Thesis Portfolio

Creating a Digital Polyphonic Theremin Using Infrared Proximity Sensors
(Technical Report)

Can Artificial Intelligence Play an Effective Role in the Production and Consumption of Music?
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

This thesis project aims to investigate the current AI-driven technologies relating to the music industry and how effective they could be in replacing their typically-human counterparts. To evaluate such, these technologies are studied through an Actor-Network Theory perspective. I investigate the networks that already exist in music composition and education and I study the relationships and dependencies between different actors in the networks. To determine the AI's potential effectiveness, I consider the situation in which the AI replaces the artist or the music teacher and evaluate how the network would respond and what would be missing. I focus on two music composition platforms—Sony's Flow Machines and Google's Magenta Project—and two music education platforms—SmartMusic and Autonomous Intelligent Music Teacher (AIMT). I study these platforms' documentations, attempt to use them, and research others opinions regarding them to determine their potential usefulness. Additionally, I have conducted an interview with an experienced music teacher to understand her point of view and to better understand what it takes to get/give a good music education.

My technical report details the creation of a digital polyphonic Theremin device that makes use of infrared sensors. The project is not related to my thesis work, but it is related to my prospectus, which can be found at the very end of this document. It was originally thought that this Theremin device would be a good learning tool for aspiring musicians and I still think it could be, but I haven't conducted any research to confirm its hypothesized efficacy.