

Jess+: A Digital Score

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Jess+

Jess+ is an intelligent digital score system for shared creativity with a mixed ensemble of able-bodied and disabled musicians. The digital score uses AI and a robotic arm to enhance the real-time dynamic engagement of a disabled musician (Jess) with the able-bodied musicians (Deirdre & Clare) allowing her to thrive in a real-time communication beyond what has so far been possible. This has flattened any hierarchy of mobility and enhanced the sense of togetherness and inclusivity in musicking.

Digital Score

We investigate the transformation of the music score through computational technologies. Digital scores utilising computational technology and digital media are emerging worldwide as the next evolutionary stage in the concept of the music score. They are generating new music experiences, innovative compositional approaches, novel performance opportunities, and broader accessibility for a vast number of musicians and music cultures around the world.

Embodied Musicking Robots

Brooks' foundational theories guides the development of embodied AI musicking robot (EMR) projects, from which Vear generated this set of principles:

- EMR must cope in an appropriate musical manner, and in a timely fashion, with the dynamic shifts inside the musicking world;
- EMR should be robust to the dynamic environment of musicking, it should not fail to minor changes in the properties of the flow of musicking, and should behave appropriately to its ongoing perception of the flow;
- EMR should maintain multiple goals, changing as required and adapting to its world by capitalising on creative opportunity;
- EMR should do something in the world of musicking, 'it should have some purpose in being' (Brooks 1987)

Vear, C. (2022) *Embodied AI and Musicking Robots* in Vear & Poltronieri eds (2022) *The Language of Creative AI*. Springer



"I would say the robot is a score-writer and it's helped develop my creativity to another level. It's that added level of a story-teller; as a musician performing, it's helping you tell your own story through music".
Jessica Fisher



Sensors:

- EEG
- EDA
- Self-Awareness (Robot positions)



"It seems like it's an equal member of the ensemble now. It's definitely helped my improvisation skills enormously. It's very freeing to be able to play with the robot".
Clare Bhabra



Sound

Sensors

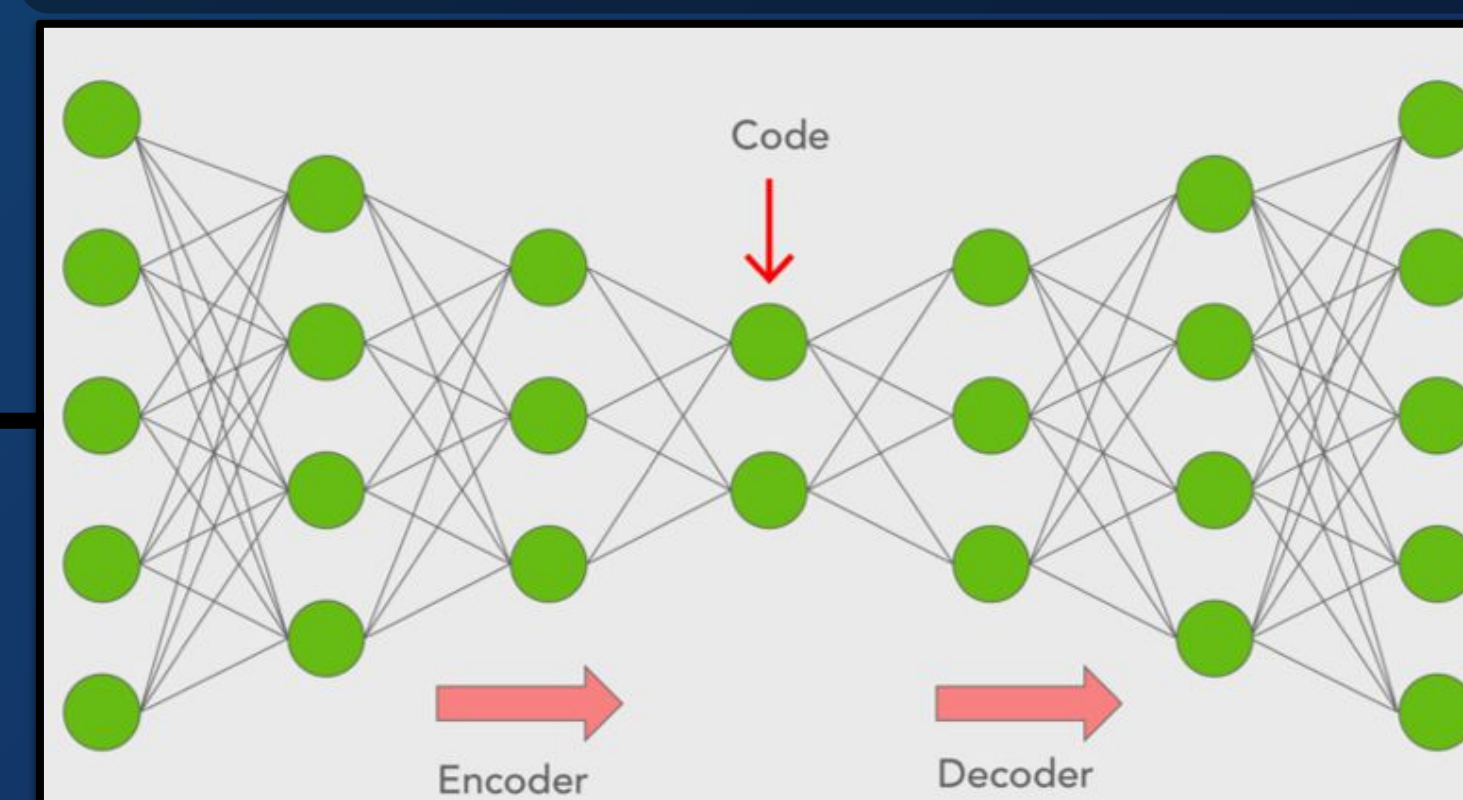
Musicians

AI

Robot
draws

AI Factory:

- Set of 7 feature-to-feature convolutional encoder-decoder neural network streams
- Audio stream
- Random poetry stream



Simple gesture manager based on thought trains (Gelernter 1994)

- **High** stream's response: *Interrupt* (startled)
- **Medium** stream's response: *Gesture from the language*
- **Low** stream's response: *Continuous off-page*

Language (belief system):

Cardew inspiration, Wolff inspiration, shapes, Off-page gestures

"The robot has developed into this very balletic movement, it's not just lines and dots and circles, it's up and down and it's fluent. I just think it's rather beautiful to look at. It's been a fantastic journey".
Deirdre Bencsik

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