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Automatic Smart Parking System Using Internet Of Things.

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ABSTRACT: Internet of Things (IOT) plays a vital role in connecting the surrounding environmental things to the network and made easy to access those un-internet things from any remote location. It's inevitable for the people to update with the growing technology. And generally people are facing problems on parking vehicles in parking slots in a city. In this project, we design a Smart Parking System (SPS) which enables the user to find the nearest parking area and gives availability of parking slots in that respective parking area. And it mainly focus on reducing the time in finding the parking lots and also it avoids the unnecessary travelling through filled parking lots in a parking area. Thus it reduces the fuel consumption which in turn reduces carbon footprints in an atmosphere.

I. INTRODUCTION:

Imagine a world where billions of objects can sense, communicate and share information, all interconnected over public or private Internet Protocol (IP) networks. These interconnected objects have data regularly collected, analyzed and used to initiate action, providing a wealth of intelligence for planning, management and decision making. This is the world of the Internet of Things (IOT). Internet of things common definition is defining as: Internet of things (IOT) is a network of physical objects. The internet is not only a network of computers, but it has evolved into a network of device of all type and sizes , vehicles, smart phones, home appliances, toys, cameras, medical instruments and industrial systems, animals, people, buildings, all connected ,all communicating & sharing information based on stipulated protocols in order to achieve smart reorganizations, positioning, tracing, safe & control & even personal real time online monitoring , online upgrade, process control & administration.

We define IOT into three categories as below:

Internet of things is an internet of three things: (1). People to people, (2) People to machine /things, (3) Things /machine to things /machine, Interacting through internet.

Internet of Things Vision: Internet of Things (IoT) is a concept and a paradigm that considers pervasive presence in the environment of a variety of things/objects that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications/services and reach common goals. In this context the research and development challenges to create a smart world are enormous. A world where the real, digital and the virtual are converging to create smart environments that make energy, transport, cities and many other areas more intelligent.

Internet of Things is refer to the general idea of things, especially everyday objects, that are readable, recognisable, locatable, addressable through information sensing device and/or controllable via the Internet, irrespective of the communication means (whether via RFID, wireless LAN, wide area networks, or other means). Everyday objects include not only the electronic devices we encounter or the products of higher technological development such as vehicles and equipment but things that we do not ordinarily think of as electronic at all such as food , clothing ,chair, animal, tree, water etc. Internet of Things is a new revolution of the Internet.

ENABLING TECHNOLOGIES

Internet of things (IoT) is a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.

With the Internet of Things the communication is extended via Internet to all the things that surround us. The Internet of Things is much more than machine to machine

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communication, wireless sensor networks, sensor networks , 2G/3G/4G,GSM,GPRS,RFID, WI-FI, GPS, microcontroller, microprocessor etc. These are considered as being the enabling technologies that make "Internet of Things" applications possible.

Enabling technologies for the Internet of Things are considered in and can be grouped into three categories: (1) technologies that enable "things" to acquire contextual information, (2) technologies that enable "things" to process contextual information, and (3) technologies to improve security and privacy. The first two

categories can be jointly understood as functional building blocks required building "intelligence" into "things", which are indeed the features that differentiate the IoT from the usual Internet. The third category is not a functional but rather a de facto requirement, without which the penetration of the IoT would be severely reduced.

There is a heterogeneous mix of communication technologies, which need to be adapted in order to address the needs of IoT applications such as energy efficiency, speed, security, and reliability. In this context, it is possible that the level of diversity will be scaled to a number a manageable connectivity technologies that address the needs of the IoT applications, are adopted by the market, they have already proved to be serviceable, supported by a strong technology alliance. Examples of standards in these categories include wired and wireless technologies like Ethernet, WI-FI, Bluetooth, ZigBee, GSM, and GPRS.

INTEROPERABILITY IN THE IOT:

IoT aims for integrating the physical world with the virtual world by using the Internet as the medium to communicate and exchange information. However, heterogeneity of underlying devices and communication technologies and interoperability in different layers, from communication and seam-less integration of devices to interoperability of data generated by the IoT resources, is a challenge for expanding generic IoT solutions to a global scale.

As for the IoT, future networks will continue to be heterogeneous, multi vendors, multi-services and largely distributed. Consequently, the risk of non interoperability will increase.Interoperability is: "the ability of two or more systems or components to exchange data and use information". This definition is interesting as provide many challenges on how to: • Get the information, • Exchange data, and • Use the information in understanding it and being able to process it. Different types of interoperability are technical interoperability, Syntactical Interoperability, Semantic Interoperability, Organizational Interoperability. A simple representation of interoperability is shown in figure

2.2. IOT APPLICATION AREAS

Potential applications of the IoT are numerous and diverse, permeating into practically all areas of every-day life of individuals, enterprises, and society as a whole. The IoT application covers "smart" environments/spaces in domains such as: Transportation, Building, City, Lifestyle, Retail, Agriculture, Factory, Supply chain, Emergency, Healthcare, User interaction, Culture and tourism, Environment and Energy. Below are some of the IOT applications.

