SMART PARKING SYSTEM

[1]Abdal Attar, [2]Akshath Krishna, [3]Bharath H K, [4]Darshan P & [5]Dr.Prasad G R
[1]Student, [2]Student, [3]Student, [4]Student & [5]Associate Professor
Computer Science and Engineering
BMS College Of Engineering, Bangalore, India

Abstract— Due to increase in the number of vehicles on the road, traffic problems are bound to exist. This is due to the fact that the current transportation infrastructure and car park facility developed are unable to cope with the influx of vehicles on the road. To overcome these problems, the smart parking system has been developed.
Smart parking system is an integrated system to organize cars. The motivation of this project is to help drivers book parking slot in advance. There is a dedicated app for the system. The user have to register to the system with his name, car details etc. After registering, the user can login and book a parking slot of his choice. The user can book a slot when he/she is near to the destination. Once the user books a parking slot, a QR code will be generated. The user will be allowed to enter and exit only if he has a QR code and registered mobile with him. For non-registered users, a temporary QR code will be given at the entry of the parking area.

I. INTRODUCTION

Smart Parking System provides a solution to the parking of the vehicles. This system allows driver to locate a free parking space and book a slot in advance. Hence it reduces the time for searching a free parking slot and also traffic congestion. A dedicated mobile application is developed. The users can find free slots and book it through the app. Various sensors are used to retrieve the status of the parking slot. The data collected by the sensors will be stored in the cloud and accessed by the app.

II. LITERATURE SURVEY

Reservation-based smart parking system[1] proposes a solution to the parking of the vehicles. The system allows the driver to find a free parking area to park the vehicle. By the use of the sensors in parking lots, the status the parking lots can be obtained. This status helps the user in reservation of the physical parking lot. The drivers can access the system with their devices. This system helps in reducing the traffic congestion caused by parking and also the time taken to park the vehicle.

A Smart Parking system based on IOT protocols and emerging enabling technologies[2]uses different technologies like RFID,WSN,NFC,Mobile and Cloud.The system collects the real time data of the occupancy of parking lots. It directs the driver to the nearest and available parking area through software application.It eases the user to pay parking fees with NFC-based e-wallet.Also,it has a customized software installed on the cloud which gives alerts to the users.

IOT based Smart Parking system[3] consists of on-site deployment of an IOT module which is used to monitor the availability of the parking space.A mobile application is developed which allows the user to check the available slots and book the slot easily.

Automated car parking system commanded by android application[4],the aim of the system is to automate the car parking.It uses sensing devices to check the availability of the parking lots.The entry and exit of the cars are commanded by the android application.This system is less dependent on humans.

Cloud Based Smart Parking System[5] helps users to automatically find an empty parking slot at the least cost based on new performance metrics to calculate the parking cost. The parking cost is calculated by considering the distance and total number of free parking slots in each parking space. This cost will be used in finding available parking space requested by the user. This system also suggests new parking space if the current parking space is full.

Parking is a major problem in many major cities. The price of developing a parking space is extremely high. Smart parking system using optical wireless sensor network[6], vehicles in the parking space can be monitored. Star based topology is used in these wireless sensor networks. This system can inform users of number of available parking slots and in which area should they be directed to. This system avoids traffic congestion.

Automatic Smart parking system using iot [7] enables user to find the nearest parking space and gives the number of available parking slots in that parking area. This system focuses mainly on reducing time in finding parking slots. Unnecessary travelling through already filled parking slots is avoided. This reduces consumption of fuel.

Ad Hoc Networks based Smart parking system[8]provides drivers with real time parking navigation service and protection against theft. This parking system also provides useful parking information to the drivers. Using this information, the drivers can easily choose their preferred parking slots close to their destinations.

An algorithm of parking planning for smart parking system[9] provides a feasible method to do parking.We transform the plan into a kind of linear assignment problem.Vehicles as jobs and parking area as agents.The cost for parking is calculated by taking the distance between vehicle and parking area.The system also gives timely and efficient guide information to vehicles for real time parking system.

IoT Based Smart Parking System Using RFID[23] identifies the free slots in a parking area and keeps the record of the vehicles.This system reduces human effort in searching of free slots by the driver calculating the payment for each vehicle.The vehicle identification is done by using RFID tags,free slot detection is done by IR sensors and payment is calculated by the period of parking.

