Digital car switch panel

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# Project background and purpose

## Introduction

The aim of the project is to give the user a digitized car switch board which will allow them to view digital gauges such as oil pressure, coolant temperature, boost pressure, mass air flow and per cylinder air volume. The user should be able to choose from some default gauges or they can add their own which will include variations on the design and the inputs available. The switch panel will also allow the user to turn on and off certain features just like a physical panel they can turn on accessories such as external lighting, fans, power kill switches and fuel pumps.

## Objectives

The project is useful as it will allow car enthusiasts to gain product which can give them much needed data and a switch panel which doesn’t take up much space on thee dash and can be connected relatively easily. There currently isn’t much else on the market which would do the same and any that do are incredibly expensive or are built for specific cars which makes it hard to have a generalised product which can be used by everyone.

The project will allow the user to click digital buttons which will control various car systems (e.g., fans or lighting)

The project will allow the user to view digital car gauges which will update in real time.

The project will allow the user to change the background of gauges to their own liking.

## Scope

The project will include switch control over some basic elements in the car such as fans, external lighting and power kill switches.

The project will display digital gauges such as oil pressure, coolant temperature, boost pressure and mass air flow.

The project will allow the user to customize the gauges with a custom image of their choice to make it personalised.

The project will allow the user to add their own sensors to the gauges.

## Deliverables

The project will deliver a program that can be run on a touchscreen display that will allow the user to control switches and view digital gauges. It will allow the user to quickly and easily control systems such as fans and external lighting. The gauges will update quickly and in real time to ensure the user is kept up to date with the latest data.

## Constraints

The project should be mindful of how it could be used as it should not be distracting for a driver as this could cause an accident. The project should also be mindful of things such as movement within the vehicle which may impact its ability to be used. The way the car communicates with the software could vary between makes and models which could pose a problem when creating the project as it shouldn’t be too vehicle specific. Start up time for the device could also be an issue as the end user wouldn’t want to be waiting long periods of time before the device turns on and is useable.

## Assumptions

The project is assuming that the end user will have a basic knowledge of cars and will be able to locate a OBD2 port which will be used for the communication of data between the car and software. The end user should also have a basic understanding of computers and how to press buttons.

# Project rationale and operation

## Project benefits

A successful project will allow car enthusiasts to have a device that will allow them to view gauges which would otherwise be unavailable to them such as oil pressure, turbo pressure or mass air flow. This extra information that the user will gain could help them to understand their car better and realise when they are at the limit of the car rather than breaking it as its been pushed too hard. The project will also allow car enthusiasts to have a much more compact switch board compared to physical switches which take up a lot of space.

## Project operation

I would use various forms of tracking including something such as a Trello board to monitor progress on specific tasks, gannet charts to make sure that timelines are being met and anything that is taking longer than expected to be monitored and changed on the charts as necessary.

## Risk analysis

A large risk the project could face is after the product has been developed and it would pose a risk as due to the project implanting a display into a moving car it could be distracting for drives and could cause an incident, to overcome this the buttons and gauges should be tested to find out the least distracting size, background and colours to be used. The software should also display a message giving the end user a warning about the possible distracting nature of the system and how it shouldn’t be used while the vehicle is moving or when its not safe to do so.

## Resources required

The resources needed for the project are very simple and are completely standard and will keep the project fairly cheap and allow it to be produced easily for others. It would require a computer which would display to a touchscreen device that would allow interaction for the user. The car would need a Bluetooth dongle that would allow it to connect to the car and allow data to be transferred between the car and the software.

# Project methodology and outcomes

## Initial project plan

## Tasks and milestones

A screenshot of a computer

Description automatically generated

## Schedule Gantt chart

A screenshot of a computer

Description automatically generated

## Project control

I would use software such as Trello or other project management tools which will allow me to track how the project is progressing and what individual tasks have or haven’t been completed. There wouldn’t be any real way of measuring progress other than seeing the physical prototype develop and become a much more useable object each time.

## Project evaluation

I will evaluate the success of the project in a few different ways; usability, user feedback and features delivered.

For the usability I would set up some test scenarios which would see the product being used such as how would it perform when going over a bumpy road, this will allow me to have a better understanding of how the delivered project works in the real world.

For the user feedback I would ask testers to fill in a questionnaire which will give them the opportunity to offer feedback on how the project has helped them and based off this I can compare it to what the project aimed to do and see if they match if so then it’s very likely that the project has succeeded.

For the features delivered evaluation I would look into what the project has been able to deliver compared to what the vison was and see if there are any big changes or features missing which would indicate success level of the project.

# References

<https://www.youtube.com/watch?v=SVn9uYfEQrA> - While researching for my project I found this very informative video of someone creating similar but instead of a switch panel it was being used purely just for a speed/tachometer.

<https://www.hackster.io/news/build-a-custom-dashboard-for-your-car-with-raspberry-pi-e66fbd46bb78> - This person used a raspberry pie which is relatively simple and inexpensive, and this helped to prove that a project of this would be possible and not just theory.