

Cardiff University

# Initial Plan

Mobile Car Messaging System

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## **Initial Plan**

**CM3203** – One Semester Individual Project, 40 Credits

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### **Supervisor Roles:**

- Providing project advice throughout the lifecycle
  - General advice regarding structure and report contents
  - Specific advice related to the project, e.g. setting up a server
- Weekly meetings to discuss progress and answer questions
- Supervising the project and ensuring that I am on track.

### **Project Description**

Modern cars are being built with more and more technology contained within their dashboards. These technologies provide their driver with lots of information regarding their car's current state, e.g. whether the front left tyre needs pumping or their rear left brake light is not working. These technologies are encouraging for drivers as they provide them with information that they can act upon to prevent fines and penalties from law enforcement agencies. However, what about the cars that people drive that do not implement these technologies? "36.5 million vehicles licensed for use on the roads in Great Britain. The average car licensed for use on the road was 8 years old. 21% were less than 3 years old."<sup>1</sup> (Vehicle Licensing Statistics 2015). That means there are roughly 28.8 million vehicles on the road that were older than three or more years. Cars from that period are unlikely to have any kind of on-board technology that provides these statistics to the driver. Having considered these facts, there is most certainly a problem that the driver is often unaware of any faults with the car they are currently driving.

The system I am proposing is a mobile communication application that will attempt to solve this problem. The application will take registered drivers as users and will allow them to message other drivers detailing that there is a problem with their car. The application will need to take into consideration that the drivers who use this application should not be driving at the time, or be endangering other drivers or themselves while using the app. The system will allow the drivers to enter a registration plate and then pick from a list of pre-set problems that could be wrong with the other person's car and then forward that message to the other driver through a server. This server could be representing a company such as the DVLA or other government body. The server will produce certificates for registered drivers that will allow them to report any problems about other vehicles on the road. The certificates will be created from registration plates that can authenticate the driver of that vehicle. The server would be used to relay the messages from other drivers about their cars and will look to forward traffic updates and maintenance routes to drivers as well, so that they can prepare for the journey.

The system will consider whether Wi-Fi direct is a possible solution to forward messages between drivers instead of relying on a server. This is an option that could rely on mobile and vehicular adhoc networks as well that could be used to forward messages between drivers depending on their cars location. However, that would mean looking at privacy issues as well because the system would have to access location data from a person's mobile phone, which could be in breach of privacy issues.

The overall aim of this project will be to create a prototype mobile application that will allow users to communicate issues with another driver's car.

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<sup>1</sup> <https://www.gov.uk/government/statistics/vehicle-licensing-statistics-2015>

### **Project Aims and Objectives**

The main aim of this project will be to create a functional mobile application that will relay messages from one user to another user through a server or Wi-Fi enabled device. The application will be tested using mobile phones as simulators for vehicles, that could potentially become on-board devices built into modern vehicles in the future.

### **Required Objectives**

I will need to complete the following objectives for this project to be deemed a success:

- Develop a functioning mobile application which allows users to create, send and receive messages regarding the status of their vehicle.
  - Register users by using their vehicle make, model and registration plate.
- Create a server that will allow generation of certificates for registered drivers, and relay messages between drivers.
  - Validate driver messages by authorising their certificates
  - Forward messages to the appropriate user based on their registration plate.
  - Generate a test data set that can represent real world number plates, vehicle makes and models.

### **Desirable Objectives**

Further objectives that will allow me to improve the system:

- A function within the server that allows me to send traffic updates and maintenance schedules to drivers on the road.
- Allow non-driver registered users to send messages regarding the status of other vehicles on the road but not to receive messages.
  - Passers-by may see a problem with a car and therefore can report that issue. But not being a registered driver and using a certificate they will only be able to send messages.
- Third party information that can be used by drivers to fix any problems with their vehicles
  - E.g. If a driver has a brake light out, then the system will recommend they visit the nearest Halfords which sells the lights required to fix the problem.
- Create a feedback function that allows drivers to rate how helpful the message they received from another driver was.

### **Ethical Consideration**

My project does not need to consider any ethical issues. The only data that the system will be capturing is registration plates from vehicles. These registration numbers are input via the system and are only stored within that system to deliver the message and relate to someone's authentication details. If the system is sold in the future, there will be considerations into the privacy and ethical issues surrounding the kind of data that is stored.

## Work plan

1. Complete initial plan – This plan is an early version of the planned actions across the three-month period and may change according to new developments.
2. Carry out background research into my project and its area. This will produce a report on the number of investigations in the area, what libraries I could make use of to develop my application and why I have chosen the necessary programs to use.
  - a. Mobile application development training. Consider the number of software packages that I could use to develop my application.
  - b. Libraries and modules available to aid my project.
  - c. How to create and run a server so that it can simulate a government body or an agency like the DVLA, that could then make use of the application itself on top of their systems.
  - d. Which database platform best suits the project and how my data will be stored and communicated between users.
  - e. What other projects out there have attempted to solve this problem and why they have not succeeded.
3. Approach – Create mock ups of the application and the database. I will use Balsamiq to produce a prototype design of the system and how it will look.
  - a. Design requirements –Design the main objectives of the system (milestone\*)
  - b. Designing the system – use case diagrams and application features (milestone\*)
  - c. Designing the database system – class diagrams, user interaction diagrams through the server and database
4. Implementation – Produce the main requirements of the project and work towards adding the desirable objectives as well.
  - a. Creating and sending a message from the application (milestone\*)
  - b. Receiving a message from another device (milestone\*)
  - c. Generation of certificates from the server
5. Testing – Produce detailed test cases and functional testing objectives to test how well the system achieves its objectives and carries out its functions.
  - a. Test cases that detail every aspect of the system and how well they have been performed (milestone\*)
    - i. Each requirement will have multiple test cases
  - b. Carry out user testing with up to 10 users to gain valuable feedback on the system and how well users think it has been implemented.
  - c. Test how functional the system is by sticking to a set of testing objectives that detail each aspect of the system.
6. Evaluation and Next steps – Produce a detailed report regarding how the system has completed or failed to complete the objectives and how well it does this. Provide details of how I could further improve the project and what work could be carried out in the future.
  - a. How well does the system complete the objectives?
  - b. What requirements could be added in future implementation cycles?
  - c. What would I change about the project?
7. Finish final report
  - a. Complete detailed documentation of the entire project and how the solution works and what parts have not been implemented and why.
8. Supervisor meetings – weekly meetings with my supervisor will be carried out throughout the entire project lifecycle.

## Gantt Chart



## **Bibliography**

### **References**

1. <https://www.gov.uk/government/statistics/vehicle-licensing-statistics-2015> Accessed 21/01/17
2. <https://www.statista.com/statistics/270821/smartphone-user-in-the-united-kingdom-uk/> Accessed 21/01/2017