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Smart Parking Space Checking System Using IoT

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ABSTRACT: Nowadays the recent developments in smart cities have become popular. In smart cities the problems that are difficult to face are traffic congestion and car parking. This proposed method is about an IOT based cloud integrated smart parking system to avoid the traffic congestion in smart cites. The proposed parking system consists of an on-site deployment of an IOT module that is used to update the details of the parking area in the webpage. This webpage updates the parking area details and the environment details. The parking system is provided with ultrasonic sensors, temperature sensor and the pollution sensor which helps to check the parking space, environment temperature and pollution around the parking area.The PIC microcontroller is used to control the signals in the circuit. The microcontroller is used to transfer the signal from sensors to IOT. The IOT updates the parking space details for every thirty second in the webpage. The User can check the availability of the parking space at anywhere from webpage. The traffic congestion is controlled and also the fuel consumption is reduced by implementing this proposed system.

I. INTRODUCTION

Today, the Internet Of Things has become a popular term for describing scenarios in which internet connectivity and computing capability extend to a variety of objects,devices and sensors .IOT systems like networked vehicles,intelligent traffic systems and sensors embedded in roads and bridges move us closer to the idea of “smart cities”which help minimize congestion and energy consumption. The concept of Internet Of Things started with things with identify communication devices.The devices could be tracked,controlled or monitored using remote computers connected through internet. IOT extends to the use of internet providing the communication and thus the inter-network of the devices and the physical objects.Here we are using the technology of Internet of Things to bring the easiest way to solve the problem of car parking in the smart cities. Because in smart cities for a single user they can have a four wheeler so that parking problem for them is very tough process. Due to this problem there is an occurrence of the traffic congestion and the wastage of petrol as it consumes petrol for searching the parking space.

Our project is very useful in the concept of smart cities for parking the vehicle. The project that is done is to search the parking space. The user can know the parking space at the place after he reach there near the parking space .But our project that we are proposed here is very easy to know about the parking space.

In our project there is an usage of Ultrasonic sensor .Because this sensor will identify the parking space whether the space is available or not .This sensor will transfer the information to the PIC board .This information is updated in the internet .Through the mobile we can know the status of the parking space in the parking area which we want to know.

There is also an additional information about the parking area are also updated .The temperature range and the pollution rate in the parking area are monitored by using the Pollution sensor and the temperature sensor by usage our invention one can save their timing and also fuel consumption is limited Through our system the stress of the traffic congestion will be avoided.

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II. EXISTING SYSTEM

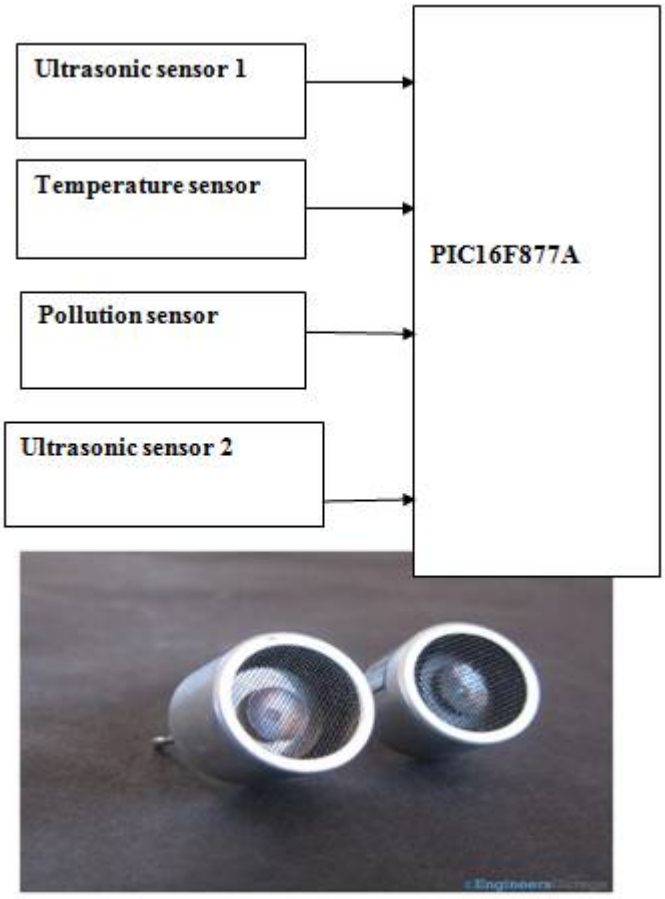
In existing system ,parking space is displayed in LCD display or green, red lamp indication .The user cannot viewthe parking space from the long distance view at instead time.

