

6.111 Final Project Checklist: E.D.I.T.H.

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Modules:

- FFT Module: Breaks the incoming audio into the frequency domain and seeks for peaks in the audio to correlate words and tone detection
- RGB to HSV: Converts a RGB pixel values to HSV values so that certain colors can be detected
- Erosion: Erodes away boundaries of regions of pixels of a certain colors to ensure that the LED can be detected correctly
- Filter: Will eliminate unwanted noise to make the movement of the mouse smoother
- Object Position: Will calculate the distance of the LED from the center of the image and use that distance to calculate the speed of the mouse in a certain direction, which will be fed to the Teensy
- Mouse State FSM: Will determine what actions the mouse should currently be performing (i.e. moving, clicking, etc)

The Commitment:

Minimum Viable Product:

- ❖ High and low tone detection
 - High tone for double left click
 - Low tone for right click
- ❖ LED light to track mouse coordinates onto the monitor
- ❖ Copper strip wires that when connected on the fingers acts as selection buttons
 - This will be done through a wired connection
- ❖ Filters
 - To protect from noise on both the audio and visual fronts
- ❖ Wired connection to the FPGA to complement an MVP
- ❖ Be able to obtain basic control of a monitor with a hand as a mouse and two basic tones

Expected:

- ❖ Added functionality on button selection

- The high tone will correspond as a redo button
- The low tone will act as an undo button
- ❖ Audio programmable mode
 - Be able to train a specific tone that the FPGA recognizes as a specific command may be to act as a delete key
- ❖ RGB LEDs to act as selection tools on the mouse
 - Red may correspond to right click
 - Green may correspond to double left click
 - Blue may correspond to left click
- ❖ Go Fully wireless
 - Glove battery pack, so the glove can be used anywhere
 - Teensy FPGA bluetooth connection
- ❖ Be able to partially use a hand as a mouse with voice as a helper function - all completely wirelessly

Stretch:

- ❖ Increased added functionality on button selection
 - A continuous high tone will act as a scroll up
 - A continuous low tone will act as a scroll down
- ❖ Basic word recognition
 - Potentially train the FPGA to recognize certain words in order to give commands
- ❖ The ability to chain mouse sensitivity
 - For ease of use
- ❖ Be able to change the LED color, for preference without losing functionality in moving the mouse
- ❖ Be able to use your hand and voice to freely control a computer monitor