Martial Arts Beat Boxing, Boxing Exercise Virtual Reality

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ABSTRACT
UPDATED—March 6, 2020. The goal of this study is to learn about exercise through Virtual Reality. In order to do this we have designed a Virtual Reality boxing exercise game called MABBoxing (Martial Arts Beat Boxing). Our team plans to use this game to conduct an experiment testing exercise and mood.

Author Keywords
Virtual Reality; Boxing; Exercise; Mood

CCS Concepts
•**Human-centered computing** → **User studies; Virtual reality;**

INTRODUCTION
Boxing is a universal sport that is a healthy way to stay active. However, it can be a dangerous sport in regards to physical contact. We are designing a Virtual Reality boxing game that will test exercise, reactions, and mood. MABBoxing, Martial Arts Beat Boxing, is a boxing video game played on the Oculus Quest. It is a Virtual Reality boxing game that will have objects coming toward the user that he/she will have to either punch or dodge. This will introduce a unique layer of game play that will elevate the users experience.

Literature Review
In 2005, Iowa State University created a Virtual Reality boxing game called Cyclone Uppercut. This was designed as an immersive boxing experience. It takes place in a boxing arena and the player fights a boxing champion.The game was made to be only used in Iowa State University's fully immersive environment, C6. C6 is a "six sided CAVE-like projection system". [3] Our game, MABBoxing, is more available to the public and can be accessed on any Oculus system.

Two psychology teams from Santa Clara University and Stanford University did a study focused on the psychological benefits of Virtual Reality exercise. In 2003, they conducted an experiment with 88 participants randomly assigned to do one of three tasks. They recorded the users' mood and compared the data amongst other tasks. [2] In our experiment we will also be measuring mood, however, we will also be measuring several other variables.

In 2015, a psychology team from the Republic of Korea did a study on the effect of Virtual Reality exercise on the balance and gait of stroke patients. 20 patients were divided in half, 10 would do a normal neuromuscular exercise (control group) and 10 would do the Virtual Reality exercise. The results showed that the Virtual Reality exercise had a positive effect on the stroke patients. [1] The positive results gave us optimism with our experiment. Although we will not have stroke patients as our primary users, we are still looking to test the effects of Virtual Reality exercise.

METHOD
We will be using an Oculus Quest for our hardware and Unity for our software to conduct our experiment. The game will have cube blocks coming at the player as well as obstacles for the player to dodge. The player will be required to do a number of movement combinations such as punches, squats, and physically moving their body. We also want to include the ability to shoot beams out of your fists in order to eliminate game objects that are meant to be targeted from a distance.

Our experiment will be within-subjects and utilize a questionnaire design. There will be three tasks: slow, medium, and fast cube speed. These will be our independent variables. We will use counterbalance and latin square for administering the tasks to participants. Prior to the experiment will record the user's age, prior experience with virtual reality, prior experience with boxing, number of times they workout per week, and questions about mood. During the experiment we will measure accuracy for hitting each block. This will be one of our dependent variables. Our other dependent variables will come from our questionnaire. We will ask about the user's mood, soreness, how sweaty they are, and if they feel like they got a good workout.

RESULTS AND DISCUSSION

CONCLUSION

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