Augmented Cognition for Music Play & Interaction

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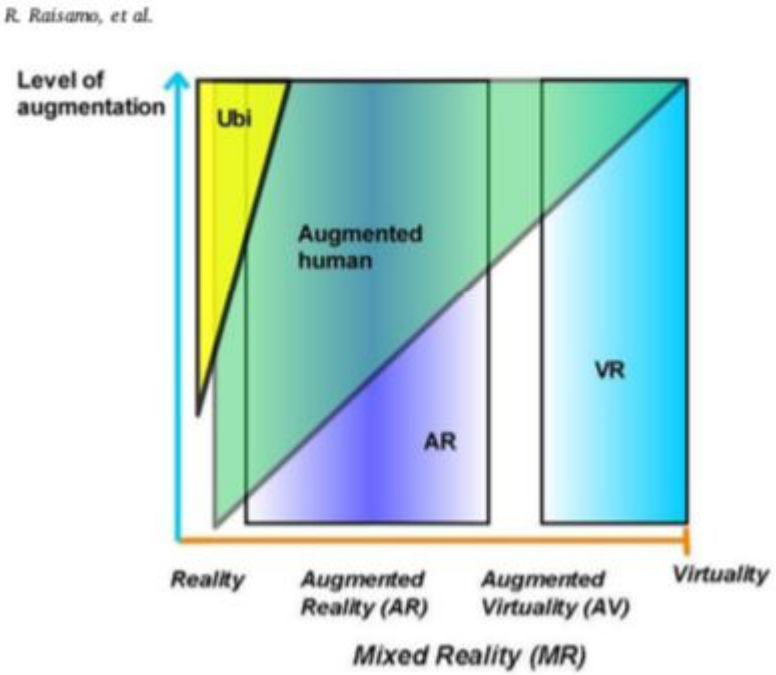
Cognitive Science Capstone

What is Augmented Cognition?

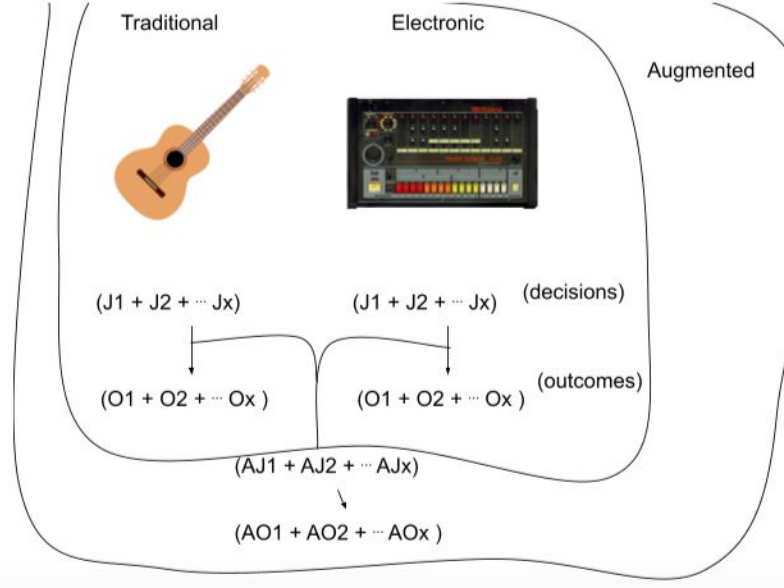
- Proposed by Englebart (guy who invented computer mouse) in a study for the Air Force entitled "Augmenting human intellect: a conceptual framework. SRI Summary Report" 1960s~
- "Augmented cognition (aka enhanced cognition) is achieved by detecting human cognitive state, using analytical tools to make a correct interpretation of it, and adapting computer's response to match the current and predictive needs of the user (e.g., providing stored or recorded information during natural interaction)" (Raisomo et. al)



Raisamo, R., Rakkolainen, I., Majaranta, P., Salminen, K., Rantala, J., & Farooq, A. (2019). Human augmentation: Past, present and future. International Journal of Human-Computer Studies, 131, 131–143. https://doi.org/10.1016/j.ijhcs.2019.05.008

What is Augmented Cognition for Music Play & Interaction?

