

IoT based Parking System using Google

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Abstract— Today's world is of internet. Internet is a thing which is making our lives easier as well as faster. The use of smart phones has tremendous applications. The IoT (Internet of things) platforms allow us to connect the sensors with the internet. Hence using this we can implement many applications. The parking system is one of them. There are many problems not only in India but also in rest of the world because of unplanned parking. Hence we are trying to introduce a parking system based on IoT to make the travelling comfortable. The android applications are very user friendly interfaces can give better results for parking places although the Google maps are the key element of this system. From these maps not only user can locate the available spaces but also can find the direction for it. This system will show the efficient place for parking and it will also direct to reach there. This can reduce accidents as well as pollution.

Index terms: Internet of things (IoT), Google maps, Raspberry pi 3, Android App.

I. INTRODUCTION

The "Internet of things" (IoT) is becoming an increasingly growing topic of conversation both in the workplace and outside of it. It's a concept that not only has the potential to impact how we live but also how we work. But what exactly is the "Internet of things" and what impact is it going to have on you, if any? There are a lot of complexities around the "Internet of things" but it is necessary to stick to the basics. Lots of technical and policy-related conversations are being had but many people are still just trying to grasp the foundation of what the heck these conversations are about. The Internet of Things (IoT) is a computing concept that describes a future where every day physical objects will be connected to the Internet and be able to identify themselves to other devices. The term is closely identified with RFID as the method of communication, although it

someone don't find the right place for parking, so it may get resulted into frustration. This type of situations may increase accidents, pollution and also can wastes the valuable time of commuters. In the process of searching a parking place, driver has to slow down the speed of vehicles which increases the traffic. Many people avoid taking their own vehicles while going to market only because they fail to find a place for parking. Also the space finding process consumes lot of fuel. Hence to solve all these problems this paper will give a solution i.e. "IoT based parking system using Google maps".

II. DESIGN

The system which is implementing includes mainly three parts. One is sensor network which will continuously give the information about the availability of the parking places. Second part of the system will be the processing the data we are getting from the sensors and also the location of user requesting for the parking places and algorithm to find the nearest available vacant place. The last and most important part of our system is the user interface which will be the android application. This will be the user friendly application to find the parking place for them. Whenever user wants to search for the parking place, android application will help to find it.

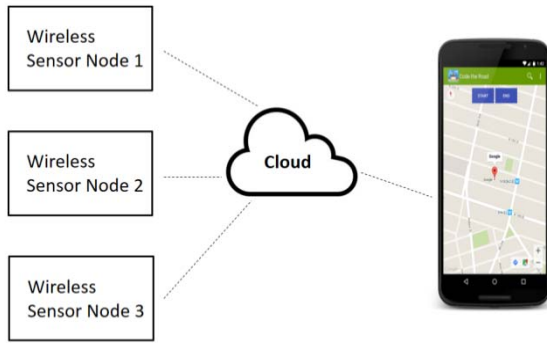


Fig.1 Overview of the system

III. IMPLEMENTATION

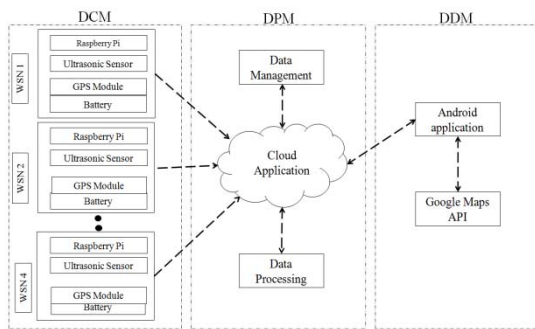


Fig.2 Block diagram

The project consists of three main modules.

1. Data Collection Module
2. Data Processing Module
3. Data Display Module

A. Data Collection Module:

This is the first module in our system. In this module, wireless sensor nodes are used to collect the data. Wireless sensor node consists of ultrasonic sensor, power supply, GPS module and Raspberry pi. At each place, this wireless sensor node is placed to detect the vehicle. Whenever there is a car in front of the node, it cuts the ultrasonic waves from the node and the waves get reflected back to the node indicating that there is a vehicle. These values are then uploaded on the cloud i.e. on Thingspeak.

B. Data Processing Module:

Next module is the data processing module. In this, Thingspeak gets the sensor values from the node and it processes it to display the graphs of availability and no availability of the places. Cloud finds the coordinates of the vacant places only and it sends that coordinates to Android application. The coordinates of vacant places are useful for the next module to display the vacant places on Android application.

C. Data Display Module:

This is the last and most important module in our system. This is the user interface module. Whatever we have done in last two modules, that module's output should be accessible to the user so that user can easily find the vacant places. Android application maps the values from the cloud with the Google map and it will display the user friendly information regarding vacant places.

