# Location tracking, Parking and Security of Vehicle using IoT

## Pooja Pushpan[1], Riya Merin Kuruvilla [2], Sneha S Nair [3], Swathy Krishna [4], Reeba R[5]

[1,2,3,4] *Student, Department of Computer Science and Engineering, Sree Buddha College of Engineering, Pattoor, Kerala, India.*
[5]*Asst. Professor, Department of Computer Science and Engineering, Sree Buddha College of Engineering, Pattoor, Kerala, India.*

---------------------------------------------------------------------***---------------------------------------------------------------------

**Abstract -** *When we parked our vehicle in a rushly densed area, several problems can be arised. The first problem is the change in the position of vehicle due to accident or stealth. The second problem is the difficulty of finding our vehicle. Another problem is to allocating parking slot in a crowded area. To overcome these situations, we have developed an app named - "Location tracking, parking and Security of vehicles using IoT-LOCK & SAFE". This uses two applications for vehicle and for user. System also focused on assisting driver to easily find vacant parking spaces in a specific parking region with the help of QR code based parking system and to reduce traffic and energy consumption and air pollution.*

***Key Words*: Internet of Things, Smart parking, QR code**

## 1. INTRODUCTION

Internet of Things (IoT) is termed as networking of physical devices which embedded with electronics, software and sensors enable devices to connect with each other and for exchange of data. Nowadays, most people were facing the problem of finding their car in a rushly densed area. In this application, uses two separate applications for the user can for the vehicle termed as user mobile app and vehicle installed application. Whenever the change in position of vehicle was detected, the user mobile application gets notified by the alert message. This app provides an option to pass the alert to nearby authorized person specifying the vehicle number so that appropriate actions can be taken by that person. Also, for location tracking of the vehicle, system deals with latitudinal and longitudinal coordinal positions. This app has come up with an optimal solution to the people to book their own parking spaces as their need. The drivers need to visit the Web application with the details of their journey and then the system suggests available parking slots in that area and can also reserve the space by making the payment for 30 min. Then a QR code has been generated and users can scan that through the Android application and get the directions to that parking slot. When driver reach the spot, he has to show the QR to security guard and immediately the parking time will be started on the server. Then the server will monitor the time and whenever the 30min time is exceeded then security and the driver will get the SMS alert in their mobile and can automatically bill the amount for rest of the time before he will leaves the parking area. Thus the problem of traffic on road, locating the vehicle in crowded area and security of vehicle from attackers can be cured..!!

## 2. LITERATURE SURVEY

### 2.1 Design and Implementation of Vehicle Tracking System Using GPS/GSM/GPRS Technology and Smartphone Application

The movement of any equipped vehicle from any location can be monitored using an efficient vehicle tracking system. The proposed system used a popular technology that combines Smartphone application with microcontroller. Global Positioning System (GPS) and Global system for mobile communication / General Packet Radio Service (GSM/GPRS) technology that used for vehicle tracking. Position change and real-time tracking of a vehicle can be determined by embedding device inside a vehicle. The GPS and GSM/GPRS modules are controlled by microcontroller. To transmit and update the vehicle location to a database GSM/GPRS module is used. The vehicle tracking system proposed in the paper has the following features:

1. GPS module provides the acquisition of vehicle's geographic coordinates and vehicle's ID.

2. After a specified time interval using the GSM/GPRS module vehicle's location and ID can be transmitted.

3. Database is designed to store and manage received vehicle's location information.

### 2.2 Vehicle Anti-theft Tracking System based on Internet of things

The vehicle anti theft tracking System based on Internet of things is proposed which can provide all round service to car owners. In order to avoid the limitations of existing systems, an anti theft system is proposed based on GPS, GSM, Mobile phone and Android technologies. The owner can use android mobile phone application to track down the car, whenever the car is stolen. Then he can receive alert message sent by GSM module.

The system features are:

1. The device uses free Google maps for tracking the car.

2. Client has to pay only for data internet and SMS charges after initial setup.

3. Doesn't require maintenance.

## 2.3 A Cloud-based Smart Parking System based on IoT

This paper is based on two aspects. The efficiency of the current cloud-based smart parking system can be increased by using a novel algorithm and network architecture is developed based on IoT. In this paper,  a system that automatically helps to finding a free parking space at the low cost .The cost is based on performance metrics to calculate the distance and the total number of free places in each car park. This cost will be used to offer a solution of ending an available parking space upon a request by the user and a solution of suggesting a new car park if the current car park is full. By analyzing the results from the algorithm helps to improve the probability of successful parking and also reduces the waiting time of user. We also successfully implemented the proposed system in the real world. The free parking spaces in each parking area can be found by using RFID reader. The use of RFID facilitates implementation of a large scale system at low cost. The system prevent disputes in the car park thereby helps to reduce time in looking for a parking space. After logging into the system, the user can choose a suitable parking space. Information on the selected parking location will be confirmed to the user via notification.