III. PROPOSED SYSTEM

The smart parking system that we propose is implemented using a mobile that is connected to the internet the system helps a user to know the availability of parking spaces on a real time basis people can know the parking details from anywhere and also the environment status also can be updated in the website

IV. BLOCK DIAGRAM

PARKING SECTION:



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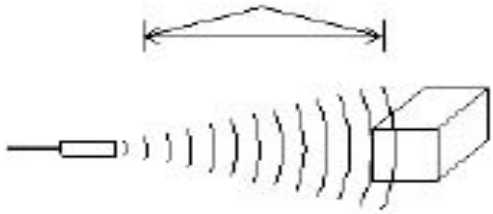
PARKING SENSORS:

For our parking system we have made use of sensors like Ultrasonic sensor, pollution sensor and the temperature sensor .The work of sensors are described here .The Ultrasonic sensor will detect whether the car parking area is vacant or not .The pollution sensor will detect the pollution rate of the surroundings of the parking area .The Temperature sensor will detect the temperature of the parking area surroundings

POLLUTION SENSOR:

Air pollution sensors are devices that detect and monitor the presence of air pollution in the surrounding area. They can be used for both indoor and outdoor environments. These sensors can help serve many purposes and help bring attention to environmental issues beyond the scope of the human eye.

ULTRASONIC SENSOR:



Understanding Ultrasonic Sensing/Control Basics Ultrasonic signals are like audible sound waves, except the frequencies are much higher. Our ultrasonic transducers have piezoelectric crystals which resonate to a desired frequency and convert electric energy into acoustic energy and vice versa. The illustration shows how sound waves, transmitted in the shape of a cone, are reflected from a target back to the transducer. An output signal is produced to perform some kind of indicating or control function. A minimum distance from the sensor is required to provide a time delay so that the “echoes” can be interpreted. Variables which can affect the operation of ultrasonic sensing include: target surface angle, reflective surface roughness or changes in temperature or humidity. The targets can have any kind of reflective form – even round objects.

When used for sensing functions, the ultrasonic method has unique advantages over conventional sensors:

- Discrete distances to moving objects can be detected and measured.
- Less affected by target materials and surfaces, and not affected by color. Solid-state units have virtually unlimited, maintenance free life. Can detect small objects over long operating distances.
- Resistance to external disturbances such as vibration, infrared radiation, ambient noise, and EMI radiation.

TEMPERATURE SENSOR:

Temperature sensor measure the amount of heat energy or even coldness that is generated by an object or systems, allowing use to “sense” or detect any physical change to that temperature producing either an analogy or digital output.

CONTROL SECTION:

MOBILE PHONE

In control section we are having only the mobile phone. Because we are accessing this system only through the mobile phone. On the parking section there are various types of sensor that are used to sense and give the result

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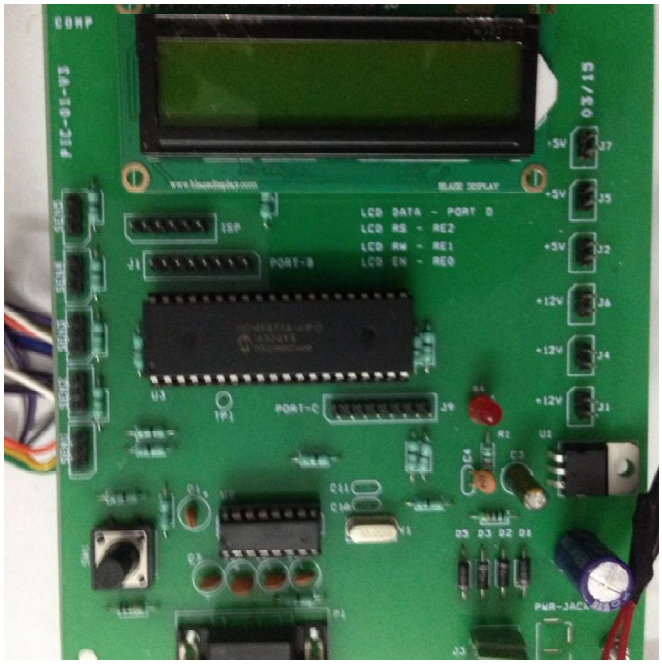
about various factors of the parking area. This information is transferred to the peripheral interface controller. The PIC will send its received information to the reputed website bythe usage of the internet of things. The Internet of things is having a kit that will be very useful in the latest technology. The usage of the internet of things kit in our project is to get the information from the PIC and then it will update the information about the parking area. The information which is updated will be known only by the mobile phone. Through the mobile internet we can know all the information about the parking area.

PROCESSING UNIT:
PIC16F877A:

The term PIC, or Peripheral Interface Controller, is the name given by MicrochipThe PIC16F877A CMOS FLASH-based 8-bit microcontroller is upward compatible with the PIC16C5x, PIC12Cxxx and PIC16C7x devices. It features 200 ns instruction execution, 256 bytes of EEPROM data memory, self programming, an ICD, 2Technologies to its single – chip microcontrollers. PIC micros have grown to become the most widely used microcontrollers in the 8-bit microcontroller segment.

Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire SPI or 2-wire I2C bus, a USART, and a Parallel Slave Port.



The pins RB0-RB7, RC0-RC7, and RD0-RD7 are digital I/O pins. The pins CCP1 and CCP2, which share locations with RC1 and RC2, can be used for a PWM signal (see DC Motor tutorial). The pins AN0-AN7 are for analog I/O (see Photo resistor tutorial). TX and RX are for debugging I/O (see Output Messages to Computer tutorial). The remaining pins deal with power/ground, the clock signal, and programmer I/O.

A PIC is made of several “ports.” Each port is designated with a letter, RB0-RB7 are a port. RC0-RC7 and RD0-RD7 are a port as well. RA0-RA5 and RE0-RE2 arealso ports, but with fewer pins. Some of these pins have special purposes, but most can be used as basic input/output pins.

For example, you can set pin RB0 to be either an input pin, or an output pin. As an input pin, the digital voltage on the pin can be read in. For example, if RB0 is connected to ground (0v), then you would read a digital 0. If RB0 was connected to power (5v), then you would read a digital 1.

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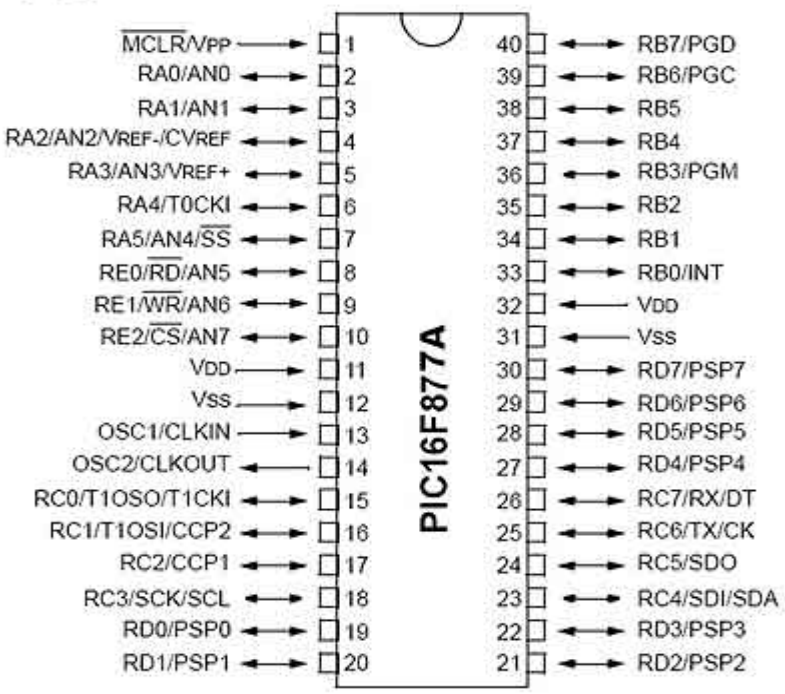
On the other hand, if you wanted to set RBO as an output pin, you could choose to make RB0 either be 5v, or 0v. This can be used, for example, to turn off or on a LED, or to turn off or on a motor.



Pin Diagram of PIC16F877A

IOT

IOT has evolved from the convergence of wireless technologies, micro-electromechanical systems (MEMS) and the Internet. The concept may also be referred to as the Internet of Everything. The internet of things (IOT) is the internetworking of physical devices, vehicles, buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data.

A thing, in the Internet of Things, can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low -- or any other natural or man-made object that can be assigned an IP address and provided with the ability to transfer data over a network.

Internet of Things (IOT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. The IOT allows objects to be sensed and/or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. IOT board featured with SIM900 GPRS modem to activate internet connection also equipped with a controller to process all input UART data to GPRS based online data. Data may be updated to a specific site or a social network by which the user can able to access the dataThe term Internet of Things generally refers to scenarios where network connectivity and computing capability extends to objects, sensors and everyday items not normally considered computers, allowing these devices to generate exchange and consume data with minimal human intervention. The Internet of Things (IOT) is the network of physical objects—devices, vehicles, buildings and other items—embedded with electronics, software, sensors, and network connectivity that enables these objects to collect and exchange data.

• **Enabling Technologies:** The concept of combining computers, sensors, and networks to monitor and control devices has existed for decades. The recent confluence of several technology market trends, however, is bringing the Internet of

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Things closer to widespread reality. These include Ubiquitous Connectivity, Widespread Adoption of IP-based Networking, Computing Economics, Miniaturization, Advances in Data Analytics, and the Rise of Cloud Computing.

