

Objective

Develop an iOS application to make users more efficient drivers. The app will be used to track gas mileage, speed, acceleration, idle time, and various other statistics using the onboard diagnostic sensor synced to the phone. Using this data, the app will give tips for driving more efficiently.

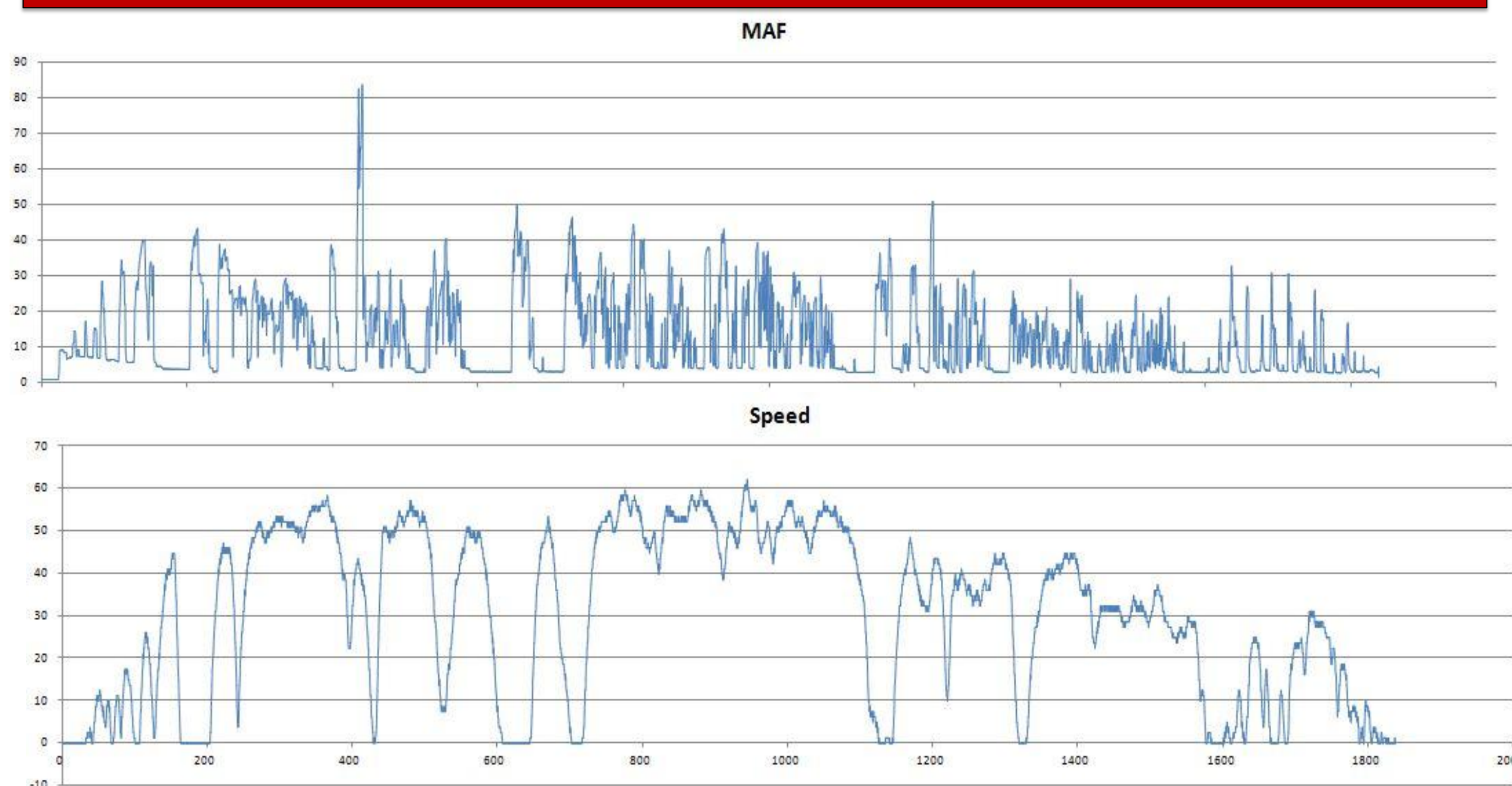
Algorithms

$$\sum_{i=0}^{\infty} m[i](t_{i+1} - t_i)/14.7 \quad \sum_{i=0}^{\infty} d[i](t_{i+1} - t_i)/3600$$

