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EECS 2020

MUSI 495: Individual Study Project Proposal

200120

In Fall 2019, I did my Senior Project for the Electrical Engineering and Computer Science major in the field of ambisonics, under the supervision of Professor Konrad Kaczmarek. Ambisonics is a method of efficiently spatializing audio in 3 dimensions. I used the Google Resonance source code and a Bela Beaglebone to build a low-latency experience in which a listener wearing headphones and headtracking can place a sound source in 3D space. Professor Kaczmarek and I found the experience sufficiently compelling to justify further work with the Google Resonance SDK.

In an effort to create a robust base of Resonance developers, Google recently open-sourced Resonance. Everything, including the original C++ code and all associated libraries, is available online for free. I used the C++ in my previous project, but Google has also released platform-specific versions of Resonance for FMOD, Unity, Unreal, Audio Monitor VST, Wwise, Android Studio, iOS, and web applications. However, there is not a Max or Pure Data version of Resonance.

The goal of this project is to create a Max and/or PureData wrapper for Google Resonance. This would make Google Resonance, ambisonics, and spatial audio more accessible to a wider range of people, ranging from developers to musicians to other artists. It would also be useful for Professor Kaczmarek’s music technology classes, which use Max MSP as an educational language.

I plan to publish the project on my personal Github so that developers and artists outside of Yale can also use it. I hope to receive feedback from internal and external users.

Further directions with this project could include using the wrapper to render ambisonics experiences on augmented audio devices such as Bose Frames/Bose 700s, or an AR headset like Magic Leap / Hololens / Vive. This project could also be a good starting point to learn how to port other SDKs used by the Music Department into Max or Pd, such as Vicon’s motion capture software, Intel’s Realsense depth tracking solutions, and HP’s Z 3D camera.