• **Connectivity Models:** IOT implementations use different technical communications models, each with its own characteristics. Four common communications models described by the Internet Architecture Board include: Device-to-Device, Device-to-Cloud, Device-to-Gateway, and Back-End Data-Sharing. These models highlight the flexibility in the ways that IOT devices can connect and provide value to the user.

IMPLEMENTATION AND WORKING:

In previous section we discuss about the hardware specification and their range of working. Now we going to discuss that how our system will work in a real time.

In our project there is a two section of hardware unit they are one is parking section unit and another is control section unit .In parking section unit most of the kit is there only. Here in the parking area in the space of parking slot there is a sensor called Ultrasonic sensor .The Ultrasonic sensor is used in the parking slot, so that it can sense whether the car is present or the space is vacant. This can be done by Ultrasonic sensor by its sound wave signal which will be produced from the sensor and it will travel along some distance in its direction and then the sensor will wait for the signal to be back to it after the will return the sensor

Will transfer its signal to the PIC (Peripheral Interface Controller).

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The PIC will get the signal from the Ultrasonic sensor and it will update its information through the Internet of Things .Through the mobile we search through internet for parking space.

We conducted an experiment in order to depict the working of our system at every stage from checking the availability of parking space to actually park a car in a vacant parking slot. This is done by implementing the smart parking system in the parking area of ashopping mall. Below are the steps that a driver needs to follow in order to park its car using our parking system.

Here in the mobile we have to search the web page of www.iotclouddata.com/project/461/iot16view.php and in that webpage there is update of every parking area details will be in every 30 seconds. By searching this we can know all the details like temperature range ,pollution rate and

Step 1:Through mobile phone by using internet search for the parking area.

Step 2: With the help of the mobile search for a parking area on and around your destination.

Step 3: Browse through the various parking slots available in that parking area.

Step 5: Fix a particular parking slot.

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Step 6: Park a car without wasting of time

The given steps are the process that is to be done by a user at the real time basis. Through this project one can save the time and the roaming in the street will be avoided. So the user can save the fuel by usage of our project

.

V. CONCLUSION

The concepts of Smart Cities have always been a dream for humanity. Since the past couple of years large advancements have been made in making smart cities a reality. The growth of Internet of Things and Cloud technologies have give rise to new possibilities in terms of smart cities. Smart parking facilities and traffic management systems have always been at the core of constructing smart cities. In this paper, we address the issue of parking and present an IOT based Cloud integrated smart parking system. The system that we propose provides real time information regarding availability of parking slots in a parking area. Users from remote locations could book a parking slot for them by the use of our mobile application. The efforts made in this paper are indented to improve the parking facilities of a city andthereby aiming to enhance the quality of life of its people.

REFERENCES

1.Chungsan Lee,DongmahnSeo*,SoobinJeon,oungtak Han, smart parking system for internet of things , 2016 IEEE international conference of consumer electronics

2. Abhirupkhanna, Rishi anand (Jan 2016) IOT based smart parking system, 2016 international conference of internet of things

3.Thanh nampham,Mingfongtsai,Ducpinhnguyen,Chyirendow,Derjiunndeng(September 2015)A cloud based smart parking system based on internet of things technologies ,2015 IEEE

4.Basavaraju S R ,(Automatic smart parking system Using internet of thing (Dec 2015) International journal of scientific and Research publications

5.[4] Botta, A., de Donato, W., Persico, V., &Pescapé, A. (2014, August). On the Integration of Cloud Computing and Internet of Things. In Future Internet of Things and Cloud (FiCloud), 2014 International Conference on IEEE.

6.Rao, B. B. P., Saluia, P., Sharma, N., Mittal, A., & Sharma, S. V. (2012, December). Cloud computing for Internet of Things & sensing based applications. In Sensing Technology (ICST), 2012 Sixth International Conference on IEEE.

7. Parwekar, P. (2011, September). From Internet of Things towards cloud of things.In Computer and Communication Technology (ICCCT), 2011 2nd International Conference on IEEE.

8.Dash, S. K., Mohapatra, S., &Pattnaik, P. K. (2010). A survey on applications of wireless sensor network using cloud computing. International Journal of Computer science & Engineering Technologies

9.Kafle, V. P., Fukushima, Y., &Harai, H. (2015, April). ID-based communication for realizing IOT and M2M in future heterogeneous mobile networks.In Recent Advances in Internet of Things (RIOT), 2015 International Conference on (pp. 1-6).IEEE.

10. Chen, S. Y., Lai, C. F., Huang, Y. M., &Jeng, Y. L. (2013, July). Intelligent home-appliance recognition over IOT cloud network. In Wireless Communications andMobile Computing Conference (IWCMC), 2013 9th International (pp. 639-643). IEEE.

11.Zheng, Y., Rajasegarar, S., &Leckie, C. (2015, April). Parking availability prediction for sensor-enabled car parks in smart cities. In Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP), 2015 IEEE Tenth International Conference on IEEE.