Designing And Improving The Qos Of Wireless Network In Smart Parking System

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Abstract: In this modern society as the technology develops day by day technology gets into everyone's daily life. When a driver enters a parking structure, parking management cannot guarantee a parking place. Many times, a driver wastes time looking for a single open space. This results in wasted fuel, traffic congestion, and driver dissatisfaction. Car parking systems have traditionally lacked an intelligent monitoring system. Humans keep an eye on the parking spaces. An Arduino is used as a microcontroller to control the system. Solar panels are used to provide power for the system. This system helps a driver to reserve a parking space before he enters the building, provide certainty to the driver and eliminating the time needed to find a space. the IoT is inter-associating with real gadgets, automobiles (assigned to as linked gadgets and wise gadgets), apartments (guest parking slots separately), and alternative items linked with electronic components, programming, sensors, actuators, and chain comparability that are found out the gadgets to save and swap information. We are uploading data in the cloud (Thingspeak) so that the users can monitor whether the slots are free or not regularly.

Keywords: parking, reservation, Smart Car Parking, NodeMCU, Ultrasonic Sensor, IEEE 802.11e.

INTRODUCTION

Currently, when public transportation is unable to provide secure and comfortable service, personal transportation has become more than an option. When the cost of vehicles and motorcycles falls below a certain threshold, difficulties arise. One issue is the scarcity of parking spaces. Finding a parking spot in a big city during rush hour gets increasingly difficult. Parking on the roadside is no longer permitted due to the rapid increase in car traffic. A driver does not sure whether he will be able to find a parking spot when entering a parking structure or area.

He needs to locate an open parking spot. A driver may have to spend a lengthy time looking for a free parking spot. They are frequently disappointed since the parking lot are crowded. Many complaints from drivers have harmed the parking management's reputation. Most of the traffic in metropolitan areas is caused by an overabundance of vehicles, thus people waste time looking for places to park their vehicles. Another concern is pollution, which occurs while vehicles are looking for parking spots and the engine is running, resulting in waste fuel.

To extend support for LAN applications with Quality-of-Service needs by improving the present 802.11 MAC. Provide enhancements to the protocol's capabilities and efficiency. These advancements, combined with recent developments in 802.11a and 802.11b PHY capabilities, will improve overall system performance and broaden the 802.11 application space. Transport of speech, audio, and video across 802.11 wireless networks, video conferencing, and media stream distribution are all examples of uses.

The Internet of Things (IoT) is a progression of web connectivity toward physical objects and everyday phenomena.They are equipped with electrical components, internet connectivity, and a variety of sensor patterns. The above-mentioned devices can connect to the internet and access information, as well as be controlled and monitored remotely. The Internet of Things (IoT) connects real things, automation (also known as linked devices and smart devices), apartments, and other goods with electronics, software, sensors, actuators, and online connectivity that is formed by the above-mentioned objects to gather and exchange data. Tang (Tang, Zheng, & Cao, 2006) proposed using wireless sensors to monitor parking spaces. Noor Hazrin proposed utilising SMS and a mini–Remote Terminal Unit to create a smart parking system. Wang developed a parking system that allows drivers to reserve an available spot. The sensor was used to detect changes in the physical parking status to determine unoccupied spaces on a regular basis (Wang & He, 2011).

Piotr and Jaroslaw proposed using Unstructured Supplementary Service Data (USSD) to create a parking reservation system (Trusiewicz & Legierski, 2013). Rahayu presented an SMS-based parking reservation system for GSM users, complete with a password to enter and exit the parking lot (Rahayu & N. Mustapa, July 2013). K. Sushma et al. proposed using Short Message Service (SMS) and RFID to make parking reservations (Sushma, Babu, & Reddy, Sep-Oct 2013). In an urban setting, V. Venkateswaran presents an internet-based parking reservation system with a barrier gate control security system (Venkateswaran & Prakash, Feb. 2014). Karbab presented a car park management system based on networked wireless sensors and RFID (Singh, Anand, Kumar, & Sharma, May 2014). Patil proposed employing QR codes to streamline parking operations and reduce traffic caused by hunting for a parking spot (Patil & Sakore, Smart Parking System Based on Reservation, June 2014).

