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Exploring Protocol Specification and Packet Transfer Using a 2016 Chevrolet Cruze

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Introduction/Abstract

To achieve connection between electronic devices, products use a protocol called the Universal Serial Bus (USB). A computer protocol is a set of rules and instructions which two computers can use to communicate. In some commercial applications, specifically vehicles, that documentation can either nonexistent or unavailable to consumers. The goal of this project is to explore the USB protocol by interpreting raw data collected from a mobile device connected to a 2016 Chevrolet Cruze.

Methods

Our original method was to use a hardware-based approach to look at the USB protocol. This would have been taken care of using two USB development boards intercepting and saving any packets transferred. Due to unforeseen circumstances where we could not meet in person, we looked for alternative protocols. Our work led us to On Board Diagnostic II (OBD-II) over Bluetooth. Bluetooth was chosen because we could do most of the communication over software which I had some experience with. Our end goal would be to have an application which could be used in conjunction with a Bluetooth OBD-II receiver to look at individual packets being sent.

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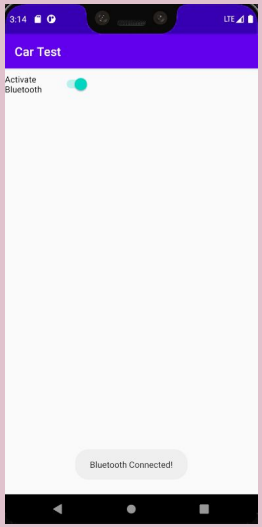

Figure 1: Application showing successful Bluetooth connection

Conclusions/Discussions

Due to unforeseen circumstances we were unable to complete the project as hoped. This did not stop some progress being made for the future. A test application had been made using the Android operating system that was capable of making a Bluetooth connection. With more time, this could be developed such that it could communicate with the vehicle and write down packets to files for interpretation. In addition, it could further be developed to allow for the sending of commands to the vehicle.

Sources

[1] https://developer.android.com/guide/topics/connectivity/bluetooth
[2] http://sdphca.ucsd.edu/lab_equip_manuals/usb_20.pdf
[3] http://www.obdii.com/
[4] https://learn.sparkfun.com/tutorials/getting-started-with-obd-ii/all

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