IJASEM

INTERNATIONAL JOURNAL OF APPLIED SCIENCE ENGINEERING AND MANAGEMENT

ADVANCED PARKING SLOT AVAILABILITY CHECKINGSYSTEM USING RASPBERRY-Pi

NIMMAGADDA CHARAN*1, Dr. M. RAKESH*2, EDARA VENGAL REDDY*3, VALLABHUNI MANIKANTA*4, BHIMAVARAPU BHAVYA SRI*5

ABSTRACT

As significantly grown, in the current era, as a result of the ever-rising number of vehicles geared by the rapid population growth in urban areas. Wherefore finding a vacant parking space has become quite a challenging task, especially at peak hours. Car operators have to cycle back and forth a number of times before they finally find where to park. This leads to increased fuel consumption, air pollution, and wastage of time, is not just a major problem in India but also in all over the world. This system implemented us a cost effective, scalable and robust to indicate the number of free parking slots in a given parking area. This system implemented by using infrared sensors in every bay which are then connected to a Raspberry Pi. The raspberry Pi transfers all the data to a server, which is open to users using a mobile application.

I.   INTRODUCTION

More than half of the world population lives in the urban areas so the cities have reached its full occupancy. As a result, number of vehicles in the cities is also increased. parking system would have more appreciated in placeless of higher demands such like Theatre, shopping malls and in some crowded place. The devices could be tracked, controlled or monitored using remote computers connected through the Net. In IOT objects are connected to each other and exchange information from internet. Our cloud-based parking organized the parking lot. It helps user to finda vacant space in parking slot. It saves user's time as well as vehicle fuel.

An infrared (IR) sensor is used at each slot parking; it tells the space availability which can be easily seen in mobile application through internet. It may be defined as connecting things present in the physical world with sensors and then connecting them to a network through wired or wireless means. The solution proposed in this paper utilizes the architecture of the cloud server is in a way that an unrestricted number of slots may be added without any change in the code. The associated mobile application can run on Windows, Android and iOS. Moreover, the code can be recycled for multiple boards making the proposed solution cost effective, adaptable and versatile. Followed by the developments in sensor technology, man modern cities have opted for deploying various IoT based systems in and around the cities for the purpose of monitoring.

1.1 INTRODUCTION OF EMBEDDED SYSTEM

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. A good example is the microwave oven. Almost every household has one, and tens of millions of them are used everyday, but very few people realize that a processor and software are involved in the preparation of their lunch or dinner.

This is in direct contrast to the personal computer in the family room. It too is comprised of computer hardware and software and mechanical components (disk drives, for example). However, a personal computer is not designed to perform a specific function rather; it is able to do many different things. Many people use the term general-purpose computer to make this distinction clear. As shipped, a general-purpose computer is a blank slate; the manufacturer does not know what the customer will do wish it. One customer may use it for a network file server another may use it exclusively for playing games, and a third may use it to write the next great American novel.

* 1,3,4,5 B. Tech Students, *2 Associate Professor
Dept. of Electronics and Communication Engineering,
RISE Krishna Sai Prakasam Group of Institutions

II. LITERATURE SURVEY

1.Abhirup Khanna, Rishi Anand "IoT Based Smart Car Parking system

In the current era the number of vehicles is increasing day by day. Parking vehicle in metropolitan cities has created havoc indeed that has created a major problem to park their vehicles in designated place which leads to traffic congestion during peak hours. Which leaves the user to search for their parking? This paper resolves the issue of parking system and has come up with IOT (Internet Of Things) enabled parking space and allocation mechanism. Smart parking involves use of ultrasonic sensor, Arduino Uno and cloud server. This system will be accessible through a android application to monitor the vacant slots available in parking area. This enables interaction between smart parking system and the user. it proposes to implement the parking system based on reservation. Every user has a unique OTP to occupy their own reserved slot.

