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RASPBERRY-PI BASED ADVANCED PARKING SLOT AVAILABILITY CHECKING SYSTEM

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ABSTRACT

as significantly increased in the contemporary era because to the continually rising car population brought on by the accelerating urban population expansion. Finding a parking space these days might sometimes be challenging, particularly during peak hours. Drivers have to make several circuits back and forth before they can find a spot to park. This leads to increased fuel consumption, air pollution, and time waste—all of which are major problems that affect India as well as the rest of the world. The installation of this system offers a dependable, scalable, and reasonably priced means of displaying the number of parking spaces that are available at a specific site. This setup features infrared sensors in each bay that are linked to a Raspberry Pi. The Raspberry Pi transfers all of the data to a server that consumers can access through a mobile app.

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 find avacant 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 domany 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.

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 interactionbetween smart parking system and the user. it proposes to implement the parking system based onreservation. 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 timethere 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 applicationsindependently of underlying networking protocols. We also introduce our recent implementation of HIMALIS sensor devices to demonstrate the proof of concept. These sensor devices have beenincluded 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 exitgates 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 forevery 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 centralized management 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 spaces instead 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 output obtained 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 afterrectification. 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, these sensors 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

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6. Faster processes

DISADVANTAGES

7. Expensive construction and installation

VII.CONCLUSION & FUTURE SCOPE

CONCLUSION

The problem of parking in smart parking is addressed by the work proposed in this system. Low-cost infrared sensors, a Raspberry Pi for real-time data processing, and an E-parking mobile application motor are used in the system's implementation. In addition to providing user authentication, the proposed system offers real-time information about parking space availability in the parking area and enables users to reserve parking spaces from a distance using a mobile application. The developed system is tested in many scenarios, including single-user and multiple-user bookings, user authentication, and user attempts to book a reserved slot.

FUTURE SCOPE

This system might easily be changed to be Arduino based. Some of the most intriguing new advancements in parking technology are automated parking lots, parking assistance, and the Internet of Things (IoT). An growth in Internet of Things (IoT)-based technology, a high acceptance rate in many cars, and a global rise in parking concerns are driving forces behind the need for the global smart parking market. However, market expansion is constrained by high labor costs, configuration complexity, and low internet penetration rates in developing nations.

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