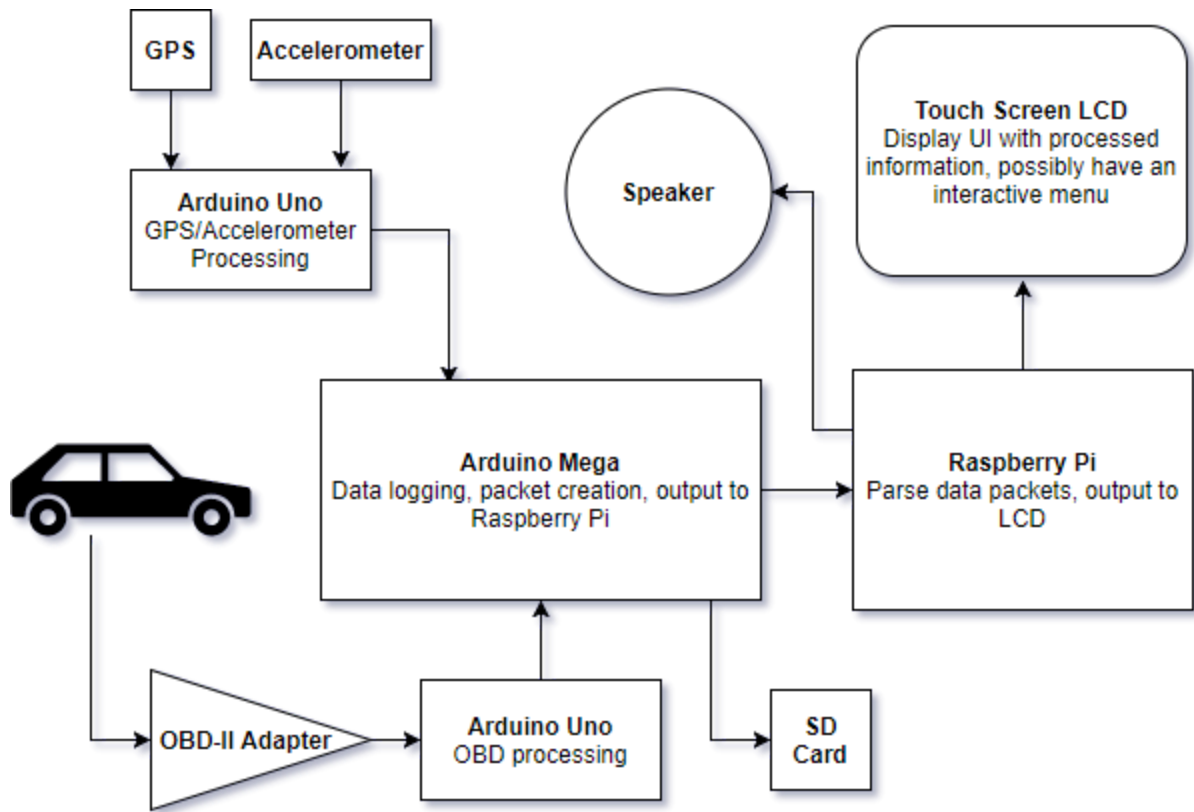# Informational Dashboard Display

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Summary

A dashboard-mounted device displaying GPS data and altitude, acceleration and orientation, and information about the vehicle using the On-Board Diagnostics (OBD-II) standard. The vehicle information will include RPM, throttle, fuel level, and other miscellaneous data.

The GPS and accelerometer data will be processed by one Arduino, while the OBD data will be received through an adapter and processed by a second Arduino. Both of these Arduinos will send their data to an Arduino Mega via serial, where the data will be sorted into packets and logged to an SD card. The data packets will then be sent to a Raspberry Pi, which parses them and displays the information on the LCD. It may also have an interactive UI for selecting certain bits of information to view. The system will contain small speakers for sound effects from the Pi or custom songs.

We will be using serial communication for sending data from the two sensor Arduino Unos to the Arduino Mega, taking advantage of its multiple built-in serial interfaces. The Mega will connect to the Raspberry Pi via serial through USB.

The OBD-II interface supplies power, which we will use to power the devices.

Objective Timeline

Each member of the group will be assigned a board to work on. The timeline will be the same for all members of the group, but each will be working on their own boards.

Simon - Data logging board/output to packet processing

James - GPS/Accellerometer processing/output to data logging board

Corey - Packet parsing, output to LCD

Michael - OBD Processing/output to data logging board

Week 8

- finalize parts and order hardware
- Draw up circuit diagrams
- Flesh out ecosystem flow chart with specifics/requirements
- Research libraries and functionality (OBDII outputs of car, gps readout commands, ect)

Week 9

- Program code that is testable with currently available hardware
- Create mock scenarios to test code

Week 10

- (most of the ordered parts should arrive)
- Wire up all hardware
- code

Week 11

- code

Week 12

- Finalize code, iron out bugs and prepare for testing

Week 13

- Testing (controlled environment)

Week 14

- Testing (real world - in car)

Week 15

- Present project

Tutorials

OBD-II setup tutorial for our adapter

http://arduinodev.com/hardware/obd-kit/

Setup of the Raspberry Pi display

https://www.raspberrypi.org/blog/the-eagerly-awaited-raspberry-pi-display/

Interfacing of Arduino and Raspberry Pi via USB

http://www.instructables.com/id/Raspberry-Pi-Arduino-Serial-Communication/

Parts List

External devices

1) SD Card Shield - $14 https://www.adafruit.com/product/1141
2) GPS - $40 https://www.adafruit.com/product/746
3) LCD for Raspberry Pi - $30
   https://www.amazon.com/Quimat-320x480-Resolution-Protective-Raspberry/dp/B06W55HBTX/ref=sr_1_4?ie=UTF8&qid=1508099074&sr=8-4&keywords=pi+display
4) OBD-II Adapter - $40
   http://freematics.com/store/index.php?route=product/product&path=20&product_id=83
5) Car
6) Accelerometer - $8
   https://www.adafruit.com/product/2019?gclid=CjwKCAjwjozPBRAqEiwA6xTOYE4l02tRAR036rkFRyYwD7XQ8h6QavCGld9V-WekHP_B5f0LIihQQhoCrNsQAvD_BwE
7) Push Button
8) Small Speakers

Microcontrollers

1) Arduino Uno x2

2) Arduino MEGA 2560
3) Raspberry Pi B+