
EE/CprE/SE 491 WEEKLY REPORT 3

10/7 - 10/21

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:** The last two weeks we continued our research and figured out the outputs for all the sensors we will need to use. We have finalized the microcontroller we will order, an arduino uno, as well as the gsm and gps module. For this we will be going with a cheaper 2G module, the SIM808. We also gained more knowledge about the IRI calculation although there are still many more questions.
- o **Past week accomplishments**
 - Researched further on IRI
 - Alternative IRI calculations
 - Microcontroller, GPS/GSM parts chosen
- o **Pending issues**
 - There will be noise from the accelerometer. There two solutions; a high pass filter and gyroscope.
 - We still need to get a better understanding of the IRI calculation.

o **Individual contributions**

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Victor Guerra	Group Meeting + Literature Review	10	21
Ethan Young	2 Group Meetings + Literature Review	14	25
Michael Petersen	2 Group Meetings + Literature Review	10	21
Shlok Singh	2 Group Meetings + Literature Review	11	20

o **Plans for the upcoming week**

- Create finalized 'Parts List' and decided microcontroller + sensors required to begin initial design
- Deeper understanding of Power Spectral Density calculation of IRI, requirements coming from that (HW, SW)
- Look into software band pass filter implementation.

o **Summary of weekly advisor meeting**

Discussed methods of IRI calculations as well as finalizing a parts list to begin ordering parts. Current plan is to order parts by the end of the week minus the accelerometers/gyroscope. As for IRI calculations we are still understanding the different methods of IRI calculation. Double integration calculation has the problem of compounded error with each integration. Current solve to solve issue of noise/drift is implementation of software-based bandpass filter. IRI calculation by Power Spectral Density is more accurate but requires a deeper understanding of physics behind IRI calculation and possible additional hardware requirements.