

**sdmay19-16: Smartphone App to Detect TwD (Texting while Driving)**

Week 7 Report

October 21 - October 27

**Team Members**

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

**Summary of Progress this Report**

- The focus of this week was to access sensors on the phone and collect raw data for simpler tests, while determining ways to collect raw data on more complicated tests (the centripetal acceleration test). Members collected more data for the camera tests and it was determined that AndroSensor could be used with Android phones to get the data we need. Gyroscope functionality was added to our app and keystroke listening was partially implemented. More research was conducted on imaging processing software and an experiment to collect raw data on centripetal acceleration was developed, to be conducted next week.

**Pending Issues**

- Need to develop and experiment for collecting raw data on centripetal acceleration.
- Data on phone holding positions must be collected.
- The keystroke listener functionality in the app must be fixed.
- Methods for taking pictures using the app must be created.
- More research on image processing and its impact on battery life needed.

**Plans for Upcoming Reporting Period**

- Derek will collect acceleration data using his vehicle and one of the test devices.
- Sara will collect data on phone holding position of the phone using test devices to see if there is a difference in how phone is held when in a car versus normal behavior.

**Individual Contributions**

Team Member	Contribution	Weekly Hours	Total Hours
Kristina Robinson	Looked into how to use phone sensors to determine centripetal acceleration. AndroSensor is an application that lets you view real time data for all of the sensors in an android phone. Using this application, you can view graphs of acceleration when the phone is moving so we can use this to see how the acceleration will differ when the	6	45

	<p>phone is at different sides of the car.</p> <p>Another paper was talking about how to account for the equivalence principle when calculating centripetal acceleration.</p> <p>Looked into machine learning profiling which includes non-distributive profile models and discriminative models.</p>		
Sara Mace	<p>Learned how to access the sensors of apps using android studio for our app. I made a screen on our app that shows the x,y, and z values of the gyroscope. I did this to learn how to access the sensors and so we could learn what data the sensors give us. By also seeing what data we get, I started to try and determine how we could possibly use machine learning to detect how a user holds the phone. By the x,y, and z values the app I made I was able to get data on how I hold my phone in different positions.</p>	7.5	46
Andrew Knaack	<p>Collected more data for camera machine learning. Created a new branch for implementing texting speed/spelling tracking. Experienced problems detecting key-strokes while a different app is in the foreground. Still working on a solution...</p>	8	46
Ryan Baker	<p>Collected more data for camera machine learning by taking more pictures in every seat of the car with various levels of lighting due to the time of the day. Researched software tools for image processing and found 5 sources, with Tensorflow by Google being the most promising. Explored some examples of image processing using Tensorflow</p>	7	45
Lucas Golinghorst	<p>Took more test data images from all passenger seats of car to observe any useful commonalities that are distinct to these pictures. Researched software tools for image processing and found OpenCV to be most effective for our needs. Explored applications of OpenCV for machine learning with image processing.</p>	6.5	45
Derek Clayton	<p>Researched experiments for collecting data on centripetal acceleration. Determined that centripetal acceleration can be determined using tangential velocity and angular speed.</p>	7	44.5

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	Designed experiment for data collection to determine differences in between left and right positions in the vehicle. Investigated GPS smoothing process. Researched how road data could be used to determine turns as well.		
		<b>Total Group Hours:</b>	271.5

### Gitlab Activity Summary

Sara fixed her text example for showing how the gyroscope measures (4 changed files, 7 additions, 9 deletions) 10/23/18

Andrew updated gradle again and fixed several warnings (3 changed files, 9 additions, 9 deletions) 10/25/18

Andrew created key listening branch, got stuck on dispatch key event. (2 changed files, 52 additions, 0 deletions) 10/26/18

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