Gesture-based human-robot Jazz improvisation

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Abstract:

We present Shimon, an interactive improvisational robotic marimba player, developed for research in Robotic Musicianship. The robot listens to a human musician and continuously adapts its improvisation and choreography, while playing simultaneously with the human. We discuss the robot's mechanism and motion-control. We then present a set of novel interactive improvisation systems based on the notion of gestures for both musical and visual expression. The system also uses anticipatory beat-matched action to enable real-time synchronization with the human player, and improvisation engine based on style modeling of great Jazz masters using Markov Models. Our system was implemented in a number of full-length human-robot Jazz compositions, displaying highly coordinated melodic and rhythmic human-robot joint improvisation. We have performed with the system in front of a live public audience more in multiple concerts in North America and Europe.