IOT BASED SMART PARKING SYSTEM

Prototype and android app development for iot based smart parking system

(By Vignesh, Deepika, Ashrith, Chandni, Srivatsa, Bhargava Rajasimha, Rohith, Muaaz Shaikh, Tapan sharma, Benji)

***Abstract*— To formulate and simulate a constructive approach for decent parking space and vehicle safety using Internet of Things as both of them are of paramount importance in current scenario. Methods/Statistical Analysis: Internet of Things plays a vital role where everything is connected with everything. IR sensors, switches, RFID and other stuff have been used to overcome the problem of vehicle parking. Already there have been early stage studies and has come up with prototype which shall aid user or drivers in finding the available parking space with the help of IOT. Findings: Since ample of related studies have been already done but integrating some new features can certainly pave the way of not only parking management but also in making the vehicle smart. Emphasizing this particular issue, we came up with a mobile application to locate the nearest parking spots available for a person based on their location and indicating the number of empty slots available in the area using sensors to check their availability. As the vehicle approaches the parking spot, we use RFID tags to determine if the vehicle is registered with our app and only then do we allow access. The app can also be used as a navigation tool for stand-alone parking facilities, being able to direct the driver towards the nearest empty slot using a simple LED floor strip moving towards the slot. As the slots are being taken, the LED strip adjusts its path to the next nearest slot. A Prime Parking subscription can be utilized with added benefits provided in certain parking facilities. We aim to make parking a hassle-free, time-efficient, smooth process for humanity to progress forwards into the future**

***Keywords*— IR sensors , MIT app inventor , ESP 32 node MCU,RFID reader**

I. INTRODUCTION

In the present situation, because of increment in rush hour gridlock, plentiful of drivers meander around looking for better than average parking spot.This makes traffic blockage as well as time squander. Consider the possibility that a driver has advance data of available parking spot in the necessary goal spot. So utilizing RFID, IOT we can design and give the parking space to the driver ahead of time. For shopping centers and air terminal, parking spaces are so amazingly huge that it is difficult to oversee it physically. In urban zones like Bangalore, Delhi, Chennai, has consistent increment in check of vehicle.Research reviews shows 40% of vehicles and bicycle lead to traffic blockage looking for a tolerable parking territory. Review likewise includes that a normal seven and a half minutes time is expected to discover a space for parking. An exploration says that 85% of gadgets in INDIA will be associated with the web by year's end 2020. Right now, we set out IR sensors such a way, that when a vehicle is stopped in a specific space, an IR sensor will detect the nearness of a vehicle in that space and update the database.The server kept up here is of shared sort. The information will be handled before sending to the database. Individuals can effectively book ahead of time the stopping opening and in a like manner, the common database will be refreshed. Future of IOT can be seen where human obstruction is negligible, innovation will assume the responsibility for everything.Current vehicle thievery can't be essentially overlooked. It is expanding day by day. Any individual with a reproduction of a unique key can begin the vehicle. The client may drop the key or overlook the key. It just includes disappointment. Seeing the key point that anybody can begin the vehicle and drive away, we coin a model that incorporates ESP826, unique mark sensor, GPS, and GSM. Much the same as OTP in any security application, the entry of OTP on the app can be utilized to safeguard the vehicle. Once the client starts his bicycle, he will likewise get message warning over his enrolled portable number along with the present area. The area incorporates Longitude furthermore, scope. Since different individuals can be enlisted, it makes simple for a family having a typical vehicle among them.

II. RELATED WORK

In this section we go through the already existing smart parking systems .Most existing parking systems rarely address the issue of parking space management. Most of the already existing organizations and apps work on space utilization and simple barrier method using photocell to calculate the total no.of vehicles in the parking premises. In real time, we have many systems related to mechanical contraptions which optimize space. Park Whiz , Meter feeder , Streetline are few of the companies we referred to .

