Smart Car

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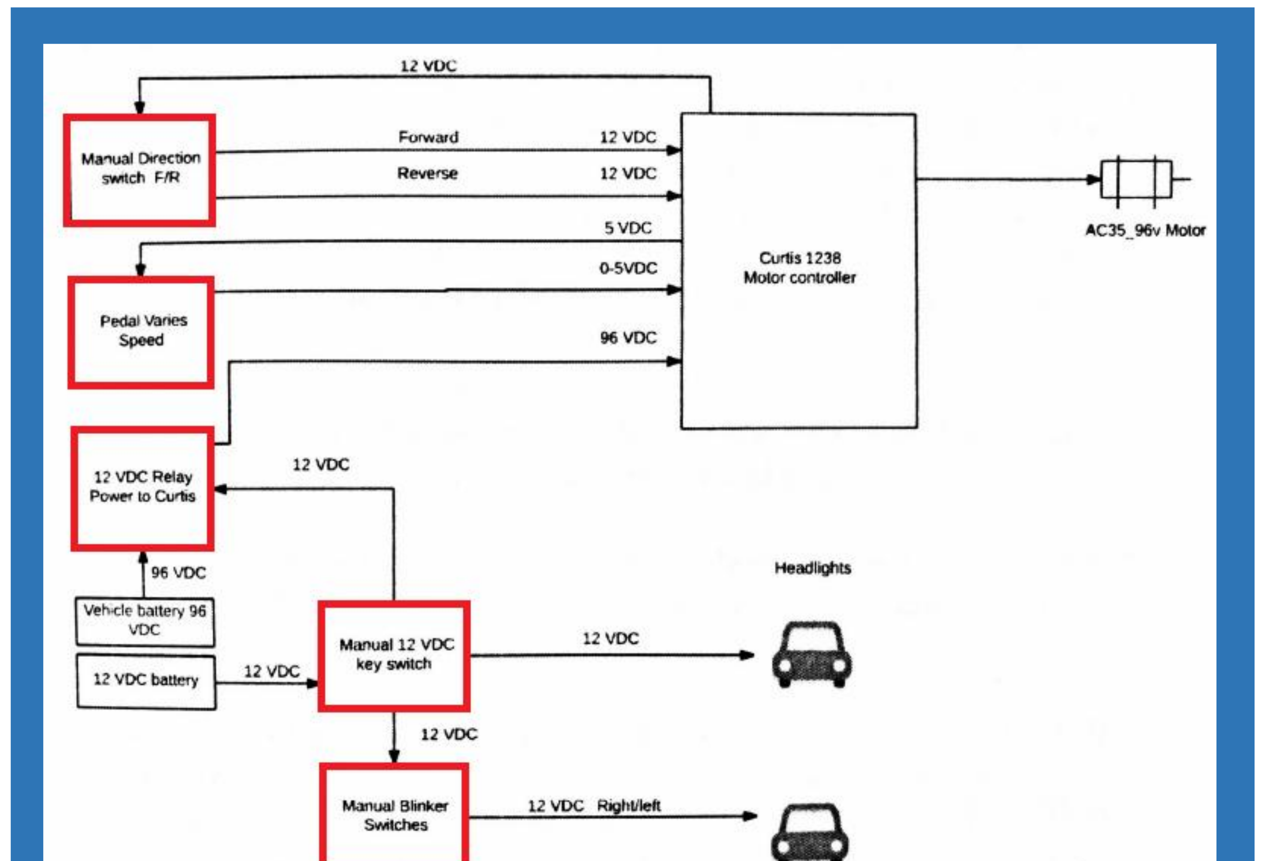
Abstract