## 2.4 Vehicle Tracking and Anti-Theft Tracking System

One way to prevent unauthorized access of devices is an anti-theft tracking system. The design and implementation of a vehicle tracking and anti-theft system for protecting a vehicle from any intruders using GPS/GSM technology based on tracking systems. For improving the accuracy of the position determination, Kalman filter is used. The owner receives a confirmation SMS that a vehicle is running now, whenever the vehicle's ignition is turned on. If the access to the vehicle is illegal, the vehicle's owner sends a SMS to turn off the vehicle. For tracking and viewing the location and a status of the vehicle on a map can be done by using a laptop with Google map. A Smartphone will be used instead of laptop to reduce the work load.

## 3. PROPOSED SYSTEM

The proposed a smart system providing better security, location tracking and parking of vehicles. Nowadays, most people were facing the problem of finding and parking their vehicle in a rushly dense area. Without the interference of the user, location of vehicle can be changed due to accident or stealth.



**Fig -1**: Proposed System

Vehicle theft has become an important concern for all vehicle owners due to the rapid growth of vehicles. The vehicle anti theft tracking System based on Internet of things is proposed which can provide all round service to car owners. It proposes a parking system that improves performance by reducing the number of users that fail to and a parking space and minimizes the costs of moving to the parking space.

## 3.1 Smart Parking System

With the rapid development of economy and the improvement of city modernization level, traffic congestion and parking have become serious social problems due to the explosive growth of the per capita amount of vehicle. Drivers are still difficult to find an available parking slot to park their car. The process of looking for a parking lot is time consuming, confusing and wasting fuel as well. At this point of time, someone may miss or late for their important event. This might cause frustration for the drivers. System is focused on assisting driver to easily find vacant parking spaces in a specific parking region with the help of QR code based parking system and to reduce traffic and energy consumption and air pollution.

Our proposed app has come up with an optimal solution to the people to book their own parking spaces as their need. The drivers need to visit the Web application with the details of their journey and then the system suggests available parking slots in that area and can also reserve the space by making the payment for 30 min.Then a QR code has been generated and users can scan that through the Android application and get the directions to that parking slot. When driver reach the spot, he has to show the QR to security guard and immediately the parking time will be started on the server. Then the server will monitor the time and whenever the 30min time is exceeded then security and the driver will get the SMS alert in their mobile and can automatically bill the amount for rest of the time before he will leaves the parking area .Thus the problem of traffic on road, locating the vehicle in crowded area and security of vehicle from attackers can be cured..!!
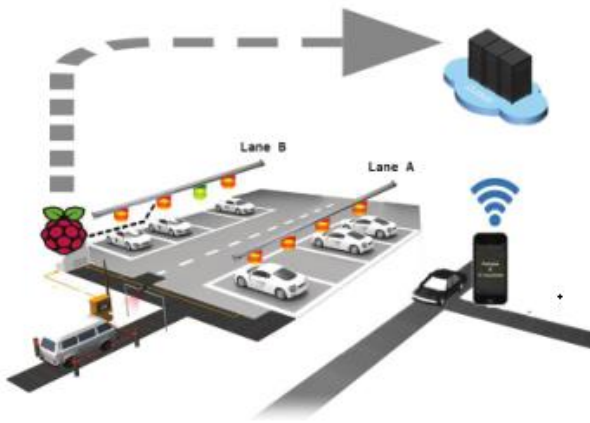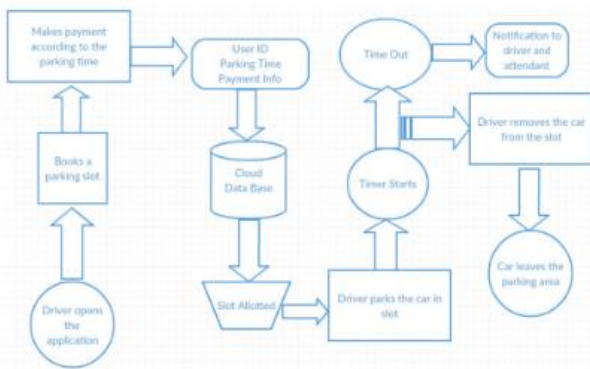
**Fig -2**: Smart Parking System



**Fig -3**: Flowchart of the system

## 3.2 Location tracking and Security of Vehicle

Vehicle Security is a primary concern for all vehicle owners. Owners and researchers are always focusing for new and advanced security systems for their vehicles. One has to be thankful for the upcoming technologies, like GPS systems, which enables the owner to closely monitor and track his vehicle in real-time and also check the history of vehicles movements. When we parked our vehicle in a rushly densed area, several problems can be arised. The first problem is the change in the position of vehicle due to accident or stealth. The second problem is the difficulty of finding our vehicle. Another problem is to allocating parking slot in a crowded area. This uses two applications for vehicle and for user. When the vehicle is stolen, the location data sent by tracking unit can be used to find the location and coordinates can be sent to owner and authorized person for further action.

In this app, uses two separate applications for the user and for the vehicle termed as user mobile app and vehicle installed app. Whenever the change in position of vehicle was detected, the user mobile app get notified by the alert message. This app provides an option to pass the alert to nearby authorized person specifying the vehicle number so that appropriate actions can be taken by that person. Also, for location tracking of the vehicle, system deals with latitudinal and longitudinal coordinal positions.