III. RESEARCH METHODOLOGY

Our approach is based on designs rather than implementation. This includes observations of users and their behaviours, surveys with stakeholders and in-depth interviews with users. This is carried out in parallel with technical advancement and software exploration, i.e. incremental development and integration of system components. At present, we have a prototype where parking slots are to be booked in advance within the app we have developed which shows the current availability of those slots near to the user using location sensing equipment. The user can book the slot and check-in in the given duration based on the distance. Upon nearing the parking slot, the user has to enter the parking lot using n RFID tag provided to them which is registered with the app. We strive towards using open source software as far as possible and in our preliminary system sketches of the system we may also be using Firebase and MIT app inventor, including both maps as well as calendar functions that can be used for reservation of parking spaces based on the users planned activity on campus. The revenue model for this product will be through basic bookings of parking slots in advance and a metered charge per time parked in the slot. Another revenue model is the Prime subscription for people who want a better experience in parking their vehicles with extra facilities and amenities.

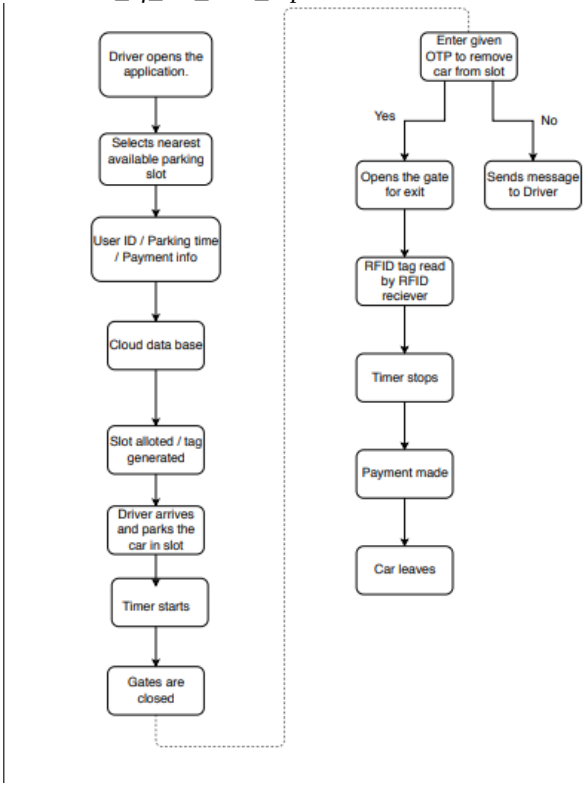
IV. SYSTEM CONTRIBUTION AND DESIGN GOALS

Vehicle Entry: On the entrance of the parking gate, we need to check whether the car entering is stolen or not. If it so, then using IPV6 protocol, we will send an alert message to the driver. Once the car enters, using RFID we cross-check the car details. If no issues, then the slot will be allocated based on availability.

Parking Management: Generally driver or user ends up in dilemma and parks the vehicle in the wrong slot. Not only this, incompetent drivers may hit other cars a well which causes frustration among people.

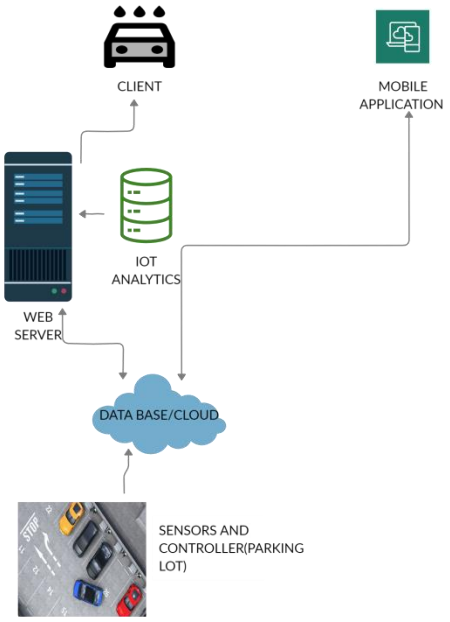
Exit of Vehicle: Upon leaving the parking space, the driver is required to pay the fee which will be calculated on time basis. Upon successful payment, that particular slot will make vacant again and the database will be updated accordingly so that the next user can use the same.

Flowchart_of_the_user_experience



The best part of this prototype is that more than one user can be registered at a single time so that multiple valid people can use the vehicle easily. The advantage of this prototype is that it's relatively very cheap and can be fixed irrespective of any vehicle. The following figures explain the flowchart of vehicle security.