- Simply the mentioned definition mapped into the music domain
- Musicians might necessarily be bound by it due to it's usefulness and how musicians are already using crude screens to learn/trade knowledge on
- Importantly for every unique decision musicians take in creating an artifact augmentation lets them achieve further than what traditional methods would



Embodiment, Ubiquitous, & Tool use

- Englebart pushes the notion that the computer is a tool
- Ubiquitous computing is having many computers, say inside a room, performing multiple functions to form a uniform experience
- For musicians this can be applied as a learning tool
- Embodiment theory plays in as augmented technology has to do with processing and extending the cognitive system further into its environment through interfaces

Live Performances

- This type of cognition gives really interesting ideas for live performances
- Of course, everyone needs access to the technology
- It also allows feedback from the audience directly into performances, which seems like a huge attractor

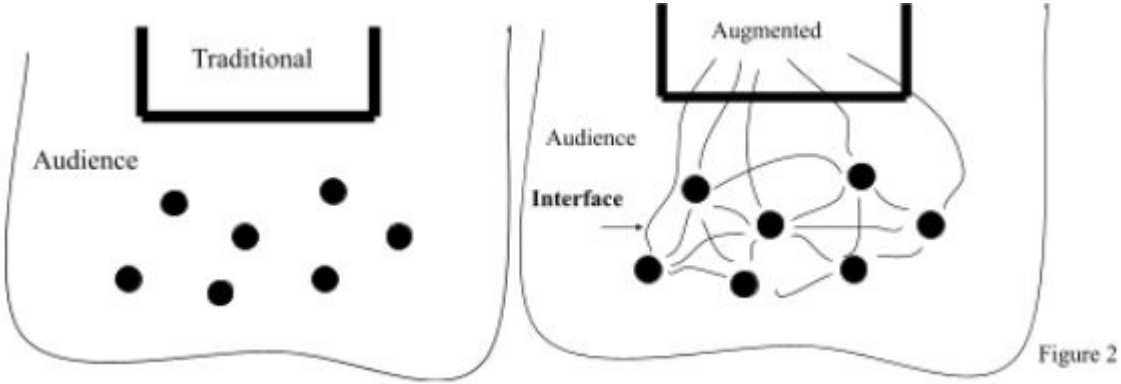


Figure 2

Music Education

- Interesting area for music educators as half virtual spaces can use other senses to indicate tonal qualities
- While there may be no quick way to download a skill, it may be a quick way to master an instrument by having outside information on an instrument that typically takes a skilled muscle movement or ear
- Mixed reality spaces can teach the theremin which is traditionally considered a difficult instrument due to the open pitch space it uses, so what will be next?
- We might also consider the ramifications for many other fields of art

Closing

One of my main takeaways for myself was in this block

ing example. If a bass player is given a novel instrument and is asked to improvise with it, he or she will not start only by "thinking" about what notes, phrases, dynamic and timbral configurations, and rhythmical patterns will be developed. That is, the process arguably does not first involve the generation of "mental maps" and explicit representations about the different possibilities offered by, for example, the new electric bass provided. Rather, improvising is intrinsically related to the actual ways the fingers hit the strings and how the instrument "responds" to the performer's intentions (i.e., what it "affords" in real time, as the improvisation unfolds), and how the entire body "feels"—how it facilitates and resonates with such activity, dynamically. Through this embodied form of *action-as-perception* (Nöe, 2006), new relationships emerge that span body, brain, instrument, and the emerging sonic world. In other words, the interplay between sounds and movement does not begin "in the head" but unfolds as the act of improvising reveals new creative horizons for musical

van der Schyff, D., Schiavio, A., Walton, A., Velardo, V., & Chemero, A. (2018). Musical creativity and the embodied mind: Exploring the possibilities of 4E cognition and dynamical systems theory. Music & Science, 1, 205920431879231–. https://doi.org/10.1177/2059204318792319