IoT based Parking Space Detection

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ABSTRACT

As many of the issues and challenges are upcoming to manage a smart city all over the world, in which Parking Space Detection is one of them. To overcome this many of the applications are emerged, as one of them is IoT . To control all the appliances around us we need modified version of every aspect, and most importantly we need to focus on security issues also or else the applications are not controlled conveniently. Connectivity also leads to an issue because it becomes a problem when the network is not present at the place when required, which can lead to a havoc to some extent. The sensors used in the project are for interference of various devices which gives the end results.

Index Terms-- *Information dissemination, smart system, Embedded System, Internet services, RF identification*

I. INTRODUCTION

In this project the main aim of the module is to measure the distance for parking the vehicles. The vehicles may be small or large depending upon their functionalities and the distance between them can be measured accordingly. There are various kinds of sensors with low cost and accuracy which have high speed also which are used in this project to determine the distance ie, ultrasonic sensor which has an esp enabled chip in it, which is of low cost and easily available. Ultrasonic sensors are both used in air and water. The main aim of the system is to make the problem of parking space detection at an ease.

Distance measurement of an vehicle is done through various other methods also such as using robotics movement, medical applications etc. In this paper parking space using ultrasonic sensor and ESp chip is presented.

1. INTERNET OF THINGS

IoT stands for internet of things. It completely depends on three points: 1) sensors and actuators, 2) connectivity and 3) people and processes. The Internet of Things comes up with the internet connectivity more in comparison to various gadgets like electronic mobile phones, desktops and laptops and many more things in day to day life and it uses the technology Embedded to have communication and exchange of information with the people around us. In the today scenario we are having atleast more than 15 billion devices connected through internet and many of the researchers have estimated a reach of 20 times more than the today's current rate. The demand for internet of things as a technology is growing day by day and is expected to be installed by 2020.

2. IMPLEMENTATION

The systems presented in this paper consist of some of the components which are: NodeMCU, ESP8266, Ultrasonic sensor. The data using these sensors is gathered to get the analog signals. The analog to digital convertor convert the signal into the digital format, which are further send to the esp chip embedded into ESP8266 wifi module and further communication is done which sends an information after detecting parking space parameters onto the cloud. This is done through coding. Formulated coding style is generated through Embedded-C and using the Arduino to simulate the code.

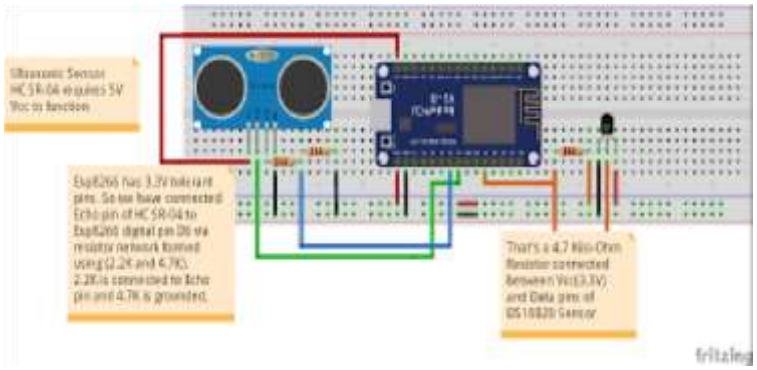

Fig I : Block diagram of parking space detection

3. THINGSPEAK

IoT platform which is a open platform, it can store and recover back data from actuators using wireless technology.

The Arduino Uno is a real time embedded device. It supports all embedded languages to perform. It has a drawback of less source utilization. Its tiny size is sometimes a key point to sale and have access control. It is useful in every embedded processing where devices the voice recognition, interfacing, automating low resolution imaging is used. It provides high deal with power and large buffer size.

Esp8266 is a wifi module which is used for transmission and receiver of data, accepts the input command and processes them. It is interfaced by 2 wires only (Transmitter/Receiver) to communicate in between the wifi module and microcontroller. The AT commands are used to connect to wifi networks and other many connections. All we need to get the data is to connect the ESP8266 to microcontroller.

a) SENSOR

The sensors are the devices which detects any of the events or changes at any place, and then responds accordingly. The most important feature of a sensor is that it is precise, resolved linear and has speed to detect any action. Sensors output can be improved sensors performance. So they should be removed. Structural outputs can be generated by calculating difference between sensors measured output and actual output. In this project also sensors the actions and generate the space for parking space detection without falling to get the errors.

1) ***Nodemcu:*** It is an open source platform. The term ”NODEMCU” refers to the computer code rather than the other kits. It includes computer code which runs on the ESP8266 wifi module and hardware which completely depends upon Esp 12 module. The computer code uses the Lua, C, C++ languages. In this paper the nodemcu checks for the input of data from Esp8266 in digital form, which further let the user to have access to the parking spaces accessed by the consumers or the individual can have the information about his own vehicle security. The data thus collected gets saved on the database which keeps a record of all the actions happened during the procedure.