The fig. 3 represents the structure of parking system. For this proposed system, it contains four slots. Each of the slots is having one wireless sensor node and one LED which indicates the place is available or not. When user enters into the parking area, LED indication will help to find the right parking slot.

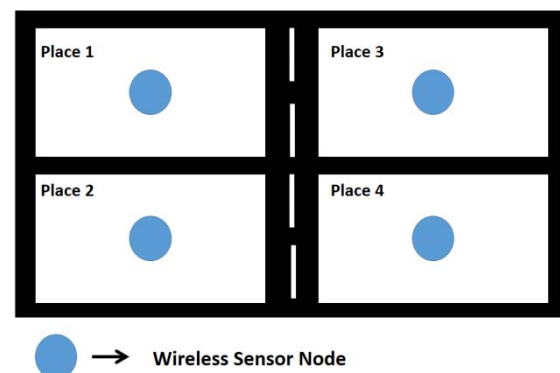


Fig.3 Parking area structure

When the availability of the parking place changes, immediately the information gets updated in the cloud, then user can access that information through internet from anywhere. This information also changes the status of LED which will be helpful for finding right slot at the parking place.

As Raspberry pi is a newly introduced device which operates with the operating system. Very less information sources are available on it.

IV. RESULTS

1. Proposed model:



Fig.4 Proposed model

2. Thingspeak result:

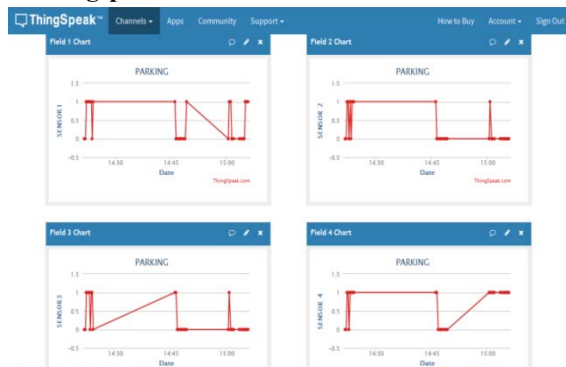


Fig.5 Thingspeak results

V. CONCLUSION

With the advancement in new technologies in embedded system like introduction of various microcontrollers and evolution of new domain 'Internet of Things', it is feasible to have a system which can resolve the problem of parking of two wheelers or four wheelers in crowded areas. With this system, user will come to know about the parking availability by using our android application. The users across the globe can take the benefit from this

system. Hence, this system will overcome the problems of time consumption, wastage of fuel etc.

REFERENCES

- [1] L. Mainetti, L. Palano, L. Patrono, M. L. Stefanizzi, and R. Vergallo, "Integration of RFID and WSN technologies in a smart parking system", in *Proc. 22nd Int. Conf. Softw., Telecommun. Comput. Netw. (SoftCOM)*, 2014, pp. 104110.
- [2] C. W. Hsu, M. H. Shih, H. Y. Huang, Y. C. Shiue, and S. C. Huang, "Verification of smart guiding system to search for parking space via DSRC communication", in *Proc. 12th Int. Conf. ITS Telecommun. (ITST)*, 2012, pp. 7781.
- [3] R. E. Barone, T. Giuffrè, S. M. Siniscalchi, M. A. Morgano, and G. Tesoriere, "Architecture for parking management in smart cities", *IET Intell. Transp. Syst.*, vol. 8, no. 5, pp. 445452, 2014.
- [4] Y. Geng and C. G. Cassandras, "New 'smart parking' system based on resource allocation and reservations," *IEEE Trans. Intell. Transp. Syst.*, vol. 14, no. 3, pp. 1129_1139, Sep. 2013.
- [5] <http://www.raspberrypi.org>
- [6] <http://www.thingspeak.com>
- [7] Prototype of an Underground Multi-Storied Automated Car Parking System 1 Eswaran.P, 2Manikandan AVM, 3Saurabh Godha 1,2,3Department of Electronics and Communication Engineering SRM University, Kancheepuram Dt., TamilNadu, 603203, India (eswaran.p@ktr.srmuniv.ac.in, manikandan.m@ktr.srmuniv.ac., ingodha89@gmail.com)
- [8] A Short Description of the History of Parking Garages, article by Nicole van Melsen, <http://www.parking-net.com/parking-industry-blog/a-short-description-of-the-history-of-parking-garages>.
- [9] <http://www.pythonteam.webs.com>
- [10] <https://developer.android.com/studio/index.html>
- [11] https://www.sparkfun.com/datasheets/GPS/Modules/LS20030~3_datasheet_v1.2.pdf
- [12] <https://www.raspberrypi.org/forums/viewtopic.php?f=63&t=62519>
- [13] <https://developers.google.com/maps/documentation/android-api/>
- [14] <https://www.youtube.com/watch?v=SbKkR57wpcY>
- [15] <https://www.raspberrypi.org/documentation/installation/installing-images/>