Flowchart of the project



A. *Table Captions*

B. *Tables must be numbered using uppercase Roman numerals. Table captions must be centred and in 8 pt Regular font with Small Caps. Every word in a table caption musReferences*

The heading of the References section must not be numbered. All reference items must be in 8 pt font. Please use Regular and Italic styles to distinguish different fields as shown in the References section. Number the reference items consecutively in square brackets (e.g. [1]).

When referring to a reference item, please simply use the reference number, as in [2]. Do not use "Ref. [3]" or "Reference [3]" except at the beginning of a sentence, e.g. "Reference [3] shows …". Multiple references are each numbered with separate brackets (e.g. [2], [3], [4]–[6]).

Examples of reference items of different categories shown in the References section include:

- example of a book in [1]
- example of a book in a series in [2]
- example of a journal article in [3]
- example of a conference paper in [4]
- example of a patent in [5]
- example of a website in [6]
- example of a web page in [7]
- example of a databook as a manual in [8]
- example of a datasheet in [9]
- example of a master's thesis in [10]
- example of a technical report in [11]
- example of a standard in [12]

IV. Conclusions

The version of this template is V2. Most of the formatting instructions in this document have been compiled by Causal Productions from the IEEE LaTeX style files. Causal Productions offers both A4 templates and US Letter templates for LaTeX and Microsoft Word. The LaTeX templates depend on the official IEEEtran.cls and IEEEtran.bst files, whereas the Microsoft Word templates are self-contained. Causal Productions has used its best efforts to ensure that the templates have the same appearance.

Causal Productions permits the distribution and revision of these templates on the condition that Causal Productions is credited in the revised template as follows: "original version of this template was provided by courtesy of Causal Productions (www.causalproductions.com)".

Acknowledgment

The heading of the Acknowledgment section and the References section must not be numbered.

Causal Productions wishes to acknowledge Michael Shell and other contributors for developing and maintaining the IEEE LaTeX style files which have been used in the preparation of this template. To see the list of contributors, please refer to the top of file IEEETran.cls in the IEEE LaTeX distribution.

References

Gandhi BMK, Kameswara RM. A Prototype for IoT based Car Parking Management system for Smart Cities. Indian Journal of Science and Technology. 2016; 9(17):1-6.

2. Tsiaras C, Hobi L, Hofstetter F, Liniger S, Stiller B. parkITsmart: Minimization of Cruising for Parking. 24th International Conference on Computer Communications and Networks (ICCCN). University of Zurich, Switzerland. 2015; p. 1-8. Crossref.

3. Rahman MA, Rashid MM, Farahana N, Musa A, Farhana A. Automatic vehicle Parking Management System and Fee Collection Based on Number Plate Recognition. International Journal of Machine Learning and Computing. 2012; 2(2):1-6.

4. Gebra S, Wang J, Wu Q, Sun Z, Zong K. IPLMS: An intelligent parking lot management system. Long Island Systems, Applications and Technology. 2015; p. 1-6.

5. Priyanka JGV, Hasnam M, Kumara WGCW. An SMS Based Parking Reservation System. 8th International Conference on Ubi-Media Computing; Colombo. 2015; 24-26:121-3.

6. Viral MV, Choksi V, Potdar MB. Car Safety System Enhancements using the Internet of Things (IoT). International Research Journal of Engineering and Technology (IRJET). 2017; 4(12):1-4.

7. Clarke S, Razzaque MA. Middleware for Internet of Things: A Survey. IEEE Internet of Things Journal. 2016; 3(1):70-95. Crossref.

8. Vardhini PH, Tushara DB. Wireless vehicle alert and collision prevention system design using Atmel microcontroller. IEEE

International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT). 2016; p. 2784-7.
9. Vilas KA, Anil BS, Jagtap SR. Intelligent System for Accident Detection and sending Notification. IEEE International Conference on Communication and Signal Processing. 2014; p. 1238-40.
10. Bhavthankar S, Sayyed HG. Wireless framework for Vehicle Accident Detection using Accelerometer sensor and Reporting with the help of GPS. International Journal of Scientific & Engineering Research. 2015; 6(8):1-4.