III. PROPOSED WORK

Smart Parking System is divided into two parts:

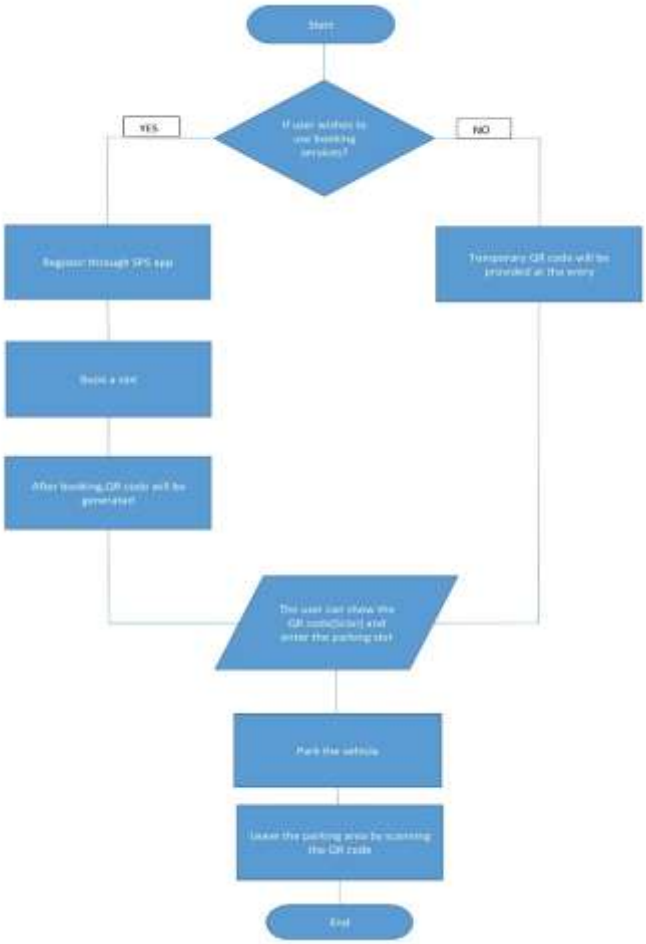
A. Registered User

The users who wish to utilize the booking services have to use the app and register themselves by providing the name and car details.After registering,user can login and find the free parking slots.Once the user books the slot,a QR code will be generated.The user can book a slot when he/she is near to the destination(Say,it takes 10-15 minutes to reach the destination)At the entry of the gate,the user can show the QR code and enter the parking slot.Thus,less dependent on humans.During the entry and exit of the vehicle,the user must have a QR code.This

feature provides security to the car.Only the owner of the car will have the access to the vehicle.Booking cancellation option is also provided to the user.

B. Non-Registered Users

The users who do not have mobile or who do not want to book a slot can directly come to the parking slot.Temporary QR code will be generated for non-regisered users.The users will be directed to the available parking slots.



IV. CONCLUSION WORK

Smart parking system can be used to inform the driver about available parking lot.The benefits of smart parking go well beyond avoiding the needless rounds of city blocks.It also enables cities to develop fully integrated intelligent transportation systems. To develop a smart parking system within a city requires different technologies, mobile phone integration , hardware and software innovation and coordina-tion among various stakeholders. These technical solutions and stakeholders are the same data structures and develop-ment groups integral to making a smart phone enabled ,fully integrated transportation solution a reality.

REFERENCES

[1] Hongwei Wang and Wenbo He,A Reservation-based Smart Parking System,in Computer Communications Workshops (INFOCOM WK-SHPS), 2011 IEEE Conference on 10-15 April 2011.

[2] Luca Mainetti,Luigi Patrono,Maria Laura Stefanizzi and Roberto Ver-gallo,A Smart Parking System based on IoT protocols and emerging enabling technologies,in Internet of Things (WF-IoT), 2015 IEEE 2nd World Forum on 14-16 Dec. 2015.

[3] Abhirup Khanna and Rishi Anand,IoT based smart parking system,in Internet of Things and Applications (IOTA), International Conference on 22-24 Jan. 2016.

[4] D.J.Bonde,Rohit Sunil Shende,Akshay Sambhaji Kedari,Ketan Suresh Gaikwad and Amol Uday Bhokre, Automated car parking system commanded by Android application ,in Computer Communication and Informatics (ICCCI), 2014 International Conference on 3-5 Jan. 2014.

[5] Thanh Nam Pham,Ming-Fong Tsai,Duc Binh Nguyen,Chyi-Ren Dow and Der-Jiunn Deng,A Cloud-Based Smart-Parking System Based on Internet-of-Things Technologies,in volume 3 on 09 September 2015.

