



INTELLIGENCE CAR PARKING SYSTEM USING INTERNET OF THINGS

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Abstract: Car parking is a major problem in urban areas in developed and additionally in developing countries. The growing range of vehicles creates a problem with parking spaces mainly in the city center and the surrounding streets. Current parking lot management is depends on either human personnel keeping track of the available car park spaces or a sensor based system that monitors the availability of every parking lot area or the general range of accessible parking lot areas. In both situations, the knowledge available was only the entire number of parking lot spaces available and not the particular location available. In addition, the installation and maintenance cost of a sensor based system depends on the amount of sensors utilized in a parking lot. This paper shows a vision based system that's ready to detect and indicate the available parking spaces during a parking lot. The methods utilized to detect available parking lot spaces were supported coordinates to point the regions of interest and a car classifier.

Keywords: Parking System, Ultrasonic Sensor, QR Code (Quick Response Code), IoT (Internet of Things)

I. INTRODUCTION

In this age of technology, we are working in a way to reduce our effort in every possible ways and the introduction of the IoT platform have further broadened the scope of this possibility in our everyday lives. One of the major problems that we are facing in today's over populated society is finding available parking lots in various public places like hospitals, office shopping malls, cinema halls, courts, schools and colleges. The process for searching the free parking space is time consuming and also wastage of fuel. Most of the times the parking spaces remain unoccupied, however the total occupancy is low because of bad management of parking lot. This causes ineffective use of the parking area and also results in traffic jams and congestion near the parking lots.

To properly manage the parking lot and display each parking division's information to the drivers before entering the parking lot have become an important issue to be resolved. In this paper, a system is proposed that will detect the total number of available parking spaces and displays the information to the drivers so that they can easily parked their cars. The QR Code is generated using python and it is displayed at the front. The user scans the QR code with the QR code scanner using a mobile. On Scanning the QR code, an image is displayed showing the level in which the parking slot is available and the number of the parking slot. Making it easy for the user to park by give all instructions about navigation to reach the parking. The status of the parking lot is updated whenever a car enters or leaves the parking lot.

II. LITERATURE REVIEW

Previous work on car parking system has been dependent on either human personnel keeping track of the available car park spaces or a sensor based system that monitors the availability of each car park lots or the overall number of available car park lots. **Antoine Bagula, ElMouatezbillahKarbab, JjamelDjenouri and SaharBoulkaboul (2016) [1]**, the author has developed s smart parking system based on the use of hybrid wireless sensors (infrared sensors + RFID), which form a cluster-tree structure. Each of them is equipped with three LED lights to control and manage the availability of parking spaces. This proposed system consists of four essential modules that are the, the input module, the output module, online booking module and the parking management module.

Harmeet Singh, Chetan Anand, Vinay Kumar and Ankit Sharma (2016) [2], the author uses the user mobile's Bluetooth for identification and registration. The vehicle is moves to the parking location with the help of a rack and pinion mechanism for linear motion. It automatically detects the unique registration number stored in the Bluetooth chip to check if the new vehicle is to be parked.



Sujata Kulkarni, Aniket Gupta, Vaibhavi Jathar, Ved Sharma and Naman Jain (2017) [3], To alleviate the aforementioned problem, authors proposed a Smart Parking Management System that helps users to automatically find a free parking space with a smaller amount. Smart Parking system involves use of Ultrasonic sensor, Arduino Uno, Wi-Fi Module, Cloud server. IoT based new parking system enable to connect, analyze and automate data gathered from IoT devices and execute smart parking possible. Smart parking system would enable vehicle occupancy, monitoring and managing of available parking lots in real-time that reducing the environmental pollution.

ManjushaPatil, Vasant N and Bhonge (2018) [4], Proposes a paper which works with passive radio frequency identification (RFID) tags which helps identifying individual cars and then booking a slot at the entrance. The author presents an idea to use wide angle camera with the sensor which will read only free parking spaces and records them. Electronic toll collection (ETC) and Intelligent Transport System (ITS) using optical character recognition (OCR) makes a record for all entering vehicle.

III. MODULES

A. Parking Slot Sensing

Use an ultrasonic sensor to notice the parking slot is empty or not. It emits an ultrasound at 40 000 Hz that travels through the air and if there's an object or obstacle on its path It will bounce back to the module. Considering the travel time and the speed of the sound we can calculate the distance between the sensors and object.

B. Controller And Gui

Arduino kit will collect the sensor readings from all the parking slots and assembles them into a encoded string. The encoded string will be in this format "sen1:sen2:sen3:sen4". A graphical user interface is developed using python tkinter package for providing easy access to the user. GUI is equipped with INIT, READ and CLOSE buttons and with parking slots update Labels. By selecting INIT button the Arduino serial port is bridged with python adaptor by using pyserial package. Based on the decoded string , the empty parking slots are identified and GUI Label will be updated as '-' and the occupied slots are marked with '*'.

C. QR Code Generation

The decode string is analyzed to find the shortest opening parking slot nearby to the entrance. Qrcode is a third party package which can be installed inside python using "pip install Qrcode" command. Based on the shortest opening slot the Qrcode for mapping that parking slot will be generated using qrmake function. The QR code consists of the 2d animated URL link of that particular slot from entrance. Once that slot is filled it will be immediately reflected in the QR code screen, to convert the Qrcode into a visible image opencv python package is used.

