sdmay19-16: Smartphone App to Detect TwD (Texting while Driving)
Week 8 Report
October 28 - November 11

Team Members
- Kristina Robinson - *Project Lead*
- Andrew Knaack - *Lead Designer*
- Sara Mace - *Meeting Scribe*
- Lucas Golinghorst - *Test Engineer*
- Ryan Baker - *Lead Architect*
- Derek Clayton - Report Manager

Summary of Progress this Report
Our focus for this reporting interval were our phone handling, texting speed, and acceleration modules. Many members of the group used our gyroscope code to collect data on phone handling, data which would give us a better idea on the viability of using machine learning to analyze phone handling for the purpose of detecting texting while driving. Furthermore, machine learning tools, such as Tensorflow and OpenCV were investigated, the later meant for handling images. Outside of the phone handling module, work was done to create a texting speed calculator that operates on the phones' foreground. Preliminary work on the centripetal acceleration data collection was conducted to determine a suitable testing area for safely driving and turning a car, while collecting data, for multiple trials.

Pending Issues
- Many tests currently work in the phone's foreground, meaning the user must open the app for it to work. Our goal is to have it run in the background, so a way to make its features active in the background is a pending issue.
- Further investigation needed on viable sensors for phone handling, the magnetic sensor looked promising and needs further testing.
- The Design Document needs considerable revision.
- The centripetal acceleration data collection experiment needs to be conducted next reporting period.
- Detailed data analysis must be conducted on the gyroscope data.
- A way to store data on a user's texting speed must be discovered so that the app and use historic data for machine learning.

Plans for Upcoming Reporting Period
- All group members will work on the sections of the Design Document they took responsibility for.
- Derek will conduct the centripetal acceleration tests.
- Andrew will work on finding a means of storing data on users as well as continuing his work on the spelling accuracy calculator.
- Sara will conduct detailed data analysis on the gyroscope data collected by the group and combine these findings with what is analyzed in the magnetic sensor.
- Lucas will get in touch with some of the client's contacts to determine which software would be most effective in implementing our application.
- Kristina will work on magnetic sensor data analysis to determine its viability in the phone handling module. She will also create a presentation template for our final presentation.

- Ryan will continue to familiarize himself with TensorFlow and OpenCV, as well as working with Lucas to get in touch with the client's contacts.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Kristina Robinson	Analyzed data from gyroscope sensor data collected by team members. Evaluated strengths and weaknesses of using this approach within our project by graphing collected data and putting it into the context of the project. We are now looking into other sensors that might give us a bigger difference in how users hold their phone to determine if we can find any way to make phone handling an effective module in out project.	7	52
Andrew Knaack	Successfully implemented a foreground texting speed calculator. Had difficulties trying to make it into a background service. Also attempted implementing a spelling accuracy calculator, but currently it fails to produce any results.	14	62
Sara Mace	Organized the collection of gyroscope data that was collected by members. Assisted in analyzing the data that was collected. Attempted to see if there was any patterns between each member that tested data and the data that was resulted. Also took measurements of other android sensors to see if they could be useful	7	53
Derek Clayton	Searched for viable areas to conduct centripetal acceleration experiments. (Possible locations: SUV neighborhood, Commuter lots near Scheman and Jack Trice, downtown Ames). Found and experimented with a phone sensor application compatible with iPhone (Sensor Kinetics). Investigated the app's use of accelerometer, gyroscope, magnetometer, linear acceleration sensor, gravity sensor, and attitude sensor.	7	51.5
Lucas Golinghorst	Collected gyroscope sensor data. Began documentation of consistent testing process for our desired solutions (ie accelerometer, gyroscope, camera phone). Researched test driven development techniques as a possible	7	52

	tool for our application development process. Learning both OpenCv and tensorflow image processing syntax. Working with client to decide which software will be best for our project.		
Ryan Baker	Research OpenCv and tensorflow regarding image processing, and worked with client to determine the best fit for our project. Also collected gyroscope sensor data. Looked into the viability of the image processing to recognize certain feature of car interiors.	6.5	51.5
		Total Group Hours:	322

Gitlab Activity Summary

Andrew experimented with text change listening. Determined it would work well with foreground apps. (2 changed files, 37 additions, 13 deletions) 10/30/18

Andrew created an example that accurately measures characters typed per second. (1 changed filed, 57 additions, 8 deletions) 10/31/18

Andrew fixed a bug where the app would crash when deleting spaces in a message. Also atempeted to implement spell-check with SpellCheckerSession. (1 changed file, 47 additions, 2 deletions) 11/1/18

Andrew fixed a bug where getting suggestions would result in a crash during messaging. (1 changed file, 42 additions, 28 deletions) 11/2/18