Fuel Consumed (Gallons) Distance Traveled (miles)

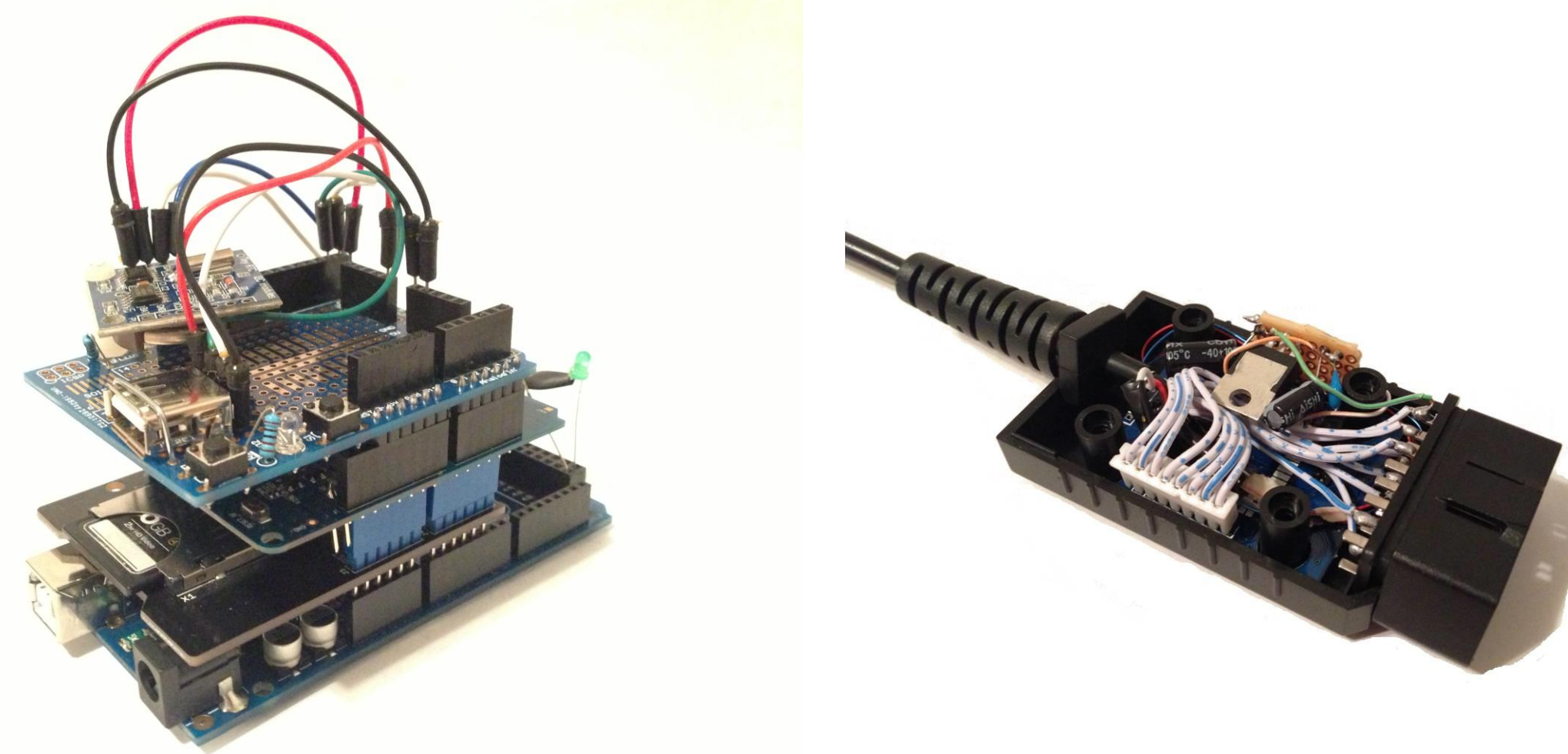
- Fuel Consumption/Distance Calculations:
 - Riemann sum of the discrete functions measured for Mass Air flow and Speed.
- Conversion
 - Air consumed to gas consumed we divided by stoichiometric air-fuel mixture ratio.
 - Converted Miles/Hour to Miles/Second.

Analysis



- Mass Air Flow and Speed were tracked in order to help us catch errors and fine tune our algorithms to be more accurate.

