

Problem Statement - Audio Extravaganza

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1 Abstract

The Audio Extravaganza project is centered around the creation of an impressive, manipulatable, and usable tool to aid in the performance arts by creating an iconic audio effect. This document looks at the project at a high-level, attempting to define a problem and minimally-detailed solution to that problem. Simultaneously addressing audiences of professional performance background, casual performance experience, and simple enjoyers of music across the spectrum, there needs to be new methods to build new sounds while maintaining accessibility and an impressability. The technological solution to this involves a portable and simple device to add modulation and looping capabilities to an audio source to be sent to an amplifier or a recording device. The device has a multitude of metrics to determine the completeness of the project, ranging from objective sound quality and latency to subjective enjoyability.

2 Problem Statement

The Audio Extravaganza project, a project centered around the creation of an impressive, manipulatable, and usable tool to aid in the performance arts by creating an iconic effect in real time, is a unique project when comparing to others in the Computer Science Capstone project, in that the requirements and objectives are very open-ended and non-restrictive by design. It is also unique such that in any sense, the project does not really “solve a problem”, at least in the traditional sense. That said, there are ways to describe the project as accomplishing a task that aids in the creation of music: perhaps the goals are centered around sales and distribution of a marketable product, or maybe the goals are built more around innovation and combination of ideas to find an original niche for a common tool.

To approach this from the highest level, one can look at it from the perspective of the users of the final product. In this case, I am going to choose to look at the problem from the perspective of creators of music and enjoyers of music. There is often a divide drawn between the artists, producers, and creators of a musical piece and the consumers, onlookers, and fans that surround the music. There are barriers between stages, different accounts for artists and users on distribution sites, and a completely hidden backend of the music industry that is often an afterthought for the common listener. However, there is a large degree of overlap between the two groups, as creators are almost always enjoyers of music, and the prohibitive factors such as financial means and technical expertise that prevent people from becoming creators are becoming less and less of an issue as time goes on and technology progresses. This seems to be a point that can be harped on. There is a lot of opportunity in designing projects that appeal to groups on both sides of this loosely-defined spectrum, and building projects with this perspective of enjoyability, usability, versatility, and manipulability can yield a product that is both innovative and marketable. Thus, a summary definition of the problem incurred by the project description could be “We need new ways to make new sounds in an accessible yet impressive format”. While this is quite vague and generalized, it creates a setting where a lot of new music-based technology in many different sectors resides.

Inherent in that statement are barriers of many levels of difficulty to overcome, ranging from ideological to technical. How is accessible defined? How is impressive defined? What constitutes as new? While those questions themselves are barriers to overcome, the key challenges present in this problem statement are vague and general in the same sense as the statement. These barriers can be approached by looking from the same perspective as done to develop the problem statement. Starting with an overarching view of performance from both the consumer and the creator exposes some areas of fine-tuning and trial-and-error style testing that will surely need addressing as the product is developed. The device needs to bring something new to the table. Whether that is the sound itself, the character of the sound, how it interacts with the sound, or the combinations of sounds, there needs to be a differentiating factor with other similar devices. This will be difficult due to the large number of devices that have had decades of development ahead of time. The device also needs to be easy enough to use, which will be a challenge for the skillset of the team, delving into a realm of hardware that most software developers have never been. The device also needs to be powerful, so that experienced performance artists can be innovative and creative with it. This will be a barrier for reasons listed before, and for finding a subjectively defined stopping point for how off-the-rails the device can be.

With that problem definition and the barriers that come with in mind, one can work towards a tech solution. To both follow the criteria of the project description and to satisfy the conditions of the problem definition, a solution involves a portable, scalable physical product that modulates an input signal while also providing a looping functionality, perhaps with an ability to recursively modulate a looped signal that gets more modulated to a user’s specifications. The device must be scalable to all types of users within a defined range, it must sound good to at least some audience, and it must sound like something new. Without knowing too much about the technical challenges and capabilities involved, I lean towards a two-button pedal that has on/off capabilities for both a modulation and a looper functionality, with controls related to the modulation on the loop, the modulation intensity, a velocity/volume/level, a mix control, and in the interest of making the product more unique, having a random variable “jangle” that really takes the sound in a new direction. In addition to this physical device, having a capability to use the software as a VST plugin in a Digital Audio Workstation seems very appealing to me, in a way that can be emulated in the same way as the physical device. Even more enticing would be to enable the product to be controlled from a application on a computer. This in itself would position the device in a new and unique environment, creating a niche between digital-based hardware and digital-only software on a DAW.

Criterion and metrics for success are difficult to describe this early in development, but there are object goals to consider in the outcome. The device should not incur any significant loss in audio quality or amplitude either engaged or disengaged, unless it turns out to be an intentional artistic choice. The device should be on a comparable level in terms of cost-to-build with other similar products. If it were to be produced on a massive scale by Moog or a similar

company, could it be sold for a comparable price compared to other devices that create similar sounds? Finally, the device should pass some quality surveys targeting both experts and people more casually invested to determine that the device sounds pleasant. The metrics for the measurability of this are unclear at this point, but finding a way to describe objectively if this product has any value will be important.