2) ***Ultrasonic Sensor:*** It measures the distance of any obstacle coming in its way at a distance defined by the user. It can lead to the security of the vehicle and owner space. High frequency waves are generated to produce patterns of the action. Ultrasonic sound vibrates at a frequency which is much higher than the human hearing. Transducers are used to send and receive the ultrasonic sound. The time lapse between the sending and receiving the ultrasonic pulse is determined by the sensor.

b) Starting with ThingSpeak

Getting Started :

*we have to log in to get registered to access account in Thing Speak

*Afterwards generate a new space to save data from sensors Thing Speak is having 'updation of any status feild' to send extra important points required on the page.

*we should mention the names of the feild: pH, Temperature. If you have selected option 'public', other people will be able to see your data.

*Then all the credidentials are saved in the channel. An API key will be generated.

Sending data to Thing Speak channel:

An http server is generated through the internet connection which is a developer tool ie., CHROME POSTER. The content which is to be posted in the thing speak is copied with the API key and URL provided by the developer tool.

The data is kept in the pH field by clicking on post. If the status update is satisfied then the API key will be in 'OK' state. We can keep updating the values and the and the status window will update the values and show it to the user.

An option 'View Charts' creates the chart of the updated data in thing speak channel.

The access to our channel is shared through a code which is translated in Embedded-C.
The data which is extracted from various actuators are then updated in the thing speak channel, which takes place in real time basis.

4. RESULTS

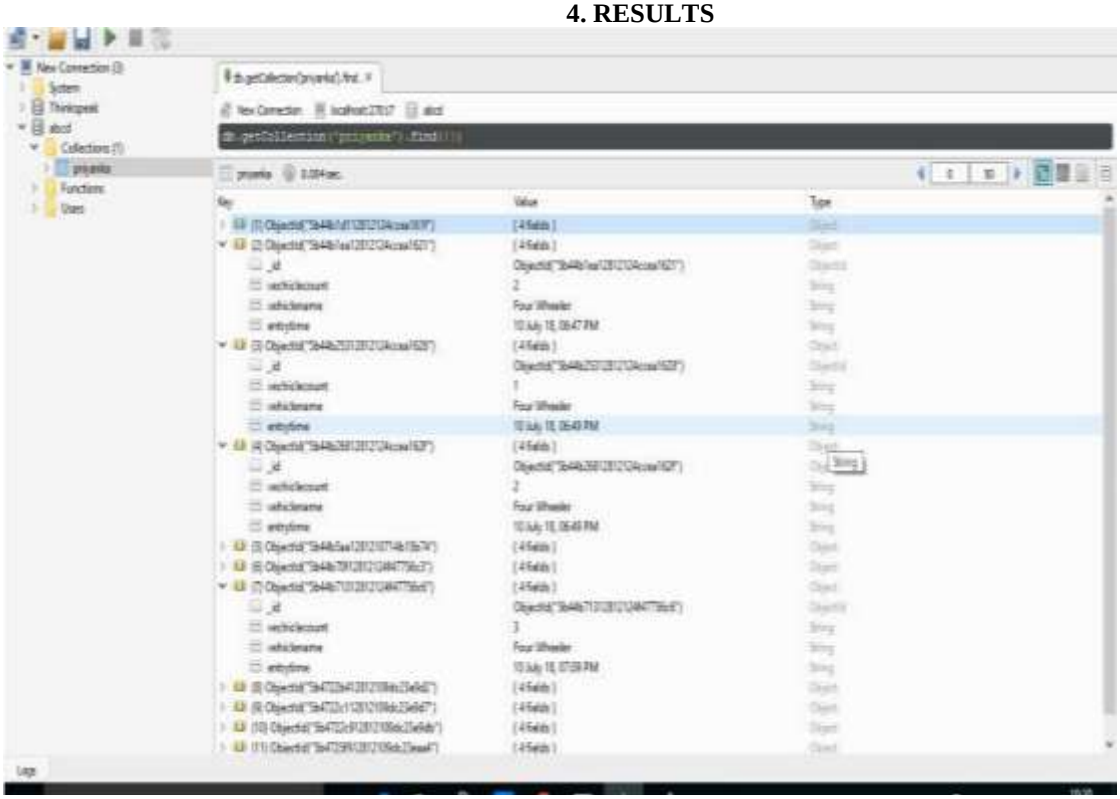

Fig II. Diagram showing results of database saved

5. CONCLUSION

In this paper, various sensors and cloud services have been used using their principle and the required output is acquired. The different applications are also designed in it to perform various functions with sensors. The working module of the proposed esp chip using ultrasonic sensor was profitably planned and executed.. The performance of the circuit was analysed for different conditions.

6. APPLICATION

This device is used to detect the parking space for vehicles and if any obstacle is there it gives a warning also.

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