Precise Onset Detection of Cell Phone Vibration (Physical Design)

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Activity Report

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1   AMENDED SOLUTION

There are no modifications to our previously proposed solution (i.e. our logical design document). The most significant update from the previous Design Document is that now we have the prototype and 3d models for our enclosed system, that will encapsulate all the components of the project. The system architecture, 3d models, and all other components are shown and described below.

2   PHYSICAL DESIGN

2.1   System Architecture

Our system currently has three subsystems we have a housing for our circuit which is a box with a phone holder with foam in, to hold the vibrating phone and dampen the vibration. Our second subsystem is inside the box which is our vibration sensor (Piezo electric sensor) connected to a Teensy microcontroller on a breadboard. Our third and last subsystem is an electroencephalogram (EEG) which is connected to a laptop screen to measure and output the electrical activity in the brain.
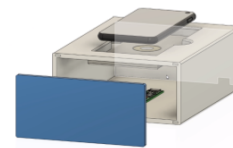
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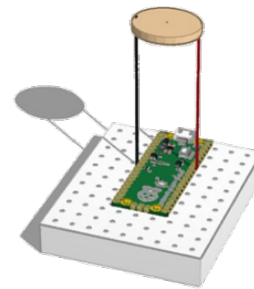
Figure 1. System enclosure

Figure 2. Vibration sensor

2.2   System Components or Subsystems

2.2.1   Subsystem 1

Subsystem 1 is the 3d Printed System enclosure. Refer to figure 1

2.2.2   Subsystem 2

Vibration Sensor using Piezo. Refer to figure 2

2.2.3   Subsystem 3

Brain monitoring sensor (EEG). Refer to figure 3

2.3   Engineering Standards

For the Project, We used 3 Engineering Standards. All for communication. Serial Peripheral
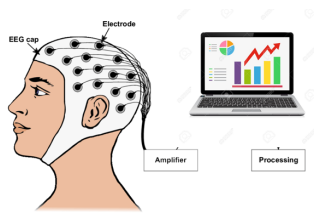
Figure 3. EEG

Interface, The Keyhole Library, and BCI2000.

2.3.1   Serial Peripheral Interface

Used by the Keyhole and BCI2000 Library.

2.3.2   The Keyhole Library

Developed By Dr. Jeremy Hill. It provides a quick way to package Data and pass it over Serial.

2.3.3   BCI2000

Provides a Real-time way to Plot Signals on MicroControllers.