

## **AN ANDROID APPLICATION TO COMMUNICATE WITH OBD-II GPS TRACKER VIA SMS**

A.K.P.D.Mishangi\*, M.A.A.Karunarathna

*Department of Electronics, Wayamba University of Sri Lanka, Kuliyaipitiya, Sri Lanka  
mishangi@gmail.com\**

### **ABSTRACT**

Real time vehicle tracking device is an electronic device which can be plugged in a vehicle to enable the owner or a third party to track the vehicle parameters at any given time. Such systems work using GPS and GSM technologies, which would be the cheapest source of vehicle tracking. With the increasing tendency for using mobile applications to enhance the convenience in day-to-day activities real time vehicle tracking even comes as a mobile application. And in today's environment mostly used mobile platform is Android, turning Android OS based smart phones to become increasingly powerful in recent years. Real time vehicle monitoring with an OBD II device is commercially available even for Android based devices. They use technologies such as Bluetooth and GPRS for communication process with OBD II device. This study is a solution to communicate with OBD II device to get vehicle parameters and diagnostic trouble codes under a user friendly environment in an efficient manner via SMS. This application enables formatting user input data in accordance with pre-defined SMS formats and presents the device sent reply SMS in an understandable manner.

**Keywords:** OBD II (On-Board Diagnostic version II), SMS, Android, GPS (Global Positioning System)

### **1. INTRODUCTION**

To face the competition successfully in the telecommunication industry it's vital for telecommunication providers to do research and development in order to launch new products and services to gain more customer attention and loyalty towards their brand. This study is the earliest development of such an upcoming product of one of the main telecommunication service providers in Sri Lanka.

Every vehicle owners' intention is to know the status of their vehicle, which will make their life more convenient and make them more confident as well. Using OBD II device which can be plugged to a vehicle via an OBD II port the driver can communicate in order to get vehicle parameters such as vehicle speed, engine RPM, engine temperature and etc<sup>1</sup>. Also this equipment can be used to get error codes with respect to vehicle model<sup>3</sup>. These OBD II devices communicate either via GPRS or SMS.

Under the current situation all the device codes are handled manually. In other words user have to create the SMS in accordance with the pre-defined message structure as stated in user manual which is provided along with OBD II GPS tracking device. And when a reply message is returned the user have to carry out hexadecimal to binary conversions and calculations to convert the device returned message into an understandable format. To overcome this inconvenience thus enabling effective communication with user and the vehicle this application can be used.

## 2. EXPERIMENTAL

User can provide input data by clicking a button or entering a text and by submitting it. The application performs the task of formatting the user input data into a device understandable format and sends it. This format differs with the type of parameters the user wants to get. The OBD II device gets the required parameters from vehicle via OBD II port and sends it to application via SMS. The application performs calculations with those data in return message and shows the parameters in a user understandable manner.

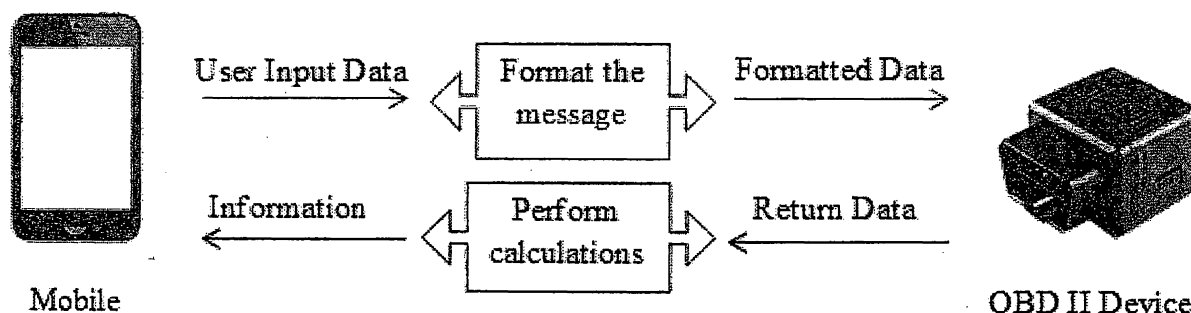


Figure 1: Architectural diagram of the application

The application was developed in Android Studio IDE and Java was used as the programming language<sup>2</sup>. For testing purposes 'Freematics' OBD II emulator was used together with 'Freematics' GUI software.

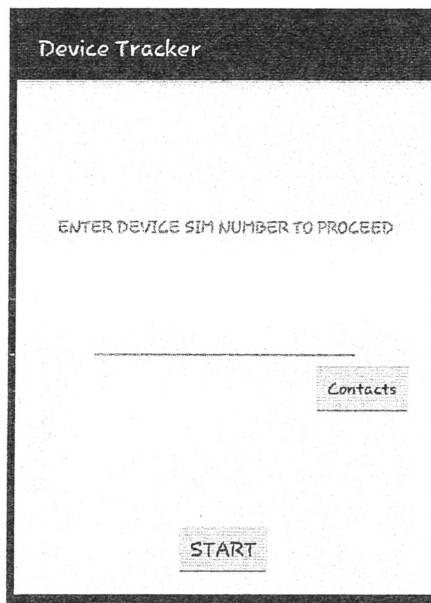


Figure 2: Main interface of the application

### 3. RESULTS AND DISCUSSION

The major task achieved with development of this system is high efficiency in communication process to get real time vehicle status via SMS. The final outcome of this research is an Android Application which enables mobile to OBD II device communication via SMS to get vehicle parameters. Though OBD data can be acquired through SMS it is not used as it is not user friendly and time consuming. Also the reply SMS contains hexadecimal values which are to be processed in order to get the information in an understandable manner. The resultant application provides a user interface which is more convenient for user and also it performs the formatting of SMSs which can be used to query vehicle parameters. Also it processes the return SMS and displays the information in an understandable format. This application was tested with an emulator and it worked successfully.

#### 3.1 Strengths of the application

- User friendly
- Less time consumption
- Inbuilt DTC database

### 3.2 Limitations of the application

- Only general trouble codes are included in database
- Compatible with Android Jellybean and above versions

This application can be further developed for other mobile operating systems. Also the inbuilt database can be populated with more trouble codes based on vehicle manufacturers' specifications.

## 4. CONCLUSION

Even though this is a preliminary study, the resultant application enables effective communication with OBD II device via SMS. Due to the lack of user friendliness and high time consumption this feature of OBD II device to communicate with vehicle via SMS was not used in any commercially available applications. To bridge that gap and to support researchers in developing their own product to commercialize this application was developed as the initial step.

## ACKNOWLEDGEMENTS

The authors would like to acknowledge and extend heartfelt gratitude to all who have helped in numerous ways to make this study a success.

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