A. IOsL (Internet of smart living):

Remote Control Appliances: Switching on and off remotely appliances to avoid accidents and save energy, Weather: Displays outdoor weather conditions such as humidity, temperature, pressure, wind speed and rain levels with ability to transmit data over long distances, Smart Home Appliances: Refrigerators with LCD screen telling what's inside, food that's about to expire, ingredients you need to buy and with all the information available on a Smartphone app. Washing machines allowing you to monitor the laundry remotely, and. Kitchen ranges with interface to a Smartphone app allowing remotely adjustable temperature control and monitoring the oven's self-cleaning feature, Safety Monitoring: cameras, and home alarm systems making people feel safe in their daily life at home, Intrusion Detection Systems: Detection of window and door openings and violations to prevent intruders, Energy and Water Use: Energy and water supply consumption monitoring to obtain advice on how to save cost and resources, & many more…

B. IOsC(Internet of smart cities):

Structural Health: Monitoring of vibrations and material conditions in buildings, bridges and historical monuments, Lightning: intelligent and weather adaptive lighting in street lights, Safety: Digital video monitoring, fire control management, public announcement systems, Transportation: Smart Roads and Intelligent High ways with warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams, Smart Parking: Real-time monitoring of parking spaces availability in the city making residents able to identify and reserve the closest available spaces, Waste Management: Detection of rubbish levels in containers to optimize the trash collection routes. Garbage cans and recycle bins with RFID tags

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allow the sanitation staff to see when garbage has been put out.

PROPOSED SYSTEM:

A vehicle parking system that helps drivers find a vacant spot. Using sensors in each parking space that detect the presence or absence of a vehicle, signs direct incoming drivers to available locations. With the Smart Park system, the garages close only at 99% occupancy.

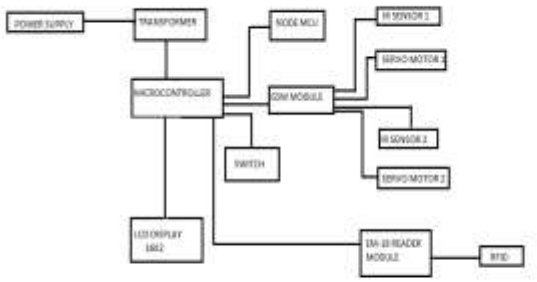

Fig. Block diagram of smart car parking system

TYPES OF PARKING:

 Angle Parking: In this type of parking, cars are parked at an angle

 Perpendicular Parking: This type of parking is common in parking lots, where
people park their cars for a longer duration

 Parallel Parking

 Illegal Parking

 Lot Parking

 Bay Parking

 Between two Vehicles

WORKING OPERATION:

Blynk is a Platform with IOS and Android apps to control Node MCU, Raspberry Pi and the likes over the Internet. It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. Home Automation Using BLYNK App

SOFTWARE ANALYSIS:

Compilers are programs used to convert a High Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors. I.E the programs written in one of the HLL like 'C' will compile the code to run on the system for a particular processor like x86 (underlying microprocessor in the computer). For example compilers for Dos platform is different from the Compilers for Unix platform So if one wants to define a compiler then compiler is a program that translates source code into object code.

BLYNK APP:

Blynk is an internet of things platform which allows controlling electronic devices remotely using its iOS and android apps. It provides dashboard by which Support for the Philips 8xC750, 8xC751, and 8xC752 limited instruction sets, Support for the Infineon 80C517 arithmetic un

BLYNK APP PROGRAM CODING:

```
#define BLYNK_PRINT Serial
#include<SPI.h>
#include<Ethernet.h>
#include<BlynkSimpleEthernet.h>
charauth[] =""; // Write your Blynk project key here
WidgetLEDled1(V1); // Virtual LED to show status on App
WidgetLEDled2(V2);
intsensor1=2; // IR Sensors
intsensor2=1;
voidsetup()
{
Serial.begin(9600);
Blynk.begin(auth); // Starting Blynk server and connecting to the cloud
pinMode(sensor2,INPUT);// Setting sensors to input
pinMode(sensor1,INPUT);
while (Blynk.connect() ==false) {
// Wait until connected
}
}
voidloop() {
intsensorval1=digitalRead(sensor1); // Saving Values os sensors
intsensorval2=digitalRead(sensor2);
29
Serial.println(sensorval1); // printing values
Serial.println(sensorval2);
delay(1000);
led1.on(); // Setting virtual led on the app
}
if (sensorval1==1)
{
led2.on();
}
if (sensorval2==1)
{
```

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```
led1.off();
}
if (sensorval1==0)
{
led2.off();
}
if (sensorval2==0)
{
Blynk.run();
}
```

HARDWARE REQUIREMENTS :

POWER SUPPLY
MICROCONTROLLER
LIQUID CRYSTAL DISPLAY (LCD
GSM MODEM
UART RELAY
L293 Motor Driver and H-Bridges
IR SENSOR
READER MODULE

HARDWARE KIT:

II. CONCLUSION:

This designed automatic smart parking system which is simple, economic and provides effective solution to reduce carbon footprints in the atmosphere. It is well managed to access and map the status of parking slots from any remote location through web browser. Thus it reduces the risk of finding the parking slots in any parking area and also it eliminates unnecessary travelling of vehicles across the filled parking slots in a city. So it reduces time and it is cost effective also.

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