2.Rico, J., Sancho, J., Condon, B. &Camus, M. "Parking easier by using context information of a smart city"

In the great majority of cities it is difficult and hardly expensive to create more parking spaces for vehicles since they have almost reached its full occupancy. Combining this problem with an inefficient use of parking spaces leads to congestions due to aggregation of parking seekers and regular drivers. Recent advances in low-cost, low-power embedded systems bring the opportunity to develop new applications to solve these problems. In particular, Smart Cities greatly enrich their sustainability by introducing new resource management applications that rely in those constrained devices a significant part of the functionality of the system. The proposed Smart Parking solution consists mainly in the on-site deployment of an IoT solution to monitor and signalize the state of availability of each single parking space, as well as using context information generated by the city and its citizens to provide accurate responses to driver's demands. Furthermore, this system improves the management of parking resources by public authorities, for instance handling groups of parking spaces facilitating the whole city traffic management. The integration of this deployment into an existing live test-bed implies an easy task requiring just the data collection through the available means of the parking spaces availability. At the present time there exist living test-beds which can be used to integrate these new functionalities for experimentation on IoT data level, to gain a better knowledge and understanding of the M2M world, reducing costs, resources, pollution and time.

3.Kafle, V. P., Fukushima, Y., &Harai, H. "ID-based communication for realizing IoT and M2M in future heterogeneous mobile networks

Internet of Things (IoT) and Machine to Machine (M2M) communication are expected to be the major paradigm of communications in the future Internet, where trillion of devices will be connected through heterogeneous mobile networks that will vary in both networking and link technologies. The IoT/M2M devices need to remain connected despite they change their points of attachment frequently to the network either due to mobility or simply switching links in the overlapped wireless coverage for better connectivity. To meet the needs of IoT/M2M devices regarding secured connectivity and seamless mobility in heterogeneous networks, we have proposed an ID-based communication network architecture, called HIMALIS, which includes several network functions suitable for IoT/M2M such as secure initial configuration of devices for network access, device discovery, remote monitoring, and control. It provides a set of simple programming interfaces to users, thus enabling the development of various IoT/M2M applications independently of underlying networking protocols. We also introduce our recent implementation of HIMALIS sensor devices to demonstrate the proof of concept. These sensor devices have been included in the JOSE testbed network, which is available to use in the Japanese domestic and international joint projects.
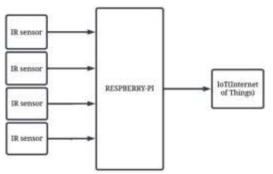
III. BLOCK DIAGRAM

Fig .1 Block diagram of advanced parking slot availability checking system using raspberry-pi

COMPONENTS IN BLOCK DIAGRAM

1. IR sensor
2. Raspberry-Pi
3. IoT (Internet of Things)

IR sensor: - It presents a novel parking system with IoT over Wi-Fi. The authors suggest an IOT based solution to the issue using a mobile app, IR sensors. Two IR sensors are used at the entry and exit gates to detect vehicle entry and exit in the parking area. And other four IR sensors are used to detect the parking slot availability. With the solution's help, users can easily look for nearby parking lots alongside Realtime availability in each parking lot. They can also block the desired parking slot through the app. Upon exit, the amount to be paid is determined using the time the service was used, which is determined using IR sensor data, and

payment is processed using the linked in-app wallet. This technology improves the overall efficiency, reliability, and convenience and reduces the preciousresources in searching for parking spaces and pollution.

Raspberry-Pi: - It first detects the vehicle parked in slots and shows the status of each slot through the webserver. Visitors can know the status of the parking slot through the webpage, after that theyhave to show their RF ID to the reader to get authenticated and note down the timeof that specific vehicle.It has Raspberry Pi is used as a core, as a prototype 4 parking slots are present. For detection of vehicle IR Sensor is used and to have special identity RFID is used for every new car. The database is maintained for every visitor. Alert of detecting the money based on thestay time of the slot will be intimated through mail.

IoT(Internet of Things): - An IoT based smart parking system, also known as a connected parking system, is a centralizedmanagement system that allows drivers to use a smartphone app tosearch for and reserve a parking spot.The drivers use this application to direct themselves to the available parking spacesinstead of wasting their time and fuel in search of one.

POWER SUPPLY

The input to the circuit is applied from the regulated power supply. The a.c. input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The outputobtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any a.c components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.
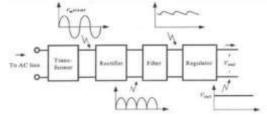
BLOCK DIAGRAM OF POWER SUPPLY

Fig .2 Block Diagram of Power supply

These sensors normally used to check volumetric water content, and another group of sensors calculates a new property of moisture within soils named water potential. Generally, thesesensors are named as soil water potential sensors which include gypsum blocks and tensiometer.
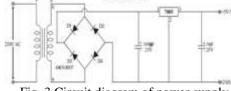
IV. CIRCUIT DIAGRAM OF POWER SUPPLY

Fig .3 Circuit diagram of power supply

The input to the circuit is applied from the regulated power supply. The Ac input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating dc voltage and it results as 5v dc supply.

