

Team Name: sdmay24-27

Team Members:

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Report Period: Oct 9-Oct 22

Summary of Progress in this Period

Hardware Progress:

The Adafruit PWM/Servo hat, which facilitates the control of up to 16 haptic feedback motors through software pulse width modulation was installed. It was tested with 2 motors and facilitated a frequency response between the Raspberry pi and the haptic feedback motors.

Software Progress:

Several demos based on creating depth frequency arrays for the haptic feedback motor modulation were experimented with. The Kinect, a temporary stereoptical camera for testing purposes, has been successfully connected to a linux device. Before then, mock data was used to create depth maps. The depth maps were then able to be split into smaller depth map blocks, each representing a motor. A single depth point from the depth map was taken to determine the frequency for the haptic feedback motor. At the moment, the mean is being used to calculate said frequency. The code structure and unit test for the official algorithms have been laid out.

Pending Issues

Hardware Issues:

The Adafruit PWM/Servo hat had issues delivering consistent power to the motors. The motors were erratic at random variables of time. The potential issues could lie within the soldering work itself, as some connections might have been bridged causing a short. The other potential issue could be a shortcoming of the Adafruit hat itself being unable to deliver efficient power, which requires a shift in planning as a different hardware solution would be required.

Software Issues:

The Raseberry pi compute power might be a limitation to the software itself, depending on the resolution of the depth map. More experimenting must be done once the software is migrated to the Raspberry pi, and the Kinect is providing direct depth maps continuously. Another issue is using the mean of a depth map block to create a single frequency for a motor. An example, if half the block was a pillar 2 meters away, and the other half was a wall 6 meters away, the frequency would report 4 meters. This behavior is unwanted as we would want 2 meters for this specific scenario. An algorithm must be used that detects the closest substantial mass to the user, and reports that frequency to the motor.

Plans for Upcoming Reporting Period

Hardware Upcoming:

Two more Adafruit PWM/Servo hats were ordered. Another installation attempt will be given to see if the soldering was at fault. More motors will be prepared to be added to the Adafruit hat as well.

Software Upcoming:

The Kinect will be linked with the Raspberry pi to facilitate a continuous stream of depth maps. The code structure for the official algorithms will be mostly completed for preliminary testing. This allows for the testing of both components simultaneously, giving us continuous streams of depth arrays for the haptic feedback motors. An algorithm to detect the best frequency will begin to be explored, and unit tests to ensure basic functionality from the established classes will be added.