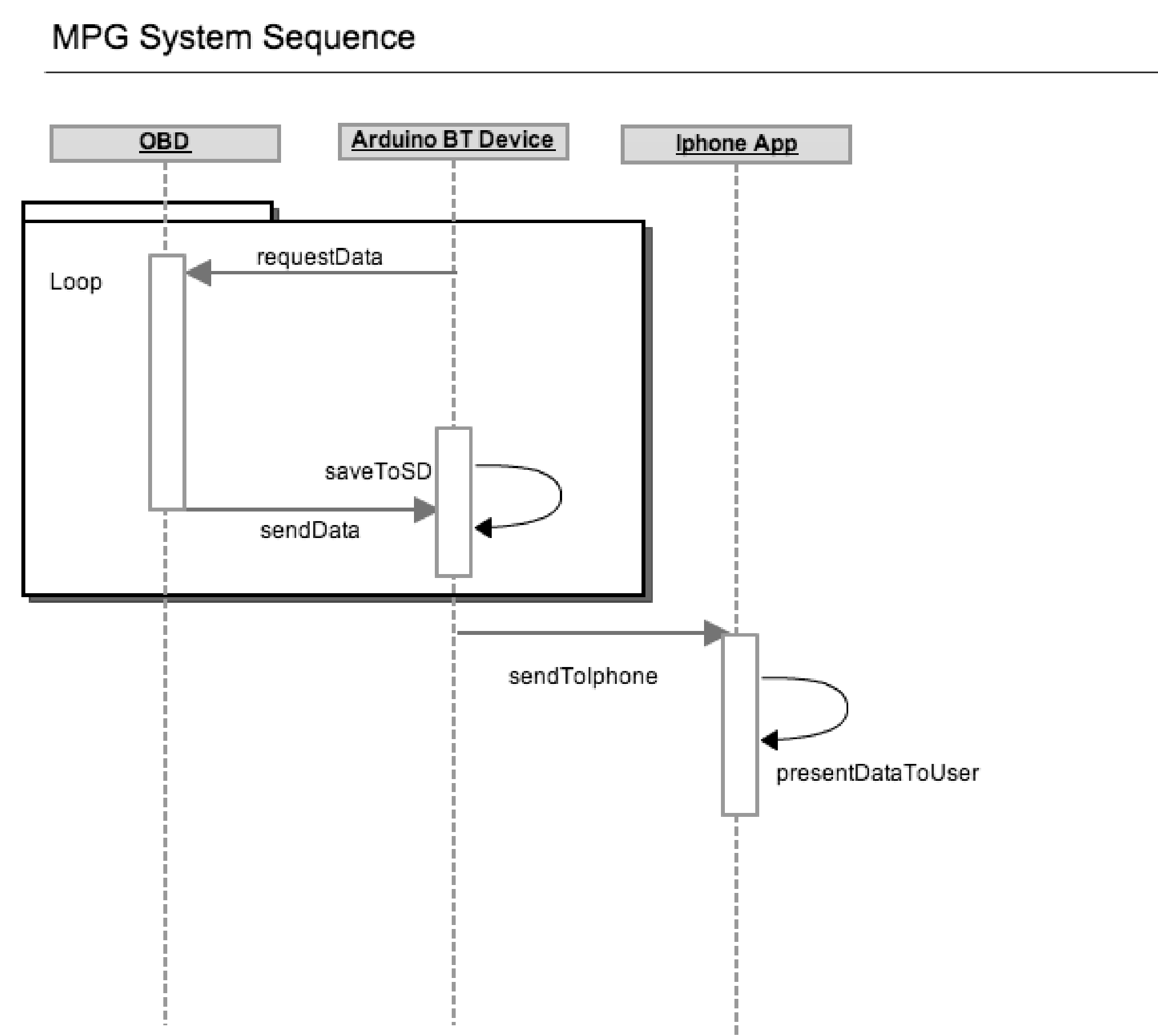
Hardware/Cost



Arduino Mega	\$25
BLE Shield (Bluetooth Low Energy)	\$30
SD Shield	\$10
Real Time Clock	\$3
OBD to USB Cable	\$10
Voltage Regulator	\$5
Total.....	\$83

- Powered by car battery using a 5V regulator
- Logs data to SD card for persistent storage
- Syncs data with iPhone over Bluetooth