## Modular Implementation

### USER MOBILE APP

This provides the Web interface to the user. User can login to the system using this app. The user can maintain an up-to-date data about the vehicle. It consists of login and signup page. Login button is for registered users, so they can directly access to the parking mode and unparking mode. Sign up button is for the new users, who can use these option to register and can access the facilities provided by the application. Two modes are available for setting and resetting the application. By the setting of parking mode, system can check continuously the status of vehicle. If any change in position of vehicle was detected, user get the alert messages through this app, so user can take the appropriate measures.
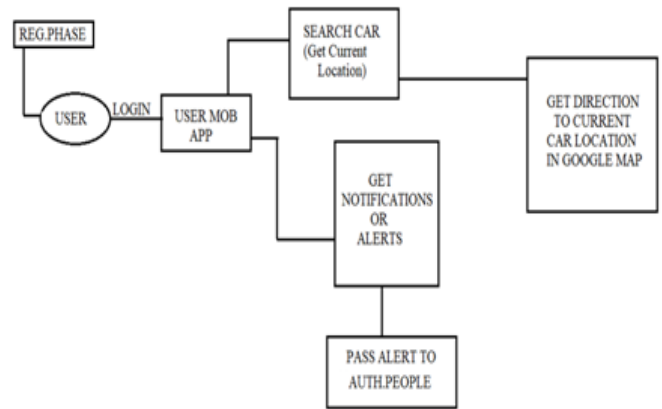


**Fig -4**: Block diagram of User Mobile Application

User mobile app consists of a login, signup and scan page.

1. Login button is for registered users, so they can directly access to the parking mode and unparking mode.

2. Sign up button is for the new users, who can use these option to register and can access the facilities provided by the application.

3. Scan button is for accessing QR code.

### VEHICLE INSTALLED APP

This provides the Web interface to the vehicle.

1. If any change in position of vehicle was detected, user will get alert messages from this app.

2. If driver is far away from the vehicle then he/she can pass alert to authorized person so that appropriate actions can be taken.

3. By the use of GPS module, user can track the exact location of vehicle, since system deals with the latitudinal and longitudinal coordinate's position.
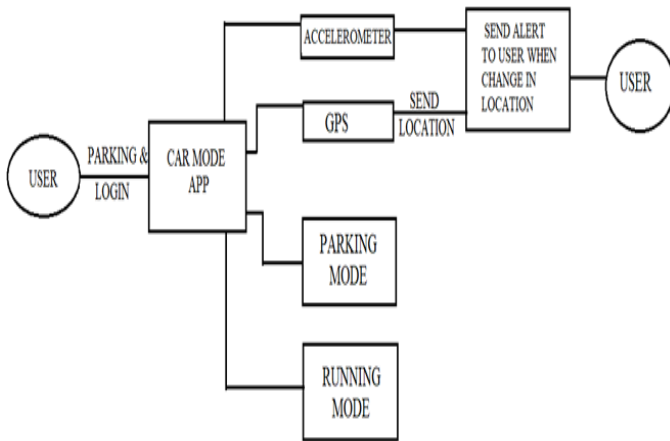
**Fig -5**: Block diagram of Vehicle Installed Application

Vehicular mobile application consists of login and signup page.

1. Login button for registered users.

2. Signup button for new users.

## 4. ADVANTAGES

The advantages of proposed system:

1. The main purpose of this project is protecting our vehicle from all threads. So the three features like location tracking, security and parking of vehicle is enclosed in a single application.

2. Exact location of vehicle is obtained since our project is dealing with latitudinal and longitudinal coordinates.

3. Reduce time to looking for a parking space. It develops a parking system that has Graphic User Interface for driver and management.

4. Nowaday's vehicle thefts are increasing rapidly. The commercially available anti theft vehicular systems are very expensive.

## 5. CONCLUSION

In this paper, we propose a smart system which provides security, parking and location tracking. The parking system that improves performance by reducing the number of users that fail to find a parking space and minimizes the costs of moving to the parking space .This system is based on GPS technology cooperating with android software used for tracking vehicle. The owner can get alert message to mobile phone whenever the position of vehicle get changed. It's the first time all features are employed in a smart phone. This system provides the technical foundation and real-time monitoring for the development of wireless network vehicle anti-theft system.

## 6. FUTURE WORK

In future, this vehicular app can be integrated to dashboard. With the help of high sensitivity vibration sensors we can detect the accident and we can send the location to the owner, hospital and police. We can extend the use of this system to the car dispatching management field, which has vast potential for future development.

## REFERENCES

[1] Anqi Zhang. Liu; and Li. Shaojun, "Vehicle anti-theft tracking system based on Internet of things".

[2] Lee. SeokJu, G. Tewolde and Jaerock. Kwon, "Design and implementation of vehicle tracking system using GPS/GSM/GPRS technology and smartphone application".R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

[3] R. Kumar and H. Kumar, "Availability and handling of data received through GPS device: In tracking a vehicle".