
EE/CprE/SE 492 BI-WEEKLY REPORT

3/13 - 4/2

Group number: 32

Project title: Development of a Smart Sensing System for Road Performance Data Collection

Client &/Advisor: PROSPER - Bo Yang & Halil Ceylan

Team Members/Role: Victor Guerra, Ethan Young, Michael Petersen, Shlok Singh

o **Weekly Summary:**

In the last three weeks we have been fine-tuning the Arduino and the format that we want the data saved onto the sd card. From this saved data, we have made a client website to upload it directly to the cloud server. Based on the memory that we have available on the Arduino after getting this all figured out, we have none left over to get the http requests implemented. Because of this, we may have to end up dropping that out of the final design and make note that an Arduino is not powerful enough to get the roughness data and send the data via http to the cloud.

o **Past week accomplishments**

- The client website has the ability to upload the log files from the SD card.
- The backend cloud server can take the uploaded log files and parse them out for further
- Arduino records GPS data (Latitude,Longitude,Speed), Accelerometer data, as well as perform calculations needed to build road profile and insure vehicle is travelling at a constant speed.
- Arduino code memory optimized to allow storage for all necessary libraries and program code.
- Arduino records data to SD card in format to be read by backend.

o **Pending issues**

- Exact filtering parameters for raw data need to be determined from literature and trial
- Embedded design must depend on constant forward speed and ignore turns
- Arduino memory is full right now and we have not implemented the http requests. In fact, we had to even delete the library to be able to run what we currently have.
- The memory and polling rate constraints both come into play for accelerometer positioning and for http data transfers

o **Individual contributions**

Name	Individual Contributions	Hours this week	Total Hours
Victor Guerra	IRI Calculation	2	110
Ethan Young	IRI Calculation, Arduino Testing	15	132
Michael Petersen	Arduino Testing	16	122
Shlok Singh	Server Preparation/Development	12	114

- Victor
 - Worked more on the accelerometer to profile physics.
- Ethan Young
 - I worked heavily on creating a client-side website where users can upload the driver logs. I tested this by uploading test documents and making sure that the server could read them to the console.
 - I also worked a lot on parsing out the files that were received. The files are parsed on the back-end and parsed out in a way which separates them by samples. These samples are decided on the Arduino itself based on a 300mm distance. If a sample comes with an “out of bounds” line, then that sample is not used as that means there was some acceleration taking place or the speed was too slow or fast. This was tested by getting a test file from the Arduino.
- Michael Petersen
 - I worked with Ethan to design the format in which the log on the SD card would format the data collected. Also I completed program code to collect Accelerometer, and GPS data within the confines of limited Arduino memory. In the process of this, the Arduino did not have the memory to execute program code. The libraries needed to be slimmed, specifically IMU library, and program code needed to implement efficient data type usage. Alongside this, unused, and quality of life code needed to be removed or reworked.
- Shlok Singh
 - working on accelerometer dynamic positioning and trying to get the GSM issues figured out

o **Plans for the upcoming week**

- Collect sample road data using Arduino to test bounds of error, and insure the data we will receive will fit with the data we are expecting. Initial IRI tests.
- Continue implementation of accelerometer to profile physics and testing it with unit test cases
- Test the full back-end features; from the file upload, all the way to storing it in the database.

o **Summary of weekly advisor meeting**

- Did not meet with advisor previous week