are low-TRL and liminal. However, they are not impossible, and progress is rapid in the areas GROUPTHINK explores, namely AI, telecommunications networks and neuro/physiological user interface. GROUPTHINK poses the necessity of responsible design on the part of innovators. The public lacks the capacity to judge, and the potential for misuse by bad actors is high.

Nature of interaction between user and art work
The user is viewing a live streaming performance of two musicians wrapped in a responsive video environment created / mediated by AI. Users are able to launch webpage which incorporates the performance with a webcam target window. By centring their face in the webcam window, a custom hemodynamic monitoring application measures their heartrate. The aggregated audience heartrate governs a visual score and video animations which reflect the perceived energy level of the audience.

What aspects of trust explained/explored/exploited?
- e.g., built, broken, instantaneous, repaired, appropriate, trustworthiness
While fully anonymised, remote hemodynamic monitoring is a technology which is both intrusive and elusive. Our application required user's to centre their face, but a more sophisticated version could detect facial contours to extract the physiological data.

Domain and setting
Is there an application area or perspective that you explored?
While this work primarily addresses remote audiences who are interacting with a musical performance online, many of its principles apply to related domains:

- In-house audiences for any kind of experience (music, film, lecture) who are fitted with networked physiological or neurophysiological sensors.
- Online participants in any kind of experience where emotional registers are useful. This could include other forms of entertainment, lectures, political messages, rallies or advertising.

Description of technology, test environment: *e.g., in-the-wild, live but lab, simulation, online but see 'domain and setting' - I think 'description of technology' is part of whether context-specific.*
Although developed in as a tightly coordinated academic team working with (Western liberal) ethical constraints, GROUPTHINK was deployed in domain situated between controlled and the wild. It was performed as part of the Ars Electronica Festival 2021, and its audience was presumably self-selected individuals who were either tech savvy or highly interested in technology.

Future opportunities for researchers to use and apply the work:
It would be valuable to develop a programme which tested the social impact of user interface which relies on involuntary physiological responses, collective decision-making and heavy intervention by AI as both an analytic and creative resource.

Are there any gaps that you have seen in the range of use cases and domains covered by the TAS (Trustworthy Autonomous Systems) project? - *Not needed for library (but interesting!)*
AH: Could you please direct me to a resource map of TAS use cases?

References – in terms of inspiration? This could map to our 'based on' elsewhere.

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Resources – e.g., images, sketches, and notes

Recording & description
https://www.nationalgallery.org.uk/national-gallery-x/groupthink

ACM video & article
https://dl.acm.org/doi/10.1145/3533610

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Please see ‘Groupthink Resources’ folder for video, stills & charts

As the originator of the content described, I understand that the above description and other information entered into this template may be made publicly available via the TAS Benchmarks Library.
Acknowledged & agreed - Ali Hossaini