App Controlled Car

The Three Commas:
Bret Pontillo, Vansh Patel, Alec Taren

Problem Statement

- The team has no experience in iPhone and wireless controls. We are trying to develop a new skill
- The team is new to microcontroller boards and wants to be able configure different modules create a functioning car
- Constructing and controlling a car via an iPhone application.
- Learn to control hardware via a wireless module.
- Develop our mobile development skills.

Solution

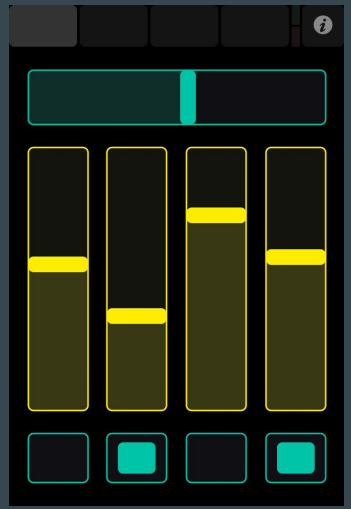
- A car controlled by a user with an iPhone application, with a easy to use interface.
- The car can be controlled when it can connect to the same wifi network as the user's iPhone.
- It will be able to traverse a flat surface, and will have LEDs to simulate car lights.
- The car will have four wheels, with batteries powering everything on the car.

Specifications - The Car:

- Will be wheel drive.
- The car will weigh less than 3 pounds.
- Top speed will reach up to 5 mph.
- The car will have a battery life of at least 2 hours.
- The car will have at least two LEDs.

Specifications - The iPhone Software (TouchOSC):

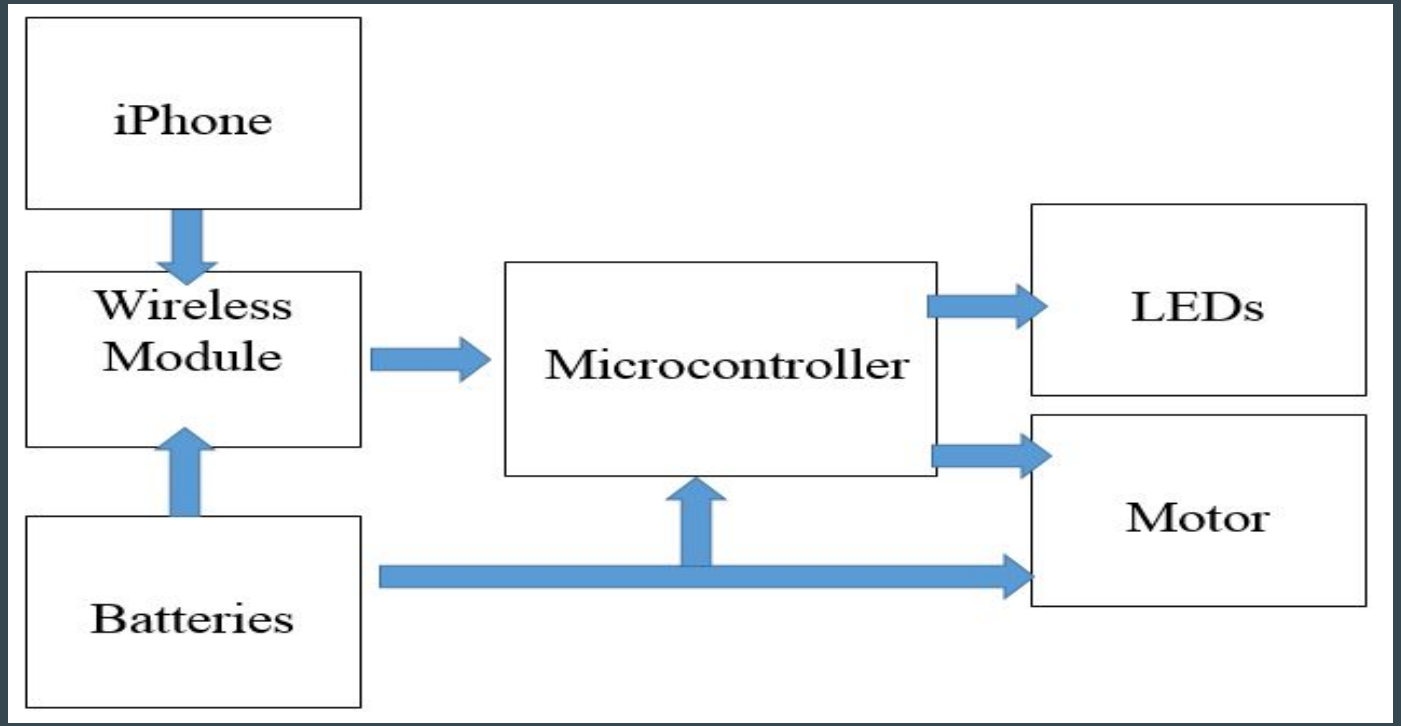
- Will utilize TouchOSC application.
- An iPhone app that can be configured with a wireless module using MIDI protocol
- Will be control all the movements of the car



