Software to Improve MIDI Controller Usability

Artistic Legitimacy in Digital Music Production

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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General Research Problem

Digital technology has already positively impacted the accessibility of music production, but how can this accessibility be improved even further?

Digital technology like computers and the internet seem unavoidable in every facet of modern life, and music production is no exception. The use of digital tools in music production has had a positive impact on the accessibility of music creation. With personal computers, laptops, and even smart phones that can be used to create and edit audio, the historical barrier of needing to spend thousands of dollars on audio gear is no longer an issue (Hracs, 2012). In addition to computers, the internet is a resource rich with educational music resources, many of which are free, allowing amateur producers to learn skills that would otherwise be out of reach (Cascone, 2000). Beyond the educational potential, the internet serves as a way for individuals to easily share their music with the world (Hracs, 2012). A common digital music production tool, the MIDI controller, will be the focus of my technical project. For my technical project, I will improve the usability of MIDI controllers by developing a MIDI modification software. For my STS research, I will explore the perspectives on the artistic value of digitally produced music, and understand the factors that shape these perspectives.

Software to Improve MIDI Controller Usability

Improving general-purpose MIDI controller usability with a layer of software customization.

Alongside computers, the standardization of Musical Instrument Digital Interface (MIDI) in 1983 may have been the key that unlocked the potential of digital technology in music production. MIDI is a digital communication system originally created to act as an interface between synthesizers, allowing one to play notes and adjust parameters on the other (The MIDI

Association, n.d.). MIDI communication involves actions like sending a “note on” message when a key is pressed or sending “continuous control” messages to adjust volume or other parameters when a knob is turned. Today, MIDI enables communication between hardware instruments, computers, and music software, fully integrating the power of digital technology into the music production process.

With widespread adoption of MIDI by instrument manufactures and software developers, the ecosystem of music production tools became far more interconnected and customizable, not only for professionals, but amateur producers as well. One common MIDI tool is the MIDI controller, which produces no sound on its own but instead acts as an output source of MIDI messages to control the hardware instruments or music software it is connected to. MIDI controllers often keep the appearance of a keyboard synthesizer, with the primary control being a piano keyboard, and extra controls like knobs, faders, and buttons being added for additional functionality. Musicians are able to play the MIDI controller in a similar way to hardware instruments and route the output to whatever hardware or software supports it. With the additional control knobs mentioned previously, it becomes possible for artists to conveniently and expressively control not only hardware instruments, but also software instruments that would otherwise have no tactile control surface.

Although most hardware and software instruments will consistently support note messages output by any given MIDI controller, a limitation of the control possibility of MIDI controllers arises when the controller is used across multiple instruments. The expected input MIDI message values will often be different, meaning that additional controls such as knobs and buttons will not function as the use expects or desires. Customization of MIDI controller output is often inconvenient and limited in its potential for complex customization. For my technical

project, I will solve this MIDI customization and flexibility problem by developing a MIDI customization software that acts as a middleman for MIDI messages input to a computer, allowing the user to modify the input before it is routed to a hardware instrument or music software.

Existing software that is similar to what I will develop is Midi Shift ("Midi Shift," n.d.). While this software focuses on accessibility through its simplicity of customization, my software will allow for more complex modification of MIDI messages, providing greater flexibility. There are also real-time remapping solutions built into some music software like control surface scripts in the digital audio workstation Ableton Live ("Creating your own Control Surface script," n.d.). Although this solution works well if Ableton Live is the only software being controlled, there is no improvement to the controller usability when switching between multiple instruments or software. My software will enable effortless switching between multiple software or hardware instruments by acting as a MIDI processing layer that runs separately from the MIDI output targets.

Artistic Legitimacy in Digital Music Production

What factors shape perceptions of digitally produced music's artistic value as digital technology has grown in prevalence in the music industry?

