CST 473

Memo

To: Kevin Pintong

From: Zak Rowland

Date: June 3, 2021

Re: Final project status memo

Percentage complete: 10.33/14 or 73.8%

Completed requirements (no strikethrough):

1. The system shall work with the 2008 Nissan Altima OBD-II protocol, ISO15765-4 (CAN-BUS.)
    a. Other vehicles that use the same protocol may work with the system, however it is not required.
2. The system shall be able to read and clear diagnostic (trouble) codes.
    ~~a. The user interface will display the diagnostic codes in list form with buttons to scroll up and down through the list.~~
        ~~i. The list will display the diagnostic codes (e.g. P0011) only.~~
        ~~ii. The user must touch one of the diagnostic codes to read the description or possible cause.~~
    ~~b. The user interface will provide a button to clear all diagnostic codes.~~
~~3. The system shall have the ability to read sensor data at minimum 30 times per second including speed, coolant temperature, and oil pressure.~~
    ~~a. The user interface will display the data in decimal format.~~
        ~~i. The option for digital gauges may be implemented.~~

~~b. The data will be displayed *by default* in units of miles per hour for speed, Fahrenheit for temperature, and pounds per square inch for pressure.~~

~~i. The option for metric units shall be implemented.~~

4. The system shall use Bluetooth 4.0 or greater for data transfer.
    a. The Bluetooth version shall be 4.0 or greater because previous versions do not support Bluetooth Low Energy (BLE.) The range of the connection is also improved with newer versions.
5. The Bluetooth transceiver circuit that interfaces with the OBD-II port shall be powered by the OBD-II port.
    a. A power circuit will be designed to ensure power from the port is reliable.
6. The handheld unit shall use a touchscreen to display information and receive user input.
    a. The touchscreen of the handheld unit shall be 3.5" or greater diagonally.
    b. The touchscreen of the handheld unit shall operate at a resolution of at least 320 x 480 pixels.
7. The user interface shall not require multi-touch or swiping.
    a. Operation with single presses simplifies the user interface and is more accessible to those with disabilities.
    b. The option to scroll through a list by swiping up or down may be implemented.
8. The rechargeable battery shall be recharged via a USB-C port.
9. The rechargeable battery shall power for the handheld unit at full load for at least 2 hours.
    a. The rechargeable battery must include protection and charging circuitry.
~~10. The charge level of the rechargeable battery shall be displayed on the user interface.~~

a. ~~The charge level will be displayed as a percentage, 100% being fully charged.~~

11. ~~The brightness level of the touchscreen shall be adjustable in the user interface in 10% increments, 100% being maximum brightness.~~
12. The handheld unit shall include a physical ON/OFF power switch.
13. The system shall use a single board computer or microcontroller.
14. The code and documentation developed shall be open source.

Incomplete requirements:

~~2. The system shall be able to read and clear diagnostic (trouble) codes.~~

a. The user interface will display the diagnostic codes in list form with buttons to scroll up and down through the list.
    i. The list will display the diagnostic codes (e.g. P0011) only.
    ii. The user must touch one of the diagnostic codes to read the description or possible cause.
b. The user interface will provide a button to clear all diagnostic codes.

3. The system shall have the ability to read sensor data at minimum 30 times per second including speed, coolant temperature, and oil pressure.
    a. The user interface will display the data in decimal format.
        i. The option for digital gauges may be implemented.
    b. The data will be displayed *by default* in units of miles per hour for speed, Fahrenheit for temperature, and pounds per square inch for pressure.
        i. The option for metric units shall be implemented.

10. The charge level of the rechargeable battery shall be displayed on the user interface.
    a. The charge level will be displayed as a percentage, 100% being fully charged.

11. The brightness level of the touchscreen shall be adjustable in the user interface in 10% increments, 100% being maximum brightness.

Five lessons learned:

- Make progress every day, even the smallest amount
- Reach out for help more
- Don't waste time on insignificant areas, get key functionality working first
- Don't be so critical of myself during difficult times
- I learned a lot about researching components, drawing schematics, building circuits, and more, so the project is still valuable