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THE FUTURE OF CAR PARKING WITH IOT SOLUTIONS

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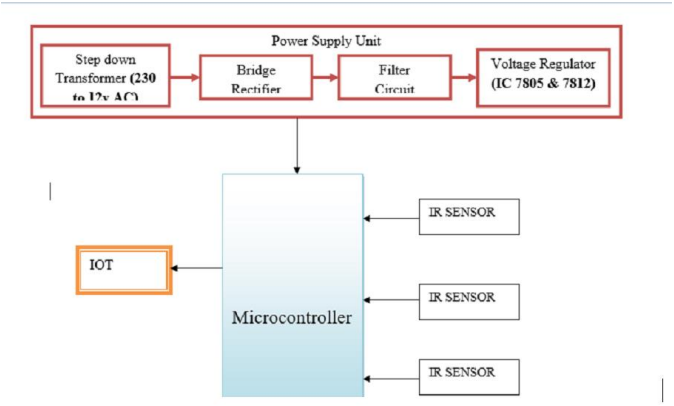
Abstract - *The current lifestyle of the peoples in the universe is totally changed from the start of human civilization. Nowadays the density of living peoples in urban area gradually increasing year by year. For this reason we are facing more like lack of natural resources, pollution, traffic etc. Here we are noted the main problem towards parking in metro areas like Chennai, Bangalore, Mumbai, Delhi. When the people plan to travel somewhere within the cities first they are think about where to park our application. In today's world most of the problems are vanished by technology. So that we are trying to solve the parking problem in metro cities using mobile application. Here we are using combined Internet of Things and Mobile Application to solve the parking problem. Initially location of the parking station in metro cities show to the user using Geographical Positioning System (GPS). When user picks the particular parking station the availability of the car parking places in that station will be show to the user. These are all done by using Internet of Things (IOT) like the availability of the places in particular parking station will uploaded to the server automatically so that the user can get the updated availability of the parking place. Finally when the user picks the particular parking place using pre-payment it will automatically booked to the user while automatically updated in the server. In the conclusion the difficulty to find out the parking station and availability of places at that particular station minimized using Technology. In future we are trying to implement this approach to all major cities in our nation. In the system we are using the location the car address in the particular location can be stored in the database in the system it can be used in the system and this system can be used in the particular location in the system they can be used in the location and the system can be used in the particular location and it can be used in the system.*

1.INTRODUCTION

In recent times the concept of smart cities have gained grate popularity. Thanks to the evolution of Internet of things the idea of smart city now seems to be achievable. Consistent efforts are being made in the field of IoT in order to maximize the productivity and reliability of urban infrastructure. Problems such as, traffic congestion, limited car parking facilities and road safety are being addressed by IoT. In this paper, we present an IoT based cloud integrated smart parking system. The proposed Smart Parking system consists of an on-site deployment of an IoT module that is used to monitor and signalize the state of availability of each single parking space. A mobile application is also provided that allows an end user to check the availability of parking space and book a parking slot accordingly. The paper also describes a high-level view of the system architecture. Towards the end, the paper discusses the working of the system in form of a use case that proves the correctness of the proposed model. The cloud is updated according to the availability of parking area. The cloud service is administered by the admin but it can also be viewed by the user to check the availability. The third section of the paper is the user side. The user gets notified for the availability via SMS through GSM module. The user interacts with the cloud as well as parking area. The user gets the notification when the parking availability is full which saves the time for the user.

1.1 PROPOSED SYSTEM

The ideal of creating a Smart City is now becoming possible with the emergence of the Internet of Things. One of the key issues that smart cities relate to are car parking facilities. In present day cities finding an available parking spot is always difficult for drivers, and it tends to become harder with ever increasing number of private car users. This situation can be seen as an opportunity for smart cities to undertake actions in order enhance the efficiency their parking resources thus leading to reduction in searching times, traffic congestion and road accidents. Problems pertaining to parking and traffic congestion can be solved if the drivers can be informed in advance about the availability of parking spaces at and around their intended destination. Recent advances in creating low-cost, low-power embedded systems are helping developers to build new applications for Internet of Things.The smart parking system that we propose is implemented using a mobile application to the Android APP.IR Sensor detects means the slot is full.The IR sensor is not empty means the Parking is Empty.