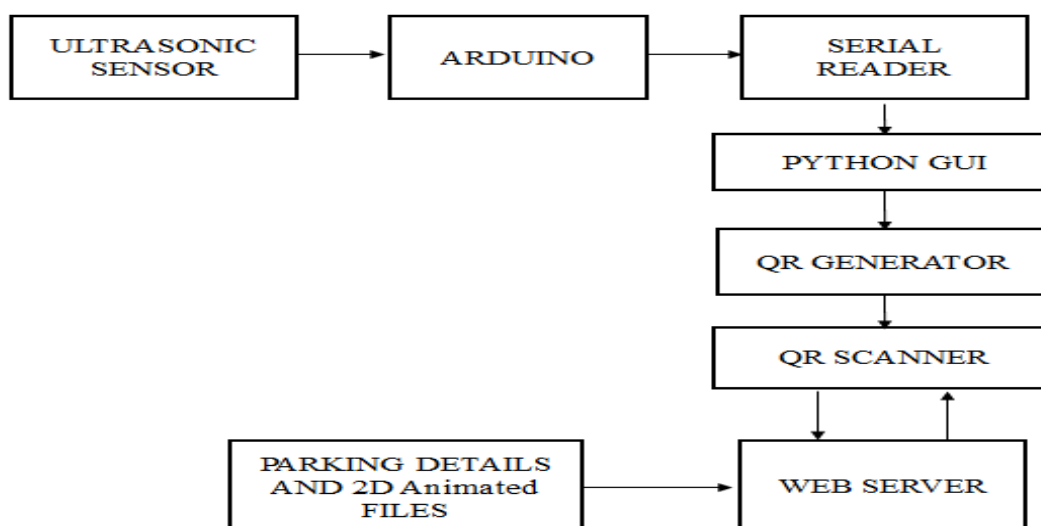


Fig .1 Architecture Diagram



D. Qr Code Scanning And Visual Path Positioning

The QRcode displayed in the entrance monitor will be scanned through mobile QR scanner and the encoded URL from the display will be opened in the user mobile window. The URL is already equipped with parking details and 2D animated files of the indoor map of parking slots. Instead of URL “No parking available” message will be displayed in case of the entire slot is filled.

IV. EXISTING SYSTEM

The existing system use of networks of wireless sensors whose nodes are infrared-Sensors that helps to detect the presence of cars in parking spaces. The monitoring module consists of a liquid-crystal display (LCD) and a peripheral interface controller (PIC) microcontroller which controls the data detected by the infrared sensor. Once the sensor detects the presence of a car, it informs the microcontroller, to display the status of this parking space on the LCD board. This system does not deal with the guiding of vehicle and GPS based car parking system is not efficient for indoors.

V. PROPOSED SYSTEM

The problems of existing system can be overcome by proposed system where gives a simpler way for parking. The QR Code is generated using python interface and it is displayed at the barricade display. The user scans the QR code with the QR code scanner on a mobile which is connected to the internet. On Scanning the QR code, the code directs you to a webpage which shows an image, showing the level in which the parking slot is available and the number of the parking slot. This reduces the unwanted confusion and traffic in the parking slot. This parking system gives you the ease of parking your car in the parking slot by just following the direction to the parking available in the parking slot.

VI. CONCLUSION

The main objective of this system is to provide best solution to users to minimize the time spent in searching of parking lot, saving fuel consumption and help in reducing the traffic congestion and pollution. The future work may be carried out with camera, that can also be connected, and number plate detection mechanism can also be implemented to make the area safer in terms of security.

REFERENCES

- [1] ElMouatezbillahKarbab, Antoine Bagula, DjamelDjenouri and SaharBoulkaboul (2016) “Car Park Management with Networked WirelessSensors and Active RFID” World Journal of Engineering and Technology, 2014, 2, 55-67.
- [2] Harmeet Singh, ChetanAnand, Vinay Kumar, Ankit Sharma (2016), “Automated Parking System With Bluetooth Access”, International Journal Of Engineering And Computer Science ISSN:2319-7242
- [3] Sujata Kulkarni, Aniket Gupta, Vaibhavi Jathar, Ved Sharma and Naman Jain (2017) “Smart Car Parking Management System Using IoT” American Journal of Science, Engineering and Technology
- [4] Vasant N, ManjushaPatil and Bhonge (2018) “Wireless Sensor Network and RFID for Smart Parking System” International Journal of Emerging Technology and Advanced Engineering ISSN 2250-2459.
- [5] Pranav Kamble, Sujit Chandgude, Ketki Deshpande, Chetna Kumari and K. M. Gaikwad (2018). “smart parking system”. International Journal of Advance Research and Development. 3(4), 183-186 .
- [6] Siddharth Das (2019) “A Novel Parking Management System, for Smart Cities” Annual Computing and Communication Workshop and Conference
- [7] Qadir.,Z, F.AI-Turjman, and T.Nesimoglu (2018), “ZIGBEE based time and energy efficient smart parking system using IOT”. Mediterranean Microwave Symposium (MMS), 295-298 .