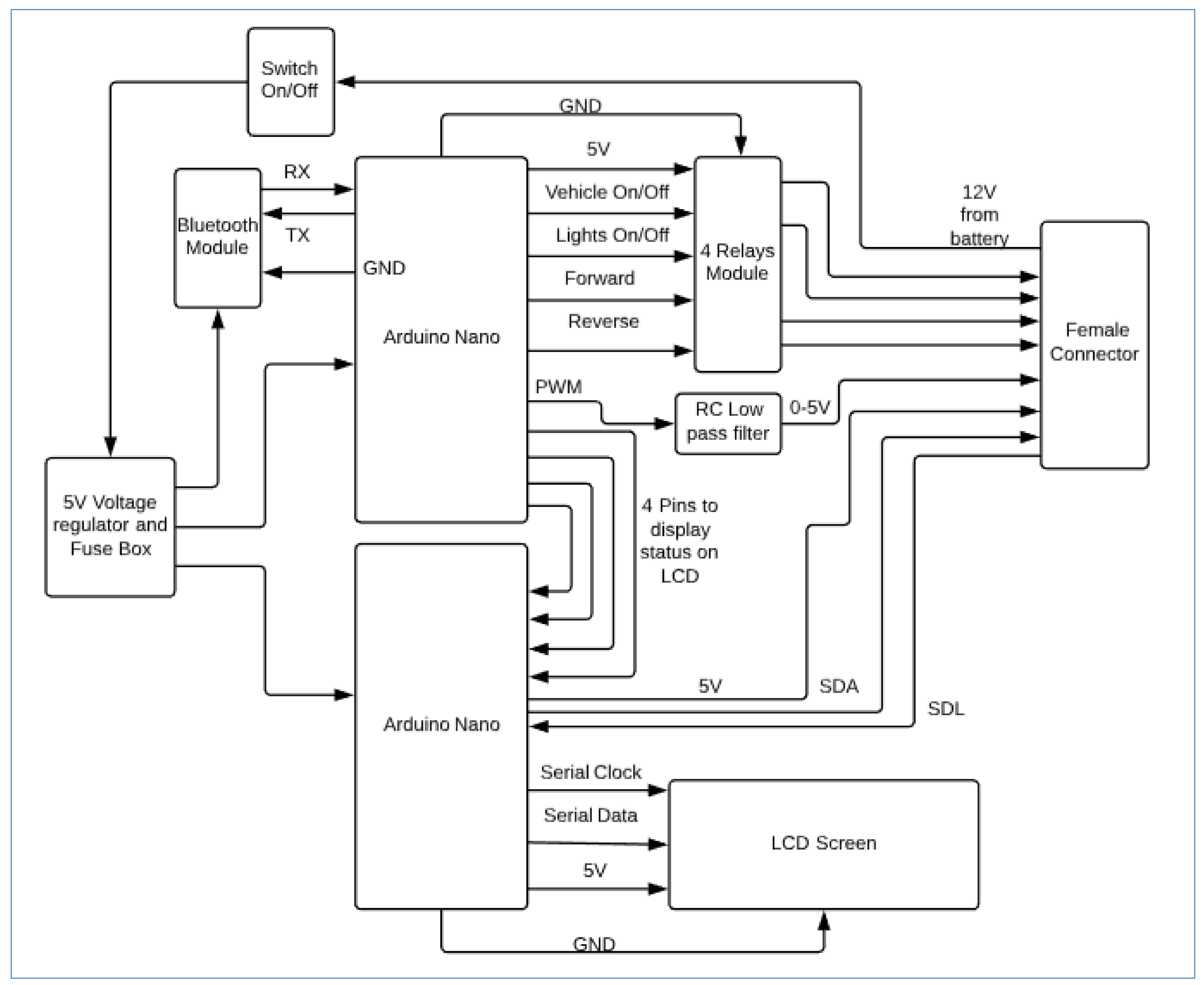
The goal of this project is to design a smart vehicle that is relevant to the most popular products in the automotive technology industry. We have utilized affordable hardware in an effort to produce a smart vehicle system that is more accessible to students. Since cell phones are a major part of millennial students' culture, we came up with the idea of controlling basic components of a Switch electric vehicle with an Android phone. The smartphone is connected to the vehicle through Bluetooth, so that an app on smartphone can turn the vehicle On/Off, lights On/Off, toggle between Forward/Reverse, and control the speed of the motor.

