Automotive CAN Network Reverse engineering & automotive instrument cluster control tool

Final Report

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Problems encountered:

CAN bus network

Before starting this project, I had never even heard of a CAN BUS network let alone know what that was so when it came to understanding it at first, I began to feel like this area of work was more suited to an electrical engineer when discussing different components and different aspects that are covered under the CAN BUS network like baudrate and bitrate and interfaces. But this is a key part of the job within this industry with having the ability to adapt and learn about aspects of different industries which are no our own to create services and applications that these industries rely on.

API

With the creation of this application a key aspect of this application is to implement the "PCAN BASIC API" and with this API it is used to link the application and the pcan device so they could communicate so the problem that I discovered was that I did not have any experience with any sort of API before starting this project so trying to wrap my head around that was found to be extremely difficult especially since it was not like a normal .net API which are well documented online but with this one it uses a .DLL file which I have also never worked with which caused some problem

Time

When talking about problems I encountered one of the biggest problems that I had to overcome is time management throughout the year and this could be put down to the structure of the year and how my time was spread across so many continuous assessments and this was a big struggle especially with how this year had gone and how working from home has changed the way I work and how my environment has created challenges and how I have tried to combat these situations.

Experience

When discussing experience, I do not necessarily mean my experience but what I mean is that when I was researching similar types of applications using similar techniques and development methods and not many people have written about creating a similar application to discover any previous problems they may have encountered and how they solved them.

Achievements:

When speaking about the achievements that I would have liked to complete unfortunately I did not get the opportunity to complete all those tasks that I would have like to complete this project and deliver on the goals I set out for my self at the start of this project. This can be put down to a couple of factures like time management when having to juggle many different smaller projects at once while also finding the time to get some good solid work completed on the project it can also be put down to the crazy year we are having and I know everyone went through the same thing but at points in this year it was hard to find the resolve to keep going and see this year through.

Learning outcomes:

Over the last couple of months while researching and trying to design this application it can be split into two different topics and those topics are C# and WPF and another aspect that I learned about is the CAN BUS network.

Language

When it comes to what I learned about the C# language and WPF I have learned plenty in terms of the differences between my previous experience with other languages which includes C++, and this gave me a good platform to work with a similar language in C#. When discussing whether to use WinForms system which I used in prior years to create the frontend application but when researching different whys in which I could create the frontend of this application and what I found is that the new way in which to create this applications frontend and this is with the use of windows presentation form (WPF). The reason why I chose to use WPF instead of continuing to use WinForms was because while researching WPF I had found

that WPF has become the more of a industry standard compared to WinForms which has become somewhat outdated and this seemed like a good chance to learn and move with the industry and this key when talking about working in the industry and working with other people from throughout the industry and having the experience to look back on when discussing WPF application design.

CAN BUS network

When first deciding what project to do at the start of the year because of my prior interest in the automotive industry and automotive internals in general it was interesting to me when I discovered that there would be such a automotive oriented project which seemed to cover a topic within the automotive industry which I had never really researched or had a key eye before and the was the electrical systems within a vehicle and this seemed like a interesting way of combining two of my key interests with computing and the automotive industry.

Before this project I had no prior knowledge of how the electrical systems within a vehicle and in some cases I still do not know everything but over the last coming months I have come to understand how each electrical and mechanical would communicate with each other through the CAN BUS network. I have also learned about the individual sector that these other applications and devices are within the automotive industry and how each of those companies are trying to carve out and distinguish between themselves and who is leading the industry and who is trying to create their own applications and devices which communicate with the CAN BUS network.

Starting again:

If I were starting this project again, I would have considered the smaller projects from other subjects were going to get in the way and try to work around those projects more efficiently

and this could be put down to the layout of this year specifically with the continuous assessment throughout the year.

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