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

Week 6 Report
October 14 - October 20

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

Summary of Progress this Report
- The focus of this week was to start collected data for some of our solutions, the focus being put on our image processing solution. Several members took pictures of key reference points in their vehicles, to be used in the machine learning image processing solution that forms one of the modules of our application. Furthermore, research was conducted on Android Studio interfaces to determine how to program the use of the different sensors available to us on Android phones. As our group does not have in depth experience with machine learning, we took this week to delve deep into it, looking at neural networks and different types of machine learning. This ML research is in preparation to implement it into our imaging and phone handling solution.

Pending Issues
- A method for measuring centripetal acceleration must be researched.
- Further research on using android sensors in Android studio must be conducted.
- More images must be collected for our ML image processing solution.
- Accelerometer and key-stroke recording features must be added to our application.
- More research on image processing needed to proceed with solution.

Plans for Upcoming Reporting Period
- Lucas, Andrew, and Derek will add more images to our images pool for the image processing solution.
- Derek and Kristina will research experiments for finding centripetal acceleration differences between left and right side of vehicle without the use of a central reference point.
- Lucas will research image processing software tools.
- Sara will work on accessing sensors through Android Studio and developing a way to display data on our application.
- Ryan will explore libraries used for machine learning in Python.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Andrew Knaack	Performed research into and took notes on specific Android Studio interfaces for technologies so the team would have a	7	38

	concrete starting point for programming the camera, motion sensors, and key events. Contributed to bulk data for machine learning with pictures and statistics.		
Kristina Robinson	Took images of my car for data collection. Watched videos and read about the basics of machine learning to get ideas of how to use it in the project. Researched machine learning methods for image processing which included model-based and supervised/unsupervised machine learning.	7.5	39
Lucas Golinghorst	Took images in my car for data. Researched machine learning techniques and learned about the different ways to create machine learning algorithms. Searched for more information about image processing and the existing technologies that have used it, and how they were able to use it.	6.5	38.5
Ryan Baker	Took pictures of where one might hold their phone while texting and driving in my car. Researched machine/ deep learning, including different neural network techniques and how it works in general. I also found and studied some examples on how to create basic object recognition software from scratch and how that worked.	7	38
Sara Mace	Took images of my car for data. Researched different machine learning techniques, did in depth research on neural network technique, and how google uses machine learning when they are classifying photos.	6.5	38.5
Derek Clayton	Conducted research on types of machine learning: supervised, unsupervised, reinforcement. Explored the grades of ML supervision: unsupervised->semi->supervised. Looked into regression and classification. Researched some python libraries used with ML, including Pandas, NumPy, and SciPy. Conducted research on calculating centripetal acceleration using linear acceleration and turn radius.	7	37.5
		Total Group Hours:	229.5

Gitlab Activity Summary

Nothing to report.