Switch Vehicles

Existing Hardware



Proposed Implementation Hardware

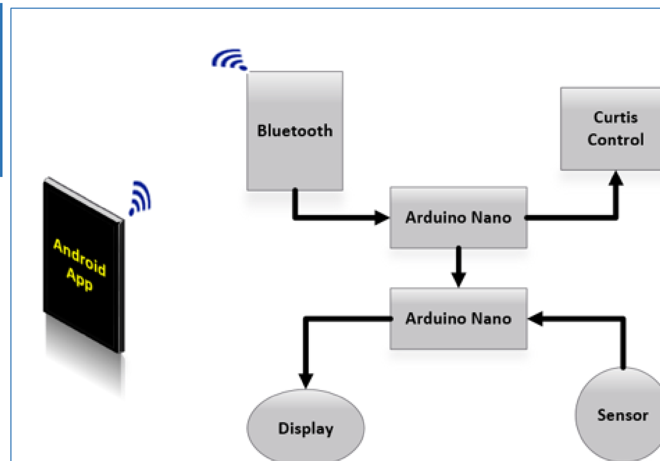


This system's external voltage regulator uses 12V from the battery and converts it into 5V which are distributed to each Arduino Nano. The Arduino Nano on top is used to control different commands that are received through Bluetooth module from an Android phone. The Arduino Nano at the bottom is used to display Vehicle status through LCD and it also collects and display Lidar data/Information.

Design

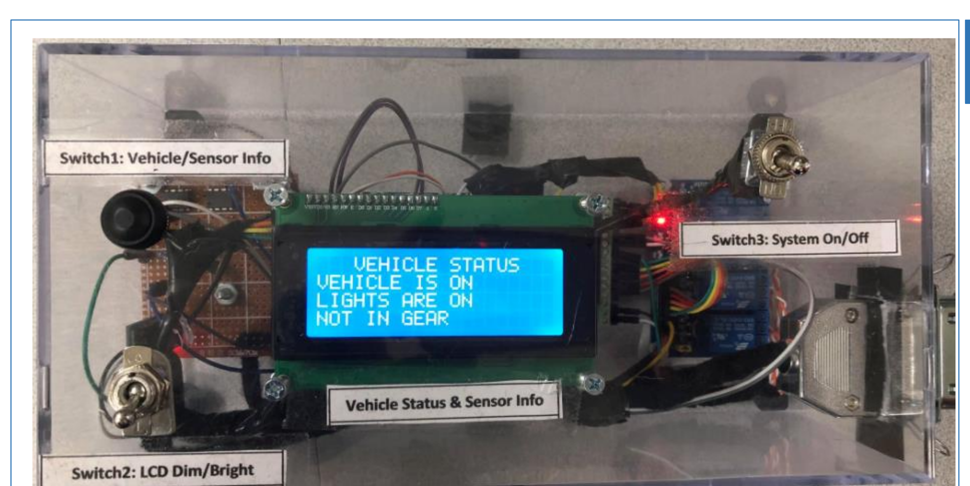
Main System

This system can be placed on the dashboard of the Switch vehicle and can also be used as an educational kit.



