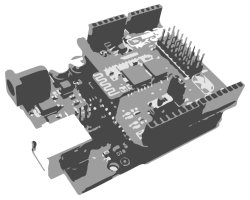
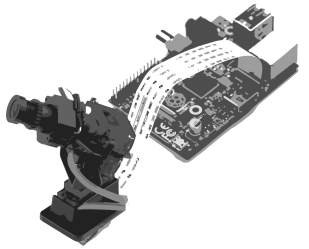
BIOFEEDBACK CINEMA

/EXPANDED CINEMA EXPERIMENT (ECE)

Project Schematic
As of 11/13/14





01. Neurosky Headset

The Neurosky headset reads electrical signals in the brain, it transmits the data to the computer via bluetooth.

The data provided is categorized into 8 categories of brain waves; delta, theta, alpha, low beta, midrange beta, and high beta. An algorithm that mind sense developed exports a 9th channel, “Attention”, which provides information about peaks and valleys in focus. Information about eye blinks is also provided.

01. To do:

1. Not mandatory to complete the project, but it would be optimal if the headset was transmitting signals directly to the arduino and raspberry pi. In the current configuration a laptop is required to receive headset signals.

02. Computer w/Processing

The computer is running a custom Processing sketch that reads the Neurosky values. Based on the values received it sends control commands to the Arduino via bluetooth. At present we have a working prototype that transmits commands to the Arduino to turn a motor based on the “attention” value.

03. Arduino w/Bluetooth Shield

The Arduino is receiving commands from the computer via bluetooth based on data from the Neurosky.

02. & 03. To do:

1. We need to map what specific input will be read and used from the Neurosky to control motor output on the Arduino. Then we need to update the Processing sketch and update the Arduino’s program as necessary.
2. ^ Along the same lines as item #1, we have an LED matrix, LED screens, and individual LEDs that may be interesting additions to the project as status lights, or indications of particular brain activity. If they are implemented, additions to the Processing and Arduino sketches will be required.
3. We still need to transmit Neurosky data to the Raspberry Pi, this may need to happen across the Arduino.

04. Raspberry Pi

At present the Raspberry Pi is not connected to the rest of the system. It is only operating as an autonomous camera with two buttons that control recording functions. Below is a list of the development required for this portion of the project.

04. To do:

1. We still need to transmit Neurosky data to the Raspberry Pi, this may need to happen across the Arduino. If possible, it would best to bluetooth Neurosky data directly to Raspberry Pi.
2. Develop python scripts that alter camera vision on the fly based on Neurosky output.
3. If possible, we need to determine an efficient mobile power source.
4. Update Pi to boot finalized script on startup.

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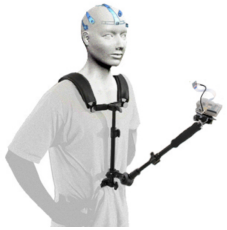
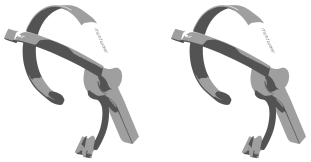


05. Support Rig

The camera mount is based on the SnorriCam, a wearable apparatus that fixes the camera to the body of the actor. As a result the actor appears still in the frame while everything moves around her. The camera becomes an extension of the human body, a prosthetic phenomena further amplified by the relationship of the actor to the camera's functions via the brain-to-camera-interface.

05. To Do:

1. A prefab shoulder mount was purchased. Some modifications may be required to mount the full system to the standard tripod head.



06. Experimentation w/Form

06. To Try:

1. We have two headsets to play with. What are the possibilities of averaging the output of two headsets to create a truly collaborative experience in the exhibition?

07. Collaboration

07. To Try:

1. Develop interesting ways to use the system. Salud has a few ideas related to dance.
2. I am interested in taking the system out into the city while and individual wears it on a dérive of sorts.

08. Documentation

08. To Do:

1. Draw schematics (in Fritizing perhaps?) that clearly demonstrate connections between hardware.
2. Publish code online.