From Students…

…to Professionals

The Capstone Experience

Alpha Presentation

Car-Net DriveView Social Competition

App

Team Volkswagen

Blake Miller
Evan Yokie
Tianyu Wang
Riley Wagner

Department of Computer Science and Engineering
Michigan State University
Fall 2021
Project Overview

• Encourage safer driving by scoring users based on how safe they drive

• Scores are calculated based on achievements as well as sensor data from the car such as blinker status, seatbelt status, speed and door locks among others

• By completing daily or weekly achievements, users can improve their driving performance for safer driving

• Rank users on a leaderboard based on these scores

• Users can compare their scores directly with other users as well
System Architecture

Client Side
- Android Studio
- Firebase

App

Server
- Flask
- Python
- Amazon EC2
- MySQL

Database Server
- Amazon RDS

User

Testing
- Postman
- Swagger
Home Screen
Leaderboard Screen
User vs Me Screen
Achievements Screen
What’s left to do?

• Fine tune our algorithm for determining driving score
• Rework the flow of the app in some pages
• Clean up pages and finish functionality for them
• Convert database to real data
Questions?
Algorithm

• Generates a driving score based on sensor data and achievements completed

• Split the data into three categories:
  - Extreme: Speed, seatbelt, doors
  - Ignorance: Blinker status, ACC, brake lights
  - General Safety: Oil and coolant temperature, MPG

• Calculating the score:
  - Mileage Multiplier, Score for each category and Previous driver score
Algorithm

- **Extreme:**
  - Max can be .12
  - \( \text{extremeScore} = (\text{previousScore} - \text{calculatedExtremeData} - 0.4) \)

- **General Safety:**
  - Max can be .1
  - \( \text{generalSafetyScore} = (\text{previousScore} - \text{calculatedGeneralData} - 0.2) \)

- **Ignorance:**
  - Max can be .1
  - \( \text{ignoranceScore} = (\text{previousScore} - \text{calculatedIgnoranceData} - 0.2) \)

- **Driving score:**
  - \( \text{subtractions} = (\text{mileageMultiplier}) \times (\text{extremeScore} + \text{generalSafetyScore} + \text{ignoranceScore}) \)
  - \( \text{drivingScore} = \text{previousScore} - \text{subtractions} \)

• If you have been a safe driver, you don’t lose points
Algorithm

• Your score will increase given you have driven safely
  
  o If your previous score is unchanged:
    » \( drivingScore = (previousScore \times 0.01) + previousScore \)
  
  o And if you have completed achievements
    » \( drivingScore = (previousScore \times 0.025) + previousScore \)