

# **CS/SE 6387 : Advanced Software Engineering Project**

## **Problem Definition : Automobile Control System**

ACS (Automobile Control System) is an intelligent monitoring, accessing and control system that can monitor, control and access the various features of an automobile by embedding all the features by sensors and data transfers. The system supports the communication and integration of the heterogeneous devices and services available in an automobile. While ACS's role is to intelligently monitor and control the automobile, the main focus is to maximize the communication between the Automobile and the user.

The present day's automobile includes various features and components which operate independently or can be accessed from the automobile. There are many features which can be remotely accesses, but still there are many features which cannot be accessed remotely by the user. With the introduction of ACS, all the details and information of an automobile can be accessed by the user and can by remotely operated by the user.

In order to control and access the features of an automobile, the user can intact with the ACS through a smart phone application or an internet web browser. ACS communicates with the car using sensors embedded in the system and control the various parameters set forth by the user. The main objective of ACS is to increase the communication between the user and the automobile remotely and minimize the efforts needed to access a information and status of an automobile by the user.

The objectives of ACS include, but are not limited to the following:

- Provide monitoring and controlling ability to various features and information in the ACS enables automobile.
- Increase the comfortless of the user using an automobile.
- Provide an environment which makes the user to have the status of the automobile on hand.
- Increase the utilization of an automobile.
- Suggest usage pattern of the automobile to the user to increase the performance and obtain the maximum efficiency from the automobile.
- Provide a remote access to the user to monitor and access the features of an automobile.

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## Key Features

ACS should provide the following capabilities:

### **ACCESS THE INFORMATION**

- Monitor the Gas and other oil gauges and notify the user to refill them when it goes below a point of level.
- Calculate the average gas mileage from the trips the user has made and display it the user.
- Monitor the condition of the car and notify the user when it is appropriate time to service the car.
- Monitoring and notifying the user if the doors and windows are unlocked after the user leaves the car or if the user is not near by the car.

### **CONTROL THE AUTOMOBILE**

- Lock and Unlock the car remotely using a mobile application or web browser.
- Turn on air conditioning system of the car and setting the optimal temperature inside even before the user enters the car.
- Open the trunk remotely using mobile app or when the user goes near the trunk.
- Activate the alarm system in the car remotely using mobile application or web browser, in case some suspicious activities are noted in or near the car.

## **NAVIGATION**

- Locate the current location of the car in a map in case if the car is stolen or lost.
- Send the destination of the route to our destination to the car's navigation system from a mobile application or web browser, which makes the route to our destination ready in the car's navigation system as soon as the user enters the car.

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## **Key Application**

ACS will interact to the automobile using the various sensors integrated to the components in the car, the sensors will be connected together to maximize the performance of the system. Considering the sensors are placed in the appropriate positions, the following operations must be performed by the system.

## **STATUS**

- The current status of the automobile which includes the amount and level of Gas and other oils in the automobile should be accessible by the user and the user should be notified if any of them go below a particular point.
- The system should be able calculate and identify the condition of the car by communicating between the sensors and notifies the user if needs a service or if any part needs to be replaced.

## **SAFETY**

- The anti theft alarm in the car should be connected to the ACS and should be synchronized.
- The user should be able to activate the alarm system in case of any emergency or if the car stolen or lost.
- The GPS in the car should also be linked to the ACS which makes it possible to identify the current location of the car from anywhere remotely.

## **NAVIGATION**

- Integrating the GPS available in the automobile and the navigation system available in the car, the navigation system can be controlled by the system using a mobile application or a web browser.
- This helps to have a record of places visited and to calculate the amount of distance travelled in a particular time.

## **COMMUNICATION AND STORAGE**

- The communication between the user and the car can be made using a mobile application or a web integrated internet browser.
- The data to the automobile system can be sent from these devices or back to these devices using a data connection.
- The data and status of the automobile has to be stored in a memory to be synchronized with the user's account.
- The initial connection between the user's account and the automobile can be made using the VIN of the car or a bluetooth connection to link the automobile to the user's account.
- The data and the status of the automobile can be synchronized between the system once the user starts or stops the car which minimizes the data transfers.