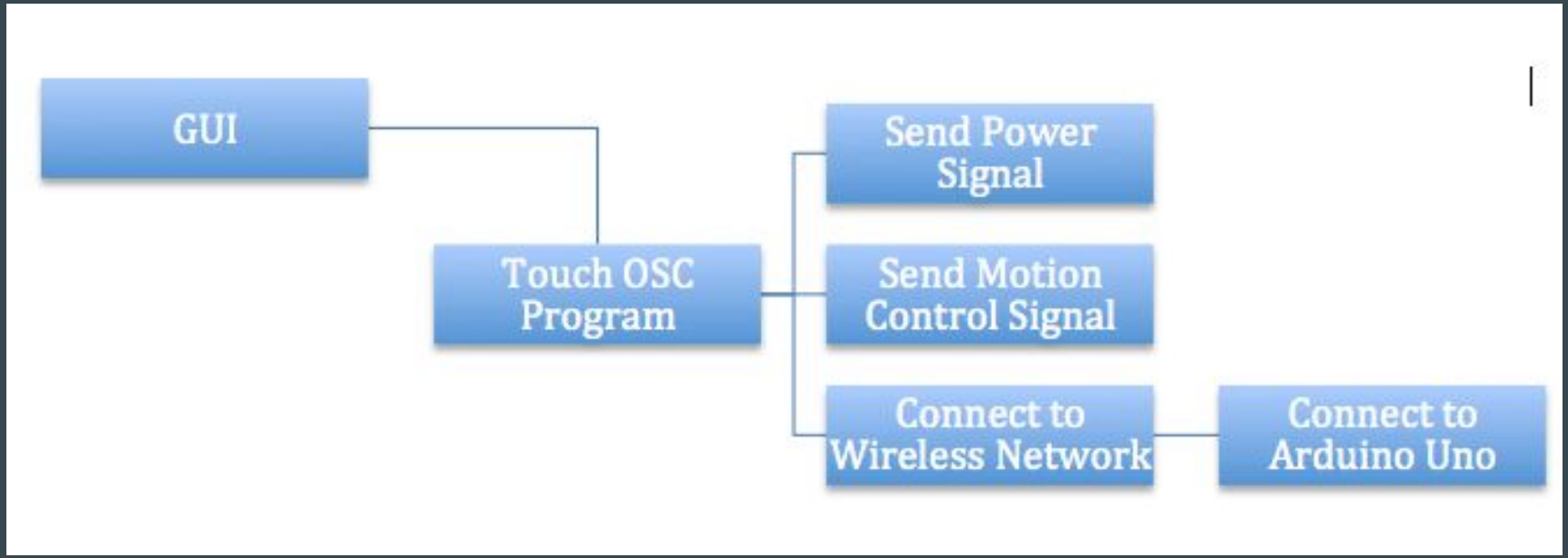
Specifications - The Arduino Software:

- Will be able to maneuver the car in any direction on a 2D plane.
- Will control the car via an iPhone interface.
- Will remotely turn the car on and off.

Block Diagram



Software Diagram using TouchOSC



Technical Details

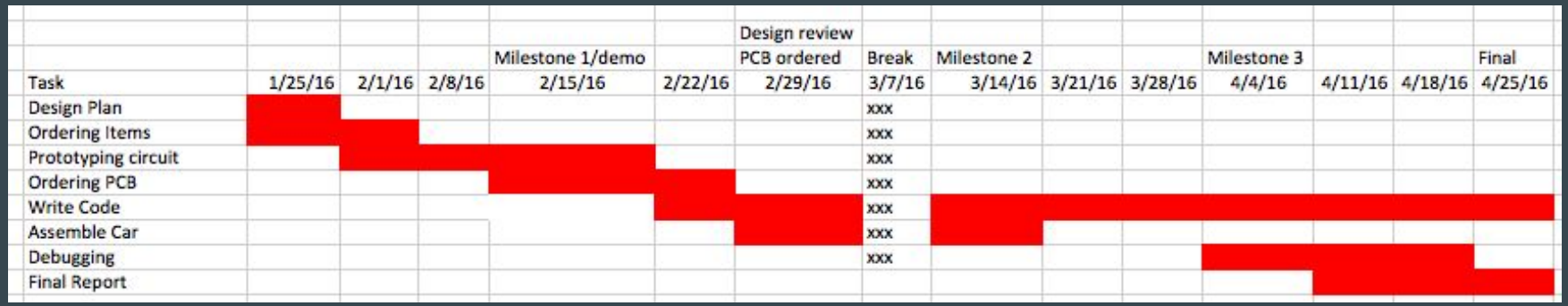
- Circuit Board Design
  - The PCB board design will allow all the other components to come together.
- Mechanical Assembly
  - Assembly will require soldering the LEDs onto the PCB board.
  - Making sure all the components can communicate.
- iPhone Application
  - Utilize TouchOSC Development Environment

Technical Details - Entire System

- The car will consist of:
  - a chassis that will contain a PCB board with connections to Arduino UNO microcontroller
  - Adafruit Huzzah ESP 8266
  - LEDs
  - This will all be powered by batteries.