"The best thing about technology is that now anyone can make music but the worst thing is that now anyone can make music" (Hracs, 2012, p. 459). This seemingly contradictory line from an interviewed musician reveals the conflicting perspectives on digital music production. On one side, proponents of digital technology cite the accessibility due to lower costs and ease of use when compared to analog gear (Crow, 2006; Hracs, 2012). The opposition, who favor analog

means of production, consider the sounds of digital production to be less natural and argue that digital technology requires little effort from the producer to achieve the same result as analog, cheapening the artistry of music production (O'Grady, 2019). Understanding the formative factors of these conflicting perspectives on digital music production will facilitate a better understanding of the artistic significance of digitally produced music as a part of music culture as a whole.

The use of digital technology in music production began in the 1980s, with analog tape being replaced by hard disk drives as the new storage medium of choice for music recording (O'Grady, 2019). By the early 2000s, powerful and affordable computers were widely available to consumers, and with them came the potential for almost anyone to digitally create and manipulate sound (Crow, 2006). Spending thousands of dollars on analog gear and paying hundreds of dollars a day to use a recording studio were no longer barriers of entry to someone interested in making music; if they had a computer at home, that was all they needed (Hracs, 2012; McGrath et al., 2016). Digital technology did not just make music creation more accessible to general consumers, but also made music production in a professional capacity more efficient. Actions like the cutting and looping of audio, which was a delicate and technical task when done with analog tape, is trivialized by music software (O'Grady, 2019). Many consider the changes resulting from digital technology's use in music production to be wholly positive, claiming that lower costs and widespread availability of digital production tools allows amateurs and people with low budgets to produce music that is potentially indistinguishable from professionals, opening the world of music creation to people who would have no access otherwise (Hracs, 2012; McGrath et al., 2016). However, there are opponents of digital production that claim that the difficulty of techniques like cutting and looping analog tape made

the end product more valuable, a value that they claim has been lost with digital tools trivializing the artform (O'Grady, 2019). A group in favor of digital production's artistic value is producers looking for new ways to experiment with sound. The endless possibilities of the fine-grained control in modern sound software can turn production tools into instruments of their own in the right hands (Cascone, 2000). However, the opposition considers the sounds of analog production to be more natural than digitally produced sounds, and they argue that technology is putting in more effort than the person using it, cheapening the artistry (O'Grady, 2019).

The existing research of digital technology in the music industry rarely considers the perspectives on artistry that are impacted by digital technology, and those that do only consider a single perspective, that of the most outspoken opponents of digital production. For my research, I will consider both sides of the conflict around digital music production, and focus on how perspectives on the artistic value of it have been impacted. By understanding the views on artistry in digital music production from all kinds of participants in the system, a more complete picture of the impact of digital technology on artistry in music can be achieved.

In order to conduct research on the shaping of perspectives on the artistic value of digital music production, data from a diverse range of people will be required. My primary data source will be interviews, both old and new, in order to observe changes in perspectives over time and understand the impact of time in perspective shaping. It will also be important to use interviews from artists who work in a range of genres, as genre history and changes is also a factor worth analyzing for its perspective shaping. Because interviews will mostly happen with high-profile producers, I will also consider the more casual source of music forum postings to broaden my data collection to amateurs and consider the impact of experience on their perspective on artistry in music production. Other perspectives worth considering are those of critics and consumers of

music. In order to collect data for these groups, I will look at the music reviews of critics and the changes in music genre popularity as digital technology gained prevalence in production. I will analyze the data under the framework of Actor Network Theory, allowing the relationships among human and non-human actors to be considered. By analyzing all the relationships of each actor in the network, I can better understand which of these relationships are factors shaping the actor's perspective on artistry in digital music production.

Conclusion

Although the opponents of digital technology in music production claim that it only results in a cheapening of the artform, the accessibility that digital means of production have provided are undeniable, and to those people who have the opportunity to create music as a result of the low barriers to entry that digital technology brings, it may be invaluable. With my STS research, I seek to better understand both of these perspectives on the artistic value of digital music production by considering how changing social, cultural, and technological factors shape each perspective. In my technical project, I will improve the usability of MIDI controllers by developing a MIDI modification software. With this software, the power and flexibility of MIDI controllers will be maximized. Accessibility in music production has already been greatly improved by the introduction of digital technology, but it is worth pursing even greater depth of usability and understanding of perspective within the space of music production.

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