System Diagram

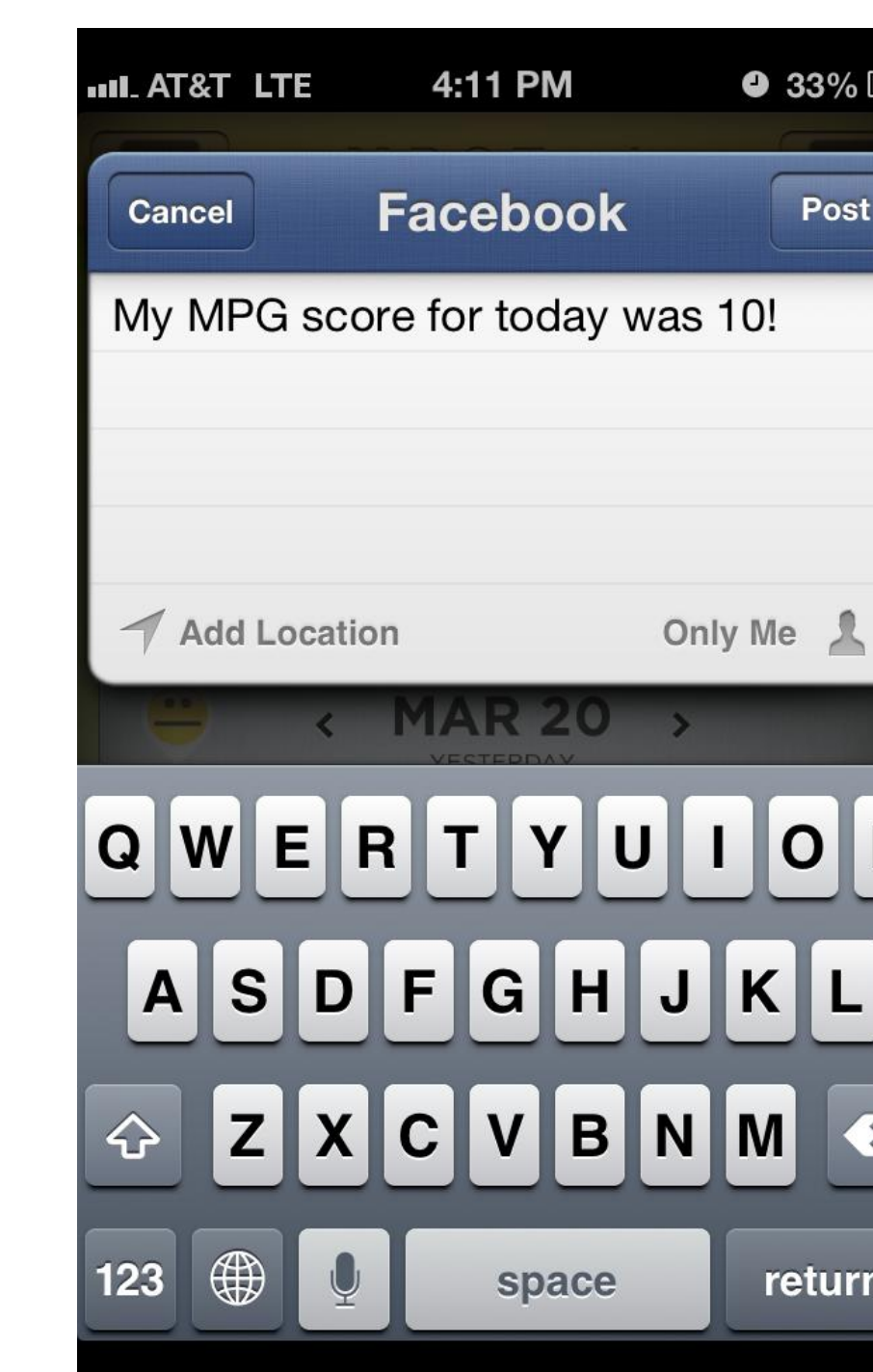


Application Interface



- Sync with hardware after a trip and review your MPG score.
- Receive driving suggestions to drive more efficiently.

Social Aspect



- Post achievements onto Facebook or Twitter.
- Compete against friends based on MPG score received weekly, monthly and/or annually.
- MPG score converted into money saved or lost based on user's local gas price and previous MPG score.