- The software will use the TouchOSC Application for iPhones.
  - This uses sliders as the graphic user interface.
  - The GUI is mapped to the values that will utilize MIDI protocol.
  - Messages will be sent in UDP packets to the ESP 8266 module.
  - The app will control the direction and velocity of the car.

Schedule



Task	1/25/16	2/1/16	2/8/16	Milestone 1/demo 2/15/16	2/22/16	Design review PCB ordered 2/29/16	Break 3/7/16	Milestone 2 3/14/16	3/21/16	3/28/16	Milestone 3 4/4/16	4/11/16	4/18/16	Final 4/25/16
Design Plan							xxx							
Ordering Items							xxx							
Prototyping circuit							xxx							
Ordering PCB							xxx							
Write Code							xxx							
Assemble Car							xxx							
Debugging							xxx							
Final Report														

Milestones:

- Milestone 1 - Week of 2/15/16
  - Run software tests with the Arduino Uno and be able to write a command from an iPhone wirelessly to the Uno.
  - Solder pins onto ESP 8266
  - All parts are ordered
- Milestone 2 - Week of 3/14/16
  - PCB order is completed
  - Car chassis is designed and ready to incorporate the PCB on arrival
- Milestone 3 - Week of 4/4/16
  - Arduino hardware code is written
- Milestone 4/ Final Review - Week of 4/25/16
  - All code is debugged
  - Car can be controlled via a wireless

Manpower

- Circuit Board Design Lead - Alec
  - PCB board design
  - Circuit Specification Requirements
- Mechanical Configuration Lead - Vansh
  - Parts Assembly
  - Solder PCB
  - Assist Bret with iPhone control development
- iPhone Control Development Lead - Bret
  - GUI Design
  - Communicate to car via wireless network

Cost Estimate (based on 90 hours of work)

BILL OF MATERIALS	INDIVIDUAL COST	AMOUNT	FINAL COST
CAR CHASSIS	$20.00	1	$20.00
ADAFRUIT HUZZAH ESP 8266	$9.95	1	$9.95
ARDUINO UNO	$24.95	1	$24.95
BATTERIES	$0.50	4	$2.00
LED'S	$0.25	4	$1.00
TouchOSC Environment	$5.00	1	$5.00
PCB	$75	1	$75.00
EMPLOYEE COST (Including Overhead)	$160.00	3	$43,200.00
		PROJECT COST	$43,337.90

References - Alec Taren

EDUCATION
The Pennsylvania State University, University Park, PA - May 2016
Bachelor of Science in Electrical Engineering

EXPERIENCE
Pennsy Supply, Subsidiary of Oldcastle — **Pittston, PA**
Mechanical Engineering Internship — **May 2015-August 2015**

- Assisted operating and repairing large scale machinery.
- Put together databases of equipment and preventative maintenance schedules.
- Assisted quality control test asphalt and stone product.
- Worked with project managers on putting together bids for state jobs

SKILLS
Programming: C++, MATLAB, Multisim, Labview, Microsoft Excel

References - Vansh Patel

EDUCATION
The Pennsylvania State University, University Park, PA - May 2016
Bachelor of Science in Electrical Engineering;

EXPERIENCE
Syska Hennessy Group, NY, NY - June 2015 - Aug. 2015
ENGINEER INTERN

- Worked closely with project manager on large scale projects such as: Healthcare Facilities, Airports, Gov't Offices and Corporate Headquarters
- Utilized AutoCAD to draw out layouts according to local codes, industry standards and guidelines
- Designed control systems, I/O points list and develop sequence of operations

SKILLS: MATLAB, AUTOCAD, LabVIEW, MICROSOFT SUITE, REVIT, ADS

References - Bret Pontillo

EDUCATION
The Pennsylvania State University, University Park, PA - May 2016
Bachelor of Science in Electrical Engineering; Minor in Mathematics

EXPERIENCE
AIG, Livingston, NJ - June 2015 - Aug. 2015
Technology Summer Analyst

- Developed knowledge of cyber security within the AIG Technology Risk Office.
- Streamlined the global recertification of distribution lists, to reduce the risk of phishing emails, by developing a project timeframe and documentation
- Devised a three-piece plan to reduce future risk and increase project efficiency.

Telemetrics Inc., Mahwah, NJ - June 2014 - Aug. 2014
Engineering Intern

- Tested and developed new software for use with robotic camera controls
- Gained exposure to a variety of departments including engineering, manufacturing, testing, international relations, supply chain management

SKILLS
Programming: Certified LabVIEW Associate Developer, C++, C, MATLAB, ABEL, Verilog, MIPS, Assembly Language, Multisim, Ultiboard