Written Reflection

A Virtual Reality Drum Set Simulator

My individual project is a VR drum set simulator that allows players to practice playing the drums. It simulates the drum set, the drumsticks, and several distinct sounds for striking the drums and the cymbals. It also simulates a living room environment. To play the game, simply grab the drumsticks and hit the drums or the cymbals. The main reason why I made this project is that drumming is an interesting yet extremely inconvenient hobby. Drums can be expensive, especially as the size of the drum kits grows. Drums take up a lot of space and create intrusive noises that annoy our roommates, neighbors or family members. Therefore, the case for practicing drums in a VR environment seems pretty compelling. VR offers the potential for drum kits to be not obtrusive to the real world, thus allowing us to play the drums at night without worrying about bothering other people. VR makes the drumming experience simple, visually appealing and fun to play with. VR gives the players the opportunities to experience playing a musical instrument in the most realistic manner possible.

Although the interface of this project is still rudimentary, it is possible to add advanced features to the project to develop a VR application that instructs players how to play the drums. VR is a great medium for drumming because not everyone has the free time to learn with a teacher in a traditional setting. However, in a VR drumming application, players can put on their headsets and follow the instructions displayed on the drums to learn how to play the drums. It is possible to have a virtual teacher accompanying the players to instruct them how to improvise and it is also possible to add interactive theory lessons, live practice sessions and animated demonstrations that allow players to explore different drumming styles and explore different drumming experiences. Players without any drumming experience might become interested in drumming during the process of playing the virtual drums and move on to play real drums afterwards.

One of the biggest challenges to traditional music learning is the need for practice. In order to master the skills of playing a musical instrument, it is important that the players practice over and over again to develop muscle memory, which is often a tedious task. Besides, individual practice is sometimes not quite productive because players only receive limited feedback. Therefore, it is likely that learners might gradually lose their interest and motivation when using the traditional way to learn how to play the drums. VR, however, can completely reshape the music learning and practicing experience. In VR, drumming can be a game where the players need to hit the drums in the proper order and at the appropriate time for a particular song in order to get high scores. The game-like nature of the VR drumming experience can encourage players to compete with each other to get the highest score possible, thus setting individual goals for improvement. It is also possible for VR drumming games to have features like in-game recording tools and sharing tools that facilitate the communication among different players, which makes music learning much more interactive and far less solitary. Moreover, we can change the background in a virtual environment. This means that we can not only simulate playing drums in a studio or in a classroom, but also simulate playing drums in an urban park, playing drums in a forest, playing drums at a beach, playing drums above the clouds and playing drums underwater. We can also simulate playing drums on stage or playing drums in an auditorium, which might be helpful for performers who have stage fright. The immersive and interactive VR drumming

experience makes practice much more interesting and gives players an incentive to spend more time on practicing playing the drums.

Although VR can be a powerful tool for us to practice playing the drums, this project is still very primitive, so it has many limitations. First, the volumes of the sounds do not change and the height of the drum kit is not adjustable. We cannot modify the intensity of the sounds based on the force of each strike and the position of each strike. We also cannot modify the height of the drum kit according to the height of the players. Second, the drumsticks do not actually physically hit anything. The drumsticks simply pass through the drums and the sounds start to play whenever they pass through the drums, so the players are unable to feel the rebound of the drumsticks and the vibration of the drums when they are playing the game. Third, the project only simulates standing up in front of the drum set and does not have the ability to simulate sitting on a chair. It is also incapable of tracking players' feet movement, so unlike real drums, the players cannot use their feet to hit the foot pedals.