



TED UNIVERSITY

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CMPE 491 Project Specifications Report

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1. Introduction

1.1 Description

CarCare+ has been designed to make life easier for car owners, at the same time helping them with reminders regarding proper car maintenance. CarCare+ puts everything in one place for its users to keep track of mileage, air filter change time, and even schedule appointments for vehicles and vehicle maintenance. The application integrated reminders for essential tasks, such as paying taxes, changing oil, and getting inspections that would simplify vehicle ownership and improve driving. CarCare+ also operates a store of consumables related to automobiles and has an appointment system set up for periodic maintenance and routine checks.

1.2 Constraints

- **Economic:** The CarCare+ application will require investment for API integrations, software development, vehicle service providers. Implementation costs may also include things like server maintenance, data storage, system updates.
- **Ethical:** The CarCare+ app must handle privacy and transparency issues responsibly and carefully when collecting data, using and sharing things like user data.
- **Health and Safety:** Care+ Car will remind the users of maintenance to be done and thus reduces the chances of accidents due to poor maintenance of the vehicle.
- **Manufacturability:** The constraint of manufacturing on a software product would be a minimum. Compatibility on different devices and operating system platforms would be the main consideration for development.
- **Sustainability:** Periodic vehicle maintenance is envisaged to extend the life of a vehicle and reduce specific wastes from the vehicle and its components.

1.3 Professional and Ethical Issues

The development of CarCare+ has important ethical responsibilities in software development. These responsibilities are created according to the principles from the ACM Code of Ethics, the IEEE Code of Ethics, the Software Engineering Code of Ethics, and computer and information ethics. Some of the ethical responsibilities that will be applied are:

- **Privacy and Security**

For users to use our application comfortably, we should pay great attention to privacy and security. Our team will give high importance to privacy and security by applying appropriate authentications. CarCare+ will deal with information such as user, vehicle, and payment information. We will use encryption and authentication methods to make our app more secure. There should be regular security checks to make sure there are no weaknesses.

- **Accuracy and Reliability**

CarCare+ will give recommendations based on vehicle information and general vehicle guidelines to keep your vehicle healthy. It is important to make sure that these recommendations are accurate, and doesn't have any commercial priority. Our team will carefully test the accuracy of the suggestions by following the Software Engineering Code of Ethics. This will ensure that CarCare+ is reliable and the algorithms are transparent and explainable.

- **Avoiding Bias and Promoting Fairness**

CarCare+ will have a store section that will include vehicle products. It is important to not have advertisements in product recommendations. Recommendations should be according to user and vehicle needs. These fair recommendations will allow users to make informed decisions.

- **Professional Responsibility and Competence**

Our team realizes the responsibility to reach high standards of competence in the development of the project. The team does research about the industry, similar works, and new technologies. It is important to be informed and up to date in the development. All the members of the team should contribute to the project.

- **Ethical Use of Technology and User Autonomy**

CarCare+ aims to give relevant information and recommendations to support user autonomy. Users will be given suggestions based on their situation and they will have freedom to choose what they desire. One of the most important parts of the ethical use of technology is respecting user choices and avoiding manipulation.

- **Minimizing Environmental Impact**

Even if CarCare+ is an application that focuses on making our lives easier by keeping our vehicles healthier, it also aims to reduce environmental harm by suggesting timely checks and repairs.

While developing the application our team will consider these principles. These will ensure that CarCare+ is functionally good and also aligns with social responsibilities.

2. Requirements

- **Core Functionality:**

- **Vehicle Status Tracking**

- The app will track the status of the vehicle for the user. Some of these status that are being tracked are: mileage of the vehicle, tyre pressure data, oil and engine related values. With this functionality the app will help the user to check the condition of their vehicle which normally would take more time and more effort to do so.

- **Notifications for tax payments, oil changes, and inspections**

- Since the app tracks some important data about the vehicle which in real life we use that information to derive some meaning and act accordingly we will also have a functionality where the app will send you notifications and suggestions on what to do with your vehicle's current condition. This way the necessary steps you should take will be more clear and more time efficient to understand where otherwise you might need to research and understand what problems you might have with the data that you have seen. The app will also have a functionality where the users will be reminded on taxes they might have to pay, insurances or maintenance times that are set by the government.

- **Store section with vehicle-related products**

- The app will have a store page where the list of all products that are available to be bought are seen. This functionality combined with the notifications and the suggestions that the app gives will make our users' life much easier since they won't have to check for products online. This with combined with the previous functionality will make the progress of seeing the data, understanding the data and acting accordingly much faster.

- **Appointment scheduling system for maintenance**

- After completing all the above steps, there will be a section where the car owner can go to a system where they can make an appointment from the app when it is time for maintenance of the vehicle. Thanks to this section, they will be directed to a site where they can make an appointment with one click. This will make servicing your vehicle easier and faster than you would normally do.

- **APIs and Integrations:**

- Since CarCare+ will read the information from your vehicle and notify you for some suggestions and reminders the app will need real-time data. Therefore it will need a integration with some of the vehicle status APIs so that it can track the data of the user's vehicle in real-time.
- Since the CarCare+ app has a store page it will also need all the features that comes with an online shopping apps. It will need easy to understand store page, details on the products and payment page. Therefore we will integrate shopping APIs.

User Interface:

- CarCare+ will have a lot of data that it is tracking and that means a lot of information for the user as well. Therefore we want to design an interface where it doesn't feel suffocating for the user with all the information, notification and suggestions. The plan is to have simplistic enough interface which with some time spent first-time users can have a basic understanding of the functionalities and how to use them.

Security Requirements:

- Since our users will have their vehicle's information and data on the app it is paramount for us that this information is available only for the user and not some third parties who shouldn't obtain that information.
- Also the CarCare+ should comply with the already set data protection regulations.

Performance Requirements:

- The app will have real-time data tracking and real-time notifications. To have a more swift and accurate tracking and notifying it should have a low-latency.
- Since every user's vehicle will be at a different condition compared to others that would mean with a large enough sample (users) we are guaranteed to have someone who might need some critical information and suggestion at the current time. This is why the CarCare+ should have a minimal down-time and high availability.
- The app should respond to any given user action in a fast way with minimum load times.
- Since this app constantly checks and stores some data we are planning to make it power and battery efficient enough where the app won't overdrain the battery.

3. References

3.1 ACM Code of Ethics and Professional Conduct

<https://www.acm.org/code-of-ethics>

3.2 The Software Engineering Code of Ethics, IEEE Computer Society

<https://www.computer.org/education/code-of-ethics>

3.3 IEEE Code of Ethics

<https://www.ieee.org/about/corporate/governance/p7-8.html>