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Implementation of Taiko simulation : Abstract

Brief description : The goal of the project is to reproduce and simulate the use of a Taiko drum in VR. In order to have a more restricted field of action, I have to work with differents technologies that I will introduce to you.

Abstract : Obviously the first constraint is to use virtual reality. So I used Unity 3D with an oculus rift to make my simulation. This is the base of my project. But instead of using the regular remote controler to locate the user in space, I have to use a tracking camera which work with windows and unity 3D. In order to fully use this depth camera, I looked for a library that could handle body tracking. As a result of my search I took the trial version of Nuitrack which is the free and 3 minutes limited version of the software. According to my project the 3 minutes restriction per use is enough.

The second restriction is, as I said, about remotes controllers. Indeed, I can not use the oculus touch for my project (the results would not have been good enough with them though). Instead, I have to make my own controllers so I could better control the sensations I wanted for my project. I made some tests and I tried to find a way to make the strike more "punchy". As a result, the controllers are made essentially of plastic : pvc tube and 3D printed pieces. I had to print some pieces because the model I had in mind for my controllers was not made of pieces I could find on the market. We can also find inside each controller a solenoid at the base of the stick linked to a microchip (ESP WROOM 02). The solenoid is activated when we virtually hit a drum and focus the sensation in one single strike at the end of the stick using a pivot mechanism. The ESP and its arduino code work in pair with a unity script using WI-FI UDP network. Because this is a one way transmission the unity script does not have to know if the message has been sent and just continues its transmission.

Along with the script, the unity project runs an environment I made myself using blender. I wanted to make it as traditional and faithful as possible which is why I studied traditional japanese rooms. I also went to a drum museum to get inspiration for visuals and sounds from japanese drums.

Conclusion : The project is not finished yet but I hope the results will be closed to my first expectations for this project. Still, during this internship I think a lot of my skills improved and I want to thank laboratory members who helped me during the internship.