

G54MRT Coursework 2 Proposal

Title: Seismo-sensor

Student ID:

Date:

Summary

A set of sensors for detecting seismic vibrations (ground movements due to earthquakes etc.) in areas where radio signal is not practical such as in areas with high electro-magnetic interference or underwater. They will record seismic vibrations, and store this. The sensors need to be time synchronised in order to allow triangulation of the source of the vibration. This will be done by putting the sensors within line of sight of each other and using visible light pulses (lasers in the real design) to synchronise clocks.

Technologies and sensor data

I will use the accelerometer to detect the vibrations. I will also use the light sensor in order to detect light pulses in order to synchronise the clocks.

Project plan

I will build and test two sensors. I won't build anything to allow collection of the data from the sensors, or any front end, I'll just manually copy it off. I also won't consider triangulation algorithms or any data processing beyond purely detecting and recording large vibration events.

I'm aiming to finish this development and testing in the 4 weeks before Easter and then write up over Easter. If I find I need to run any more tests, I'll do those in the last lab.

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| Week 1 Recording sensor data | I will spend some time in the lab recording vibration events from a GrovePI accelerometer. I will create vibrations by putting it on a table and wobbling the table. |
| Week 2 Vibration detector development | Using data recording in part 1, I will develop an algorithm to take sensor data and detect vibration events. These events will be logged to a text file with time stamps. |
| Week 3 Light pulse detector | Build a light pulse detector, which resets the time stamp each time it detects the end of a pulse of light. |

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| Week 4 Testing | <p>Test 1: I will record data whilst wobbling the table once per 30 seconds, and check that vibrations are detected.</p> <p>I will install the software on two Raspberry Pis, and test by a)shining a light on both light sensors, and then b)creating vibrations, and comparing when each device detected the vibrations.</p> <p>I'll create descriptive statistics for each of these tests.</p> |
| Week 5 (and over Easter) Write-up report | |
| Week of 15/May | Any last minute testing for report. |

Skills and competencies

I've used accelerometers before, and I have quite a bit of unix knowledge and python skills, I'm happy working with log files, I think I should be fine doing this.