Lightsaber Construction Report

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Abstract— The aim of my lightsaber controller prototype was to provide a simplistic yet effective alternative into the constantly developing VR controller market. The alternative initially aimed to provide a more accessible and customizable option, with which any player can easily pick up, but most importantly caters to players with any form of disabilities. I found this a particularly important motive as I have always been of the belief that anyone, anywhere should be able to pick up games, and destroying barriers to entry on all fronts is the easiest way to ensure that players from all walks of life are tailored to equally. In the end, while not able to get the level of customization required, the end product is a good building block for what can go on to be a good alternative to the market leaders.

I. INTRODUCTION

The main issue that this controller is looking to solve pertains mostly to accessibility, with elements of usability and simplicity considered in the design process. As mentioned earlier, the main reason for this controller is to ensure that all players are able to enjoy a VR experience with a controller that is both easy to use and allows them to customize said controller to match their user experience. A lot of the iteration that went into this focused firstly on the simplicity of it all. This issue is addressed by having this super ease to use base of a controller, a lightsaber type controller that has simple motion tracking as well as a singular input. This controller at its base can then be built upon by the player to ensure that their own personal needs are met. This document will therefore address a prototype, that while unable to be completed, has been well thought out and revised, to ensure that anymore future iterations can incorporate the level of functionality, usability and simplicity that this controller is aiming to showcase.

II. LITERATURE REVIEW

In the first paper, the topic of discussion covers "the common ground between VR developments in the area of hand control devices" [1]. The paper addresses some of the design flaws that went into developing a couple of the most popular VR controllers. It then tests each of them against one another, determining if certain control features stack up against each other, and in the general context works well. Specifications such as the size and weight are also considered and discussed, so that there is often context behind the study. The paper goes on to conclude that many of the controllers tested "share few parallels in design, and interaction [1], as well as concluding that "further development of VR Hand Controllers requires reform to ensure an authentic human experience" [1].

III. METHODS

Initially, the idea was to have two assignable buttons on the side of the controller to ensure that the players had two buttons that could be mapped on a game to game basis, and ensure that it gave the player enough option and scope to work through that. However, that idea was ditched for a singular middle button, front and center of the controller, mimicking that of a lightsaber, inspired by the works of George Lucas' *Star Wars*. This was to promote that simplicity, and allowed for more room to build towards customization. The slanted design was also ditched for a vertical and straight up design, allowing for an easier shape as well as something that works better as a customizable entity. See [2] for a visual process.

IV. RESULTS

The SUS [3] and QFD [4] showed that while the idea in theory worked well, that there was plenty of room for improvement. Stacked up against our competitors, the controller didn't perform as well as expected. The main issue was that in most instances, the established players, such as the AMVR controller, as well as the HTC Vive just did a lot of things better. It was clear however based on consumer feedback that this was an idea that needed to be explored more. One of the biggest

issues that was quickly faced was that, tech wise, the controller didn't stack up very well. Areas like connectivity and motion tracking. These are issues that certainly could be solved down the line, with lined up iterations for how this could be implemented lined up.

V. Takeaways

There was a lot to learn and takeaway from this experience. For numerous different reasons, iteration was something that you just cannot escape. On reflection, it is a strong belief that with further development and faster iterations, that the project could have come out smoother. While I do believe passionately about this project, it is also of the belief that the level of tech that might be required to ensure that a project like this can be properly undertaken, which might now prove as an explanation as to why many of the major players has opted off of this matter. In all, this space does require innovation and it is my hope that someone in the VR controller realizes this sooner rather than later. Not only because of what it would do for the space, but because, like I mentioned, it is of the utmost importance that gamers everywhere, can enjoy gaming.

References

[1] Cook, David & Dissanayake, Derani & Kaur, Kulwinder. (2019). Virtual Reality and Older Hands: Dexterity and accessibility in hand-held VR Control. CHIuXiD'19: Proceedings of the 5th International ACM In-Cooperation HCI and UX Conference. 147-151. 10.1145/3328243.3328262.

[2] Iterative Design Workflow Graphic, attached in repo

[3] QFD Documentation, attached in repo

[4] SUS Documentation, attached in repo