Jeffrey Chen

Art 385

Final Project Ideation

April 30, 2020

Document Info

I will be prototyping a gaming peripheral for consoles that does not require the use of the fingers and thumb. Basing it on the control scheme of the 5th generation consoles (Xbox one, PS4 and Nintendo Switch. While the possibility of this prototype can extend to PC gaming, keyboard and mice controls are not supported. This prototype will attach to the user's body like clothing and will detect subtle movements of the upper arm as inputs. As such, the following control scheme has been ideated:

D-pad/Joystick: Controlled by circumduction movement of the arms. Assuming the user is using their right arm, moving the arm forward will read "up", moving it away from the body will simulate "right" and moving it towards the torso will simulate "left" and so on. Thoughts of adding functionality to the opposing d-pad/joystick on the same side of the controller were present in the previous stage of development by adjusting the user's shoulders but implementation at this point is difficult.

L1/R2: Controlled by pronation of the arm, meaning inward twisting of the arm. Left arm will control L1, and the right arm will control R1.

L2/R2: Controlled by subnation of the arm, meaning outward twisting of the arm.Similarly to the last control set, left arm will control L2, and the right arm will control R2.

L3/R3: Controlled by flexing of the muscles picked up by myoelectric sensors. .Similarly to the last control set, left arm will control L3, and the right arm will control R3.

Audience
The specific audience targeted by this project idea are for individuals without the ability to operate a console controller with their hands. This project seeks to remove the necessity of using hands to operate a complex control scheme and instead focuses on the user's upper arms to navigate through popular game genres such as FPS's, action, and souls-like.

Hand-drawn sketches
TBD(drawn)

Interaction Diagram (Interface Design)
Due to the complexity of the prototype, and the limitations of the sensors, I can only create a limited model of the prototype. As such, I have divied up the resources so they can reflect each of the control schemes:

Button: Buttons will be used to represent the actuation of the D-pad/Joystick when the user is circumducting their arms. Based on the layout of a JLF arcade stick, button presses will represent a single switch being actuated. Perhaps I can put in a randomizer so that when the button is pressed, a different switch is pressed

LDR: Since this project uses myoelectric impulses to check for muscle contractions, the LDR is a perfect tool to check this. However, due to the nature of action potentials, it will either be on or off so the entire range of the LDR will not be used.

Potentiometer: Lastly, the potentiometer will be used to represent the pronation and subnation of the arms since this is the only sensor you can twist. I will base the arduino on the "left side" of the controls so twisting the potentiometer clockwise will be pronatio and twisting it counterclockwise will be subnation.