1.2 BLOCK DIAGRAM

This block diagram explains the proposed system of how three systems are interconnected the sensor system, IOT, Hydroponics. In our proposed system the Microcontroller acts as the heart of the entire setup. we have used PIC16F877A microcontroller in our project set up since it has various advantages like the it has the serial port of communication so that there would be any overlapped information that is transmitted during a peak time of information transmission. It also has a built in setup for storage of data that is either transmitted or received. So there is no need for an external storage device for retrieving the data.IT also has the advantage of low maintenance and installation cost and is more suitable to be implied for the monitoring and controlling systems. It is more of like a plug and play device that is there is no possibility of corruption in files and data even in case of power interruption and incase of external disturbances

Here we have used the sensor system for the identification of changes in the parameters. Since sensor systems are more of delicate and can even sense small changes in the parameters more accurately than manual identification. In our proposed system we have used for sensor which include the water level sensor, PH sensor, Humidity sensor and temperature sensor. These sensors are interconnected with each other and performs accordingly with the changes in the parameters that are set in the microcontroller as the threshold value. When these minimal and ideal value for the growth of the plants values gets exceeded the corresponding output systems are operated accordingly.

The output systems include the exhaust fan when the temperature rises beyond the ideal value the alarm becomes On and the exhaust fan also ON. Similarly the when the humidity also decrease or increase the threshold value then the exhaust fan ON and the alarm ON. When the ideal PH value is deviated then the PH poor message is thrown to the mobile and alarm ON then the water is changed by removing the water into fish tank(aquaculture)which can again be reused for other cultivation.

2. HARDWARE DESCRIPTION:

MICROCONTROLLER

A microcontroller (MCU for microcontroller unit) is a small computer on a single metal-oxide-semiconductor (MOS) integrated circuit (IC) chip. A microcontroller contains one or more CPUs (processocores) along with memory and programmable input/output peripherals. Program memory in the form of ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips. In modern terminology, a microcontroller is similar to, but less sophisticated than, a system on a chip (SoC). SoC may include a microcontroller as one of its components, but usually integrates it with advanced peripherals like graphics processing unit (GPU), Wi-Fi module, or one or more coprocessors.

. IR SENSORS

An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment. Infrared radiation was accidentally discovered by an astronomer named William Herchel in 1800. While measuring the temperature of each color of light (separated by a prism), he noticed that the temperature just beyond the red light was highest. IR is invisible to the human eye, as its wavelength is longer than that of visible light (though it is still on the same electromagnetic spectrum). Anything that emits heat (everything that has a temperature above around five degrees Kelvin) gives off infrared radiation.

ESP8266

The ESP8266 is a low-cost Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability, produced by Espressif Systems in Shanghai, China.

The chip first came to the attention of Western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands.

The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing the building of single-chip devices capable of connecting to Wi-Fi.[4]
These microcontroller chips have been succeeded by the ESP32 family of devices, including the pin-compatible ESP32-C3

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Three different soil test meters in one device; Measures moisture, pH/Acidity, and light.100% Accuracy; Easy to read moisture, pH and light levels; Perfect monitor for growing healthy plants.Takes the guesswork out of gardening; Know exactly when to water, amend your soil or adjust lighting.

2.1 SOFTWARE DESCRIPTION

Arduino IDE:
The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards .

EMBEDDED C LANGUAGE:
Embedded software is computer software, written to control machines or devices that are not typically thought of as computers, commonly known as embedded systems. It is typically specialized for the particular hardware that it runs on and has time and memory constraints. This term is sometimes used interchangeably with firmware.
A precise and stable characteristic feature is that no or not all functions of embedded software are initiated/controlled via a human interface, but through machine-interfaces instead.

ANDROID STUDIO
Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development available. It is for download on Windows, macOS and Linux based operating systems or as a subscription-based service in 2020. It is a replacement for the Eclipse Android Development Tools (E-ADT) as the primary IDE for native Android application development.
Android Studio was announced on May 16, 2013 at the Google I/O conference. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0

JAVA
Java is a class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible. It is a general-purpose programming language intended to let application developers write once, run anywhere (WORA), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. Java applications are typically compiled to bytecode that can run on any Java virtual machine (JVM) regardless of the underlying computer architecture. The syntax of Java is similar to C and C++, but has fewer low-level facilities than either of them. The Java runtime provides dynamic capabilities (such as reflection and runtime code modification) that are typically not available in traditional compiled languages. As of 2019, Java was one of the most popular programming languages in use according to GitHub, particularly for client-server web applications, with a reported 9 million developers.