In this we have used stepdown transformer whose input is 230V Ac supply and then it is converted to 12V Ac which is the output of stepdown transformer. And then we have used some other components like rectifier and filter and voltage regulator to convert from 12V Ac to 5v Dc. Here, the rectifier bis used to convert from Ac to Dc.
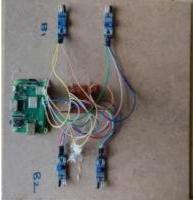
V RESULT

WITHOUT POWER SUPPLY

Fig 4: Without power supply

WITH POWER SUPPLY

Fig 5: With power supply

An IoT-based parking system is a centralized management that enables drivers to search for and reserve a parking spot remotely through their smartphones. Hence, this is the output of our project where it shows parking slots are available based on IoT by using raspberry-Pi.

VI. ADVANTAGES DISADVANTAGES &APPLICATIONS

ADVANTAGES

1. Reduce congestion and improve traffic

flow by using sensors to monitor parking space availability and direct drivers to available spaces.

2. IoT gateway protocol help connect IoT devices and sensors in sizable parking slots.
3. Increased efficiency
4. Enhanced security
5. Reduced costs
6. Faster processes

DISADVANTAGES

7. Expensive construction and installation

VII. CONCLUSION & FUTURE SCOPE

CONCLUSION

Work proposed in this system addresses an issue of parking in smart parking. The system is implemented using ow-cost IR sensors, Raspberry pi for real time data processing, E-parking mobile application motor. The developed system contributes real time information of availability of parking slots in parking area and allows users to book parking slot from remote locations by using mobile application and also provides user authentication. The developed system is tested for different cases such as single user booking, multiple users booking, user trying to book reserved slot and user authentication.

FUTURE SCOPE

This system can also be converted into Arduino based. Parking assistance, automated parking lots, and the Internet of Things (IoT) are some of the most promising technologies for the future of parking. An increase in parking concerns across the globe, growth in demand for Internet of Things (IoT) based technology, and high adoption rate in several vehicles drive the need for the global smart parking market. However, high employment cost & configuration complexity, and low rate of internet penetration in developing regions restrain the market growth

REFERENCES

[1] Harsha H Prasad International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395- 0056 p-ISSN: 2395-0072 Volume: 06 Issue: 05 | May 2019.

[2] Jaspreet Singh Computer Science and Engineering International Conference on Advances in computing, communication control and networking (ICACCCN2018).

[3] Prof.K.T. Jadhao, Assistant Professor, Alamuri Ratnamala Institute of Engineering and Technology (ARIET), Thane, – Maharashtra, India.

[4] R. Manjunatha1 International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 - 0056 p-ISSN: 2395-0072 Volume: 04 Issue: 03 | Mar - 2017.

[5] Prayag Bhatia, Shakti Rajput ,Shashank Pathak, Shivam Prasad , §School of Computing Sciences and Engineering, VIT Chennai, Tamilnadu, India 600127

[6] Riddhi Patel, shruti B yagnik,'(IJCTT)-vol.5, no.4, ISSN2231- 2803, November 2013

[7] L.Atzori ,A.lera ,G.Morabito ,"The internet of things. A survey ", Computer Network. vol.54, no.15,ISSN-2787- 2805,2010.

[8] Rajat Bhise, Nikilesh Phadnis, Rahul Bari, Vijay Dhage Iot Based Door Lock and Unlock System Using Face Recognition," International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395- 0056 Volume: 05 Issue: 12 | Dec 2018

[9] P. Viola and M. J. Jones, Robust real-time face detection, International Journal of Computer Vision, 57 (2004), pp.137–154.

[10] Demirel, Hasan & Anbarjafari, Gholamreza. (2009). Histogram based face recognition system. ELECTRONICS WORLD. 115. 32-37.

[11] Z. Cha, and Z. Zhang. "A survey of recent advances in face detection " ,Learning, no. June,p. 17, 2010

[12] Hongming Zhang and Debin Zhao from Department of Computer Science and Engineering, Harbin Institute of Technology, Harbin, 150001, China.

WEBSITES

1. www.irjet.net
2. ktjadhao@gmail.com
3. https://www.javatpoint.com/internet-of-things-applications
4. https://www.geeksforgeeks.org/advantages-and-disadvantages-of-iot/