Designing Human-Machine Ensembles

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Position paper

In 1996, Tod Machover stated: *"I now believe that the highest priority for the coming decade or two is to create musical experiences and environments that open doors of expression and creation to anyone, anywhere, anytime"* [2]. In this position paper I am willing to (i) show that this statement still loudly resonates after 20 years, and (ii) explore solutions to address this issue.

Music making is among the activities that best fulfil a person's full potential [1]. However, it is also one of the most complex and exclusive: successful music making requires study and dedication combined with a natural aptitude that only gifted individuals possess. However, the advent of novel interfaces for musical expression, combined with modern approaches to algorithmic creativity, is opening new possibilities to reproduce the human ability to make music.

My work has been devoted to find a design solution to address this issue. The fundamental point of this solution is to distribute the complexity of this activity between the human and the machine. The two players of this hybrid ensemble need to dialogue, each employing their own assets and delegating their limitations to the other. The sensibility and natural inclination to aesthetics is for the human. The complex cognitive and motor challenge of music making is for the machine.

The collaboration with an intelligent agent needs to be encoded in a domain that the player is familiar with. To

this end, new interaction metaphors lying outside the musical domain need to be developed. In two previous interactive systems, The Music Room[1] [3] and The TwitterRadio [4], I've been testing *emotions* as interaction metaphor to mediate musical meanings. In these works, players' musical meanings are encoded into emotions, which, in turn, are mapped into combinations of structural factors that determine the affective character of the music. Replacing musical notations with emotions in the process of music making results in a number of critical implications in the design process.

The design and evaluation of these two works in fact suggested that the most critical implications concern the different involvement of the player in the music making activity, and the way the engagement with the artwork is sustained. The traditional paradigm based on a note-to-note control is replaced by a higher-level control. The human player can interact with the composition using control strategies based on emotions, while the machine is let to interpret this information and select the best combination of musical factors. To this end, an algorithmic composer needs to be developed that systematically converts user input described in emotional language into compositional rules, which are in turn used to direct the composition.

The experience of the player in this hybrid ensemble is another aspect that I would be keen to discuss with the workshop participants. In this framework, the human player can concentrate on higher goals and feelings rather than low-level control activities needed to make music with traditional instruments.

[1] For a video of The Music Room please refer to youtu.be/DrULqzx7pMo

References

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