

## Abstract

We present a machine learning (ML) digital model of a composer-performer and a corresponding system that listens to live audio and plays along, using the digital model as a “choice engine” to drive its performance. This system represents the first fruits of a long-term project aimed at developing easy-to-use AI software for musical scenarios. The current system reacts to live audio input, playing along dynamically and appropriately with the audio it is hearing, thus providing a stable user experience. This system differentiates between ambient noise and a listened-for signal, having been trained to listen for a given timbre. It then uses a logarithmic scale to first define these incoming amplitude levels as MIDI velocities and subsequently defines them using standard musical terms like piano and forte. These definitions may change dynamically throughout a given session, so if the system suddenly receives a higher audio level than previously encountered, the definitions adapt accordingly. The avatar player system can be loaded with the ML model of a given player and, using the incoming audio as a modifying, limiting, or triggering force, can respond to live input and make context-appropriate musical choices. The system is also programmed with various performing behaviors, which utilize the ML model in various ways, such as favoring repetition, favoring novelty, or chord making. These behaviors are similarly modeled on living performers using an algorithmic AI approach. The current system can be used as standalone software or as a Max-for-Live device in Ableton Live.