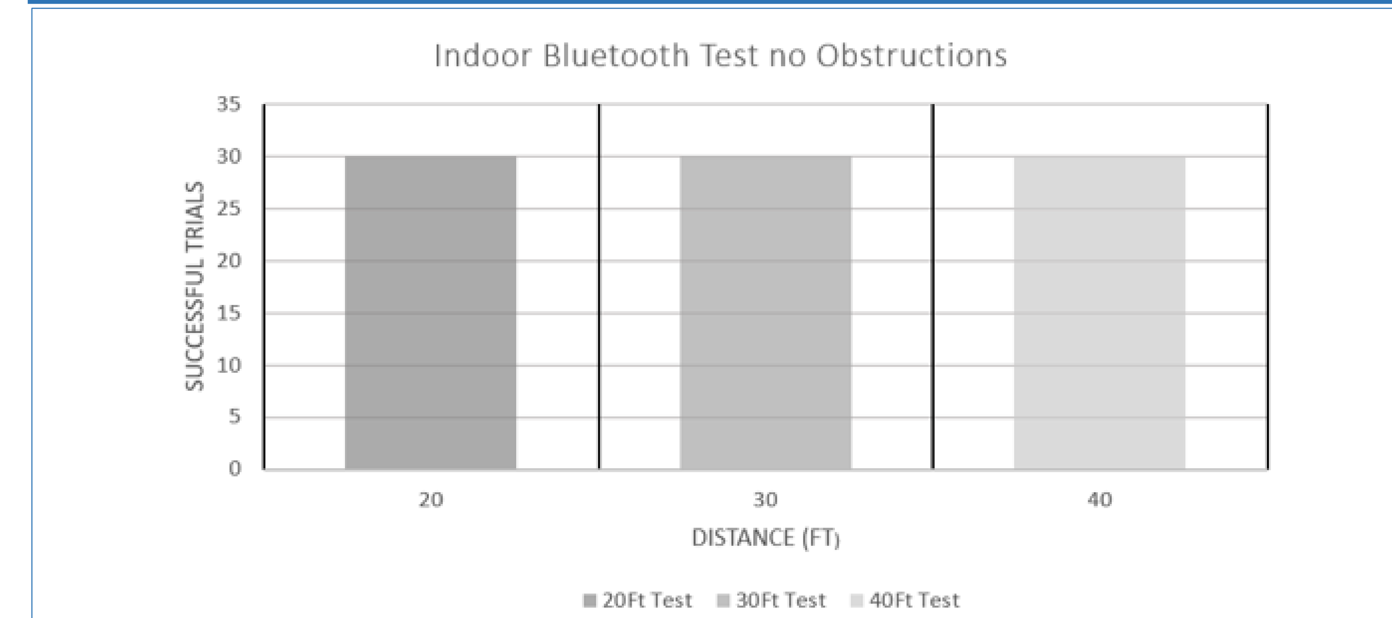
Test Board

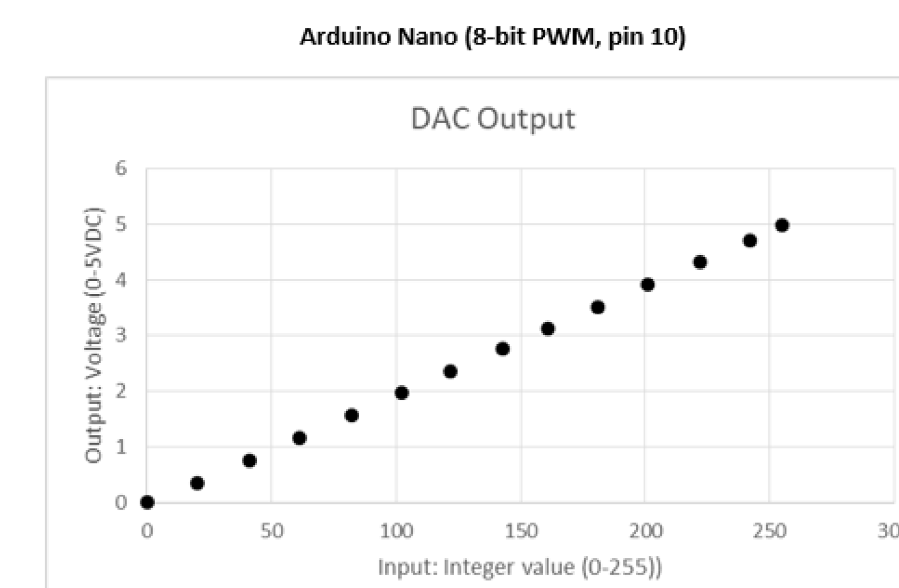
The Test board was used to show the proof of concept.



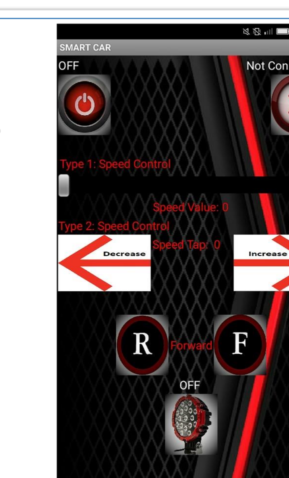
LIDAR

Test Results





MIT app inventor was used to create app for an Android phone. The app works with most of the android phones.



MIT App Inventor

Future Work

- Further research is needed to determine the blind spot with Lidar more accurately.
- Utilize more sensors and cameras to scan the environment and as a result provide a detailed report of objects detected.

Acknowledgment

Thanks to Switch vehicle for providing the test bench for our first two tests. Special thanks to Dr. Farid Farahmand and Engineering department for all the knowledge and support that they have provided.