Xml
Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. The World Wide Web Consortium's XML 1.0 Specification[2] of 1998[3] and several other related specifications[4]—all of them free open standards—define XML .

3.METHODOLOGIES

The ideal of creating a Smart City is now becoming possible with the emergence of the Internet of Things. One of the key issues that smart cities relate to are car parking facilities. In present day cities finding an available parking spot is always difficult for drivers, and it tends to become harder with ever increasing number of private car users. This situation can be seen as an opportunity for smart cities to undertake actions in order enhance the efficiency their parking resources thus leading to reduction in searching times, traffic congestion and road accidents. Problems pertaining to parking and traffic congestion can be solved if the drivers can be informed in advance about the availability of parking spaces at and around their intended destination. Recent advances in creating low-cost, low-power embedded systems are helping developers to build new applications for Internet of Things. The smart parking system that we propose is implemented using a mobile application to the Android APP.IR Sensor detects means the slot is full. The IR sensor is not empty means the Parking is Empty.

There methodologies involved in our system cloud system.

Cloud computing system:

Cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases, networking, and software.
Rather than keeping files on a proprietary hard drive or local storage device, cloud-based storage makes it possible to save them to a remote database. As long as an electronic device has access to the web, it has access to the data and the software programs to run it.

4.APPLICATIONS

1.Smart home.
2.Wearables.
3.Smart City.
4.Smart Grid.
5.Industrial internet.
6.Connect Car.
7.Connected Health.

5.SIMULATED OUTPUT/IMPLEMETATION

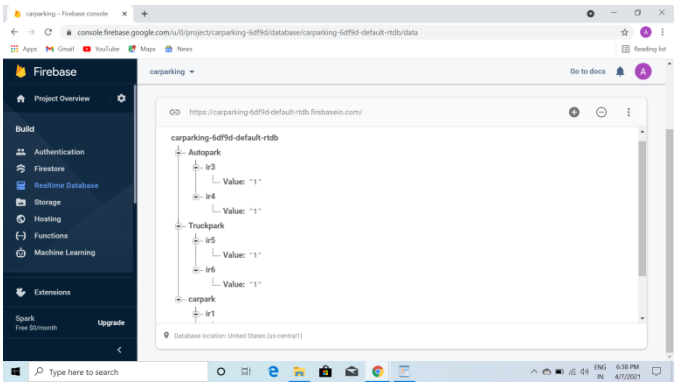

Chart -1:FIREBASE CONSOLE

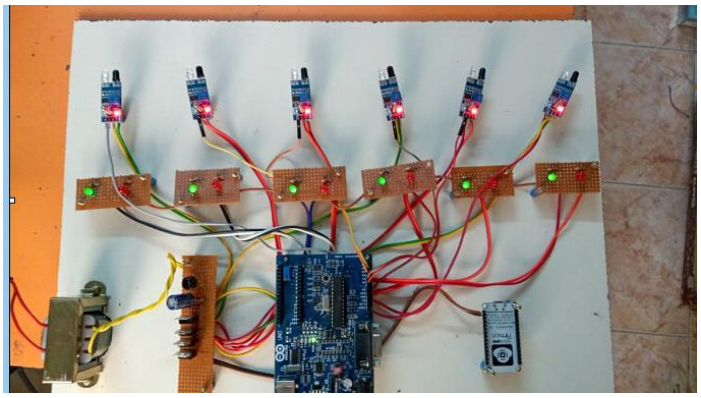

Fig -1: Final Implementation

6. CONCLUSIONS

The smart parking system based on IoT concept has been implemented using various sensor circuitry and cloud (server). It is an efficient system for car parking which prevails traffic congestion. This work is further extended as smart car parking system with automatic billing
system also fully automated system using multilayer parking method. Safety measures such as vehicle no. tracing, driver face recognition. Also care has taken so that there is no malfunction of wrong vehicle entering into the allocated slot by providing an unique OTP to each person and ensuring the same person parks in the given slot.

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