

Smart Car Parking System using Arduino

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Abstract - Car parking is a major issue in modern cities of today. There are too many vehicles on the road and not enough parking space. This has led to the need for efficient parking management systems. Thus we demonstrate the use of IOT based parking management system that allows for efficient parking space utilization. To demonstrate the concept we use IR sensors for sensing parking slot occupancy along with a DC motors to simulate as gate opener motors. We now use a Wi-Fi modem for internet connectivity and an AVR microcontroller for operating the system. The system detects if parking slots are occupied using IR sensors also it uses RFID technology to scan the RFID card of the vehicle to display the user name in the web page. The system reads the number of parking slots available and updates data to the cloud server to allow for checking parking slot availability online and also displays the shortest parking slot near to the user using Dijkstra's algorithm. This allows users to check for available parking spaces online.

Key Words: RFID, Car parking, IR sensors, Cloud, RFID reader, Micro-controller

1. INTRODUCTION

So many researches on traffic congestion analysis reveal that an estimated 70 per cent of all drivers currently on the road are searching for effective parking. This will intensify traffic congestion as the vehicles spend more time on the road. Drivers may also tend to drive at low speed when they are searching for a parking space. Researches in this area have found out that vehicles spend an average of 15 minutes looking for a parking space, travelling at an average of 10 mph and covers only half a mile in the meantime. The result is frequent traffic congestion. When the drivers are in search of a parking space the possibility for accidents increases as they give less attention to the road. A sophisticated car parking system can only solve these problems. That is why numerous research works are taking place in this area all around the world. Empty parking slot detection is the first phase of any smart parking system. The second phase is sharing this information to the drivers who are in search of parking lots. There are many methods used for detecting empty parking slots.

There are so many methods available for finding a parking slot in the parking lots, but most of them use a set of cameras to find the parking slot. They have their own drawbacks and it will cause trouble to the user while finding a slot, so to overcome this, this paper presents a new method to find the parking slot with the help of Internet of Things (IOT) technology. Internet of Things is a system of interrelated

computing devices, mechanical and digital machines are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction

2. Existing system

In the Existing System they use parking camera for detecting the number of available cars in the parking area using threshold optimizing technique in image processing. The camera send the information to the fog node, fog nodes process the pictures from multiple camera in order to identify the number of available parking slots. Fog nodes connect to cloud through proxy server and user can access the information using internet.

Fog nodes deployed at parking lots, cooperating with each other, enable real time parking slot information provisioning as well as parking requests processing. The cloud center will enforce global optimization on parking requests allocation. The experimental results of our approaches show higher efficiency compared with other parking strategies. The fog computing-based smart parking can lower the average parking cost and minimize gasoline wastes and vehicle exhaust emission. One main disadvantage of the existing system is the user will not know the shortest path available to the parking slots. For example, if there are slots 2 and 5 free and cloud will not update the shortest path available to the user and this may lead to high fuel consumption in search of the parking slot.

2.1 Disadvantages

The existing system will send the information from the cameras to fog nodes and it takes higher time for processing of these images. The user will not be aware of the shortest available parking slot in the parking space and also the user will not know are there any available parking slots in the parking space before entering. Resources such as fuel and time are wasted in search of the parking slot.

The search for the parking slot will also leads to accidents because the users will be less focusing on road while searching.

3. Proposed system

In this paper, we will make of micro-controller and this is used to process the instructions continuously in a loop. The user will first scan the RFID card using the RFID reader and

the webpage will update the user details and even before the user scans the RFID card, the web page will display is there any available parking slot or not. After updating the user details on web page, a DC motor is used to open the gate for the user.

Now the web page displays the available parking slots as well as the nearest parking slot to the user. IR sensors are used for the object detection in the paper and by object in this is the vehicle. As soon as the user parks the vehicle in the parking slot, the IR sensor will detect the object and forwards the information to the micro controller and the micro controller will process this information and update on the web page.

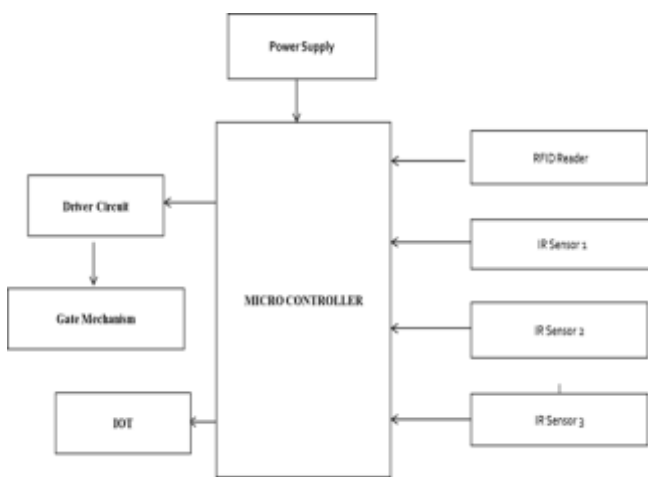


Figure 1. Block diagram of smart car parking system using Arduino

The web page will be updated for every few seconds and this helps to keep the information of the parking slot updated. Internet of Things is used for sending the web page from the micro controller to the cloud and IoT a system of interrelated computing devices, mechanical and digital machines are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

3.1 Advantages

The main advantage of this paper is, the user can easily find the nearest available parking slot with the help of shortest path detection. The safety will be highly increased as the web page displays the nearest parking slot and the user does not have to search for a slot. There will high changes in the pollution emitted from the vehicles.

Resources such as fuel and time of the user can be saved. The web page will display is there any parking slots available even before the user enters the parking space. There is no need of image processing in this and this means a lot of time can be saved.

4. Result obtained

The following pictures show the result obtained for the paper and each one of the pictures are described.



Figure 2. All the parking slots are empty and the nearest available slot is S1.



Figure 3. The slot 2 is filled and for the next user the web page displays S1 and S3 are free but S1 is near to you.



Figure 4. All slots are full and so the web page displays "All slots full".

5. Conclusion

In this paper, the available smart parking system is further enhanced by the help of VAN network and we can train the system using machine learning, Machine learning (ML) is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. A camera will be placed near the parking slot and the number plate of the car can be scanned by the camera and the system will recognize the vehicle using machine learning, so this will enhance system and reduce the time for parking vehicle.

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