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# How do Musicians Experience Jamming with a Co-Creative “AI”?

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## Abstract

This paper describes a study in which several musicians were invited to jam with an “AI agent”. Behind the scenes, the agent was actually a human keyboard player. In interviews about the experience, the musicians revealed that they had taken a different attitude to musical interaction than they normally do with human musicians. They had lower expectations to the musicality of the system, and therefore felt less constrained by musical rules. A perceived freedom from judgement allowed some of the musicians to feel less self-conscious about their own performance.

## 1 Introduction

How might human musicians experience music-making with a highly capable and flexible co-creative musical AI system? How might collaboration with such a system change a musician’s approach to music-making? Answers to such questions are critical to understanding how future musical AI systems might be useful. Yet designing general-purpose computational agents capable of interacting with musicians in real-time is still notoriously challenging, for instance requiring competence in machine listening and modeling of musical style and interaction conventions that matches or exceeds the current state-of-the-art. We have therefore conducted a study investigating these questions with an “AI” that is freed from the limitations of current technology, by employing a Wizard of Oz (WoZ) (Kelley, 1983) methodology in which a human musician simulates the co-creative musical AI.

## 2 Method

Three musicians with experience in jamming—a jazz pianist/percussionist (participating on piano), a jazz double bass player, and a composer pianist—took part as participants. Each participant believed they would be jamming with an AI agent.

Two rooms were used—a “study room” where a participant played their instrument and interacted with a software user interface, and an “operating room” where the human “wizard” keyboardist played and the researcher video-recorded the sessions. The user interface provided the participant with high-level control over what they believed to be the “agent”, with buttons requesting the “agent” to repeat the previous behavior (*Go back*), to try something new (*Change*), or signaling approval of current output (*Thumbs up*). During music-making, the participant’s audio and their user interface actions were relayed to the wizard. The participant heard the wizard’s keyboard sound coming from the study room computer in realtime.

Participants took part individually, each in one session with the wizard. After an introduction to the system, the participant jammed for 15 minutes with the wizard, then took part in a 20-minute semi-structured interview with the first author. Toward the end of the interview, we revealed to the participant that they had been playing with a human.

Figure 1: The participant (right) plays their instrument in one room with the computer. Unbeknownst to them, the wizard (left) plays the keyboard in another room, and their sound is played through the participant's computer.



The wizard was a professional pianist, keyboard player, and composer. He was instructed to engage in four distinct interactive behaviors borrowed from Young and Bown (2010), as paraphrased by Blackwell et al. (2012): *shadowing* (a close following of the participant's input), *mirroring* (call-and-response type reflections of the input), *coupling* (more independent behavior perturbed by participant input), and *negotiation* (a higher level behavior that may involve attempts to modify the behavior of the participant or to adapt its own behavior according to the direction of the music). The wizard rehearsed these behaviours in advance, after several meetings with the first author.

### 3 Results

The semi-structured interviews first explored what it was like to play with the system, how the experience differed from other co-performance situations, how it affected the participant's creativity, whether participants felt pulled in any new directions, and what the positive and negative aspects of the interaction were. Then, the WoZ aspect of the study was revealed, and participants were asked whether they would have played differently if they had known the "agent" was a person, and how they felt about the fact they'd been playing with a person. The most notable outcomes of the interviews are summarised below.

Participants' immediate reactions to engaging with the system were mostly positive, using words like "fun," "engaging," "organic," and "instructive." None suspected they had been playing with a human.

All three participants expressed that their focus had been influenced by the (presumed) absence of a human counterpart. They assumed that the system was tonally or harmonically agnostic, and they all paid less attention to normal musical conventions as a result.

Two participants expressed that they were emboldened by the notion of a non-human system that withheld judgement and allowed them to play without having to worry about sounding good or being correct. They also stated that they were less critical of the system's output than with human musicians. Apparently, this trade-off—accepting "less musicality" while being free of judgement—was a prospect they found exciting. The assumption of "less musicality" also made the participants positively surprised when the system appeared to respond in ways they had not expected. One participant expressed that the lack of a social dimension gave her a heightened sense of security, and she was "able to check out a lot of things that I never would have done with people". This participant was visibly ruffled upon learning that the agent was in fact a person; after reflection, she acknowledged that a willingness to leave her own comfort zones and venture into unknown territory was the biggest difference from the co-performative situations to which she is accustomed.

Participants felt they had taken part in a dialog with the AI. They referred to the system as an agent with a capacity to influence the musical choices that they made. At the same time, they also emphasized their ability to influence the system, such as one participant's claim that it was "easily tricked" into following her. Benson (2003) claims that a dialog is only possible when there is a mutual tension of accountability, and that "to treat the other as other requires that I recognize the other as having a kind of claim on me" (p. 167). Our study suggests that a genuine musical dialog with a computational agent is not solely dependent on technological factors, but requires the human user to relax the notion of control and give space for the agency of the system to manifest itself collectively.

Ultimately, these results suggest that a musician's mere belief that they are performing with AI can strongly influence their musical expectations and judgments, as well as their own musical goals and approach to risk-taking. Even an AI that achieves human-like musical capabilities may not be experienced as a stand-in for a human collaborator, but may bring its own, distinct creative affordances and challenges.

## **Ethical implications**

WoZ studies—common in HCI research—involve mild deception in that participants interact with what they believe is a purely computational system, when the system is actually under human control. We believe this deception can be justifiable when it enables testing an interaction that is not feasible to implement computationally. In our study, we took care to be sensitive in how we revealed the “Wizard” to assuage any feelings of gullibility; two participants did feel a passing sense of embarrassment, which they took with good humour, and neither claimed their right to withdraw from the project.

## **References**

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