[6] Jatuporn Chinrungrueng, Udomporn Sunantachaikul and Satien Tri-amlumlerd,Smart Parking: An Application of Optical Wireless Sensor Network,in Applications and the Internet Workshops, 2007. SAINT Workshops 2007. International Symposium on 15-19 Jan. 2007.

[7] Mr. Basavaraju S R,Automatic Smart Parking System using Internet of Things (IOT),in International Journal ofScientific and Research Publications, Volume 5, Issue 12, December 2015.

[8] Rongxing lu,Xiaodong lin,Haojin zhu and Xuemin shen,Ad Hoc Networks based Smart parking system,on 2009.

[9] Xuejian Zhao,Kui Zhao and Feng Hai,An algorithm of parking plan-ning for smart parking system,in Intelligent Control and Automation (WCICA), 2014 11th World Congress on 29 June-4 July 2014.

[10] Yanfeng Geng and Christos G. Cassandras,New Smart Parking System Based on Resource Allocation and

I. Reservations,in IEEE Transac-tions on Intelligent Transportation Systems(Volume: 14,Issue: 3, Sept. 2013).

[11] Dr Y Raghavender Rao,Automatic Smart Parking System using In-ternet of Things,in International Journal of Engineering Technology Science and Research,Volume 4, Issue 5 May 2017.

[12] Zhanlin Ji,Ivan Ganchev,Mirtn ODroma,Li Zhao and Xueji Zhang,A Cloud-Based Car Parking Middleware for IoT-Based Smart Cities: Design and Implementation,on 25 November 2014.

[13] Vrushali D. Ichake,Priya D. Shitole and Mohsina Momin,Smart Car Parking System Based on IoT Concept,in

I. International Journal of Engineering Science Invention ISSN (Online): 2319 6734, ISSN (Print): 2319 6726

II. www.ijesi.org ——Volume 5 Issue 3—— March 2016 —— PP.48-54.

[14] Patil Vaishali1,Pingalkar Nishigandha,Najiya Inamdar,Sonawani Dhawal and Prof.Vijay Sonawane,A Survey on Smart Car-Parking System Using On Internet-of-Things,in International Journal of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Vol. 4, Issue 9, September 2016.

[15] Mohammed Raheel Ahmed and T C Jermin Jeaunita,IoT Based Cost Efficient Smart e-Parking System,in International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (An ISO 3297: 2007 Certified Organization) Vol. 5, Issue 11, Novem-ber 2016.

[16] AmitRoy,JunaedSiddiquee,AngshudharaDatta,Priyam Poddar,Gaurav Ganguly and Aritra Bhattacharjee,Smart trafficand parking management using IoT,in Information Technology, Electronics and Mobile Communication Conference (IEMCON), 2016 IEEE 7th Annual,13-15 Oct. 2016.

[17] SUNIL CHOUHAN and SANDHYA P,INTERNET OF THING BASED CAR PARKING SYSTEMon 3 March 2017.

[18] K. Ashok kumar, R. B. Sam, and B. Arshadprabhu,Cloud based intelligent transport system,in Proc. 2nd Int. Symp. Big Data Cloud Comput. (ISBCC).

[19] R. E. Barone, T. Giuffr, S. M. Siniscalchi, M. A. Morgano, and G. Tesoriere, "Architecture for parking management in

I. smart cities," IETIntell. Transp. Syst., vol. 8, no. 5, pp. 445452, 2014.

[20] Geng Y. and Cassandras C. G. 2011. A new smart parking system based on optimal resource allocation and reservations,

I. in Proc. IEEE Conf. Intell. Transp.Syst. pp. 979984.

[21] M. Patil, V.N. Bhonge, Wireless Sensor Network and RFID for Smart Parking System, in IJETAE, Vol. 3, No. 4, 2013.

[22] H.A.B. Sulaiman, M.F.B.M. Afif, M.A.B. Othman, M.H.B. Misran, and M.A.B.M. Said, Wireless based Smart Parking

I. System using ZigBee, in IJET, Vol. 5, 2013

[23] Prof.S.S.Thorat,Ashwini M,Akanksha Kelshikar,Sneha Londhe and Mamta Choudhary,IoT Based SmartParking SystemUsing RFID ,Volume 4, Issue January 2017, pp. 9-12 ISSN (O): 2349-7084 International Journal of Computer Engineering In Research Trends.