Annosha presented a shared memory car parking system (Annosha S, S., Sivambiga, & Soundarya, 2015). Singh identified the vehicle and registered parking using the driver's Bluetooth device (Karbab, Djenouri, Boulkaboul, & Bagula, 2015.
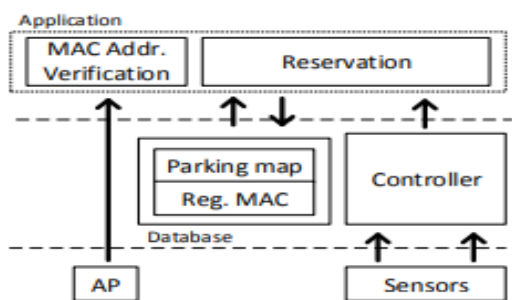
Architecture Working

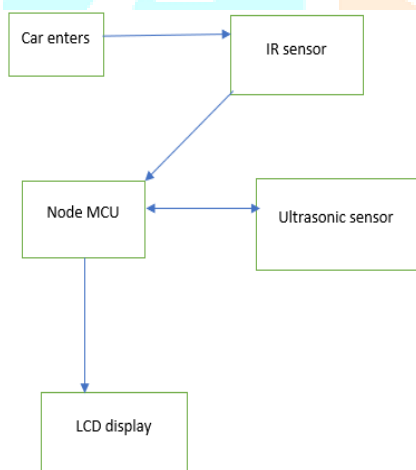
Figure1 Communications Network

Figure 2 working flow of project

As we have discussed the architecture in the above section as we consider the real-time the system by using a flow chart.
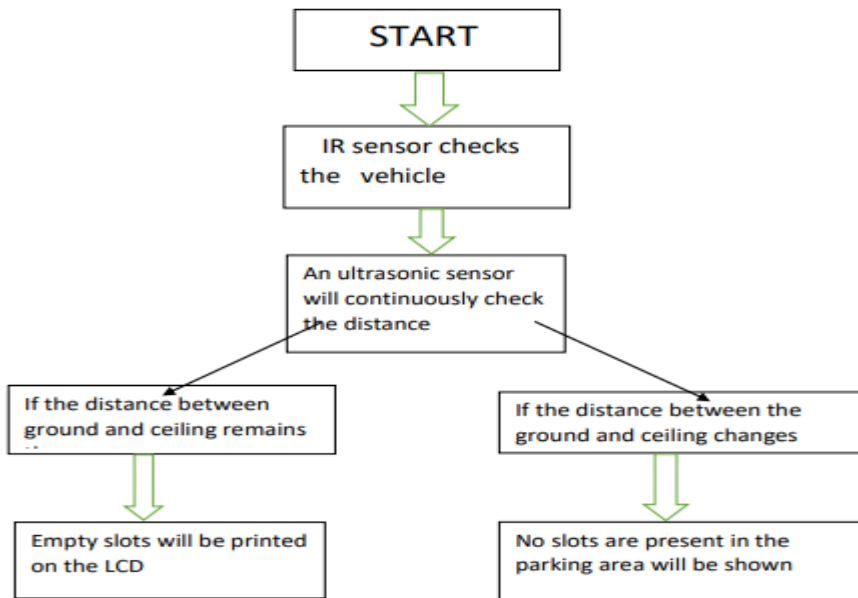
Figure 3 Flow chart

As we have discussed the architecture in the above section as we consider the real-time the system by using a flow chart.

Result And Discussion

The Node MCU features built-in WiFi, which allows it to communicate with mobile devices via a mobile application. It's a low-cost wifi-in-built chip that can be utilised for a variety of IoT applications.It is more powerful and less expensive than Arduino.

The car goes into the parking lot, and the IR sensor detects the vehicle.

The IR sensor transmits data to the Node MCU, and the Node MCU asks the Ultrasonic sensor for information about the region. he ultrasonic sensor in the parking space that continuously measures the distance between the ceiling and the ground. The message "which slot is empty on the display" appears on the LCD. If all slots are full, the LCD will show no empty slots.

The entrance barricade will now open, allowing the car to access the parking space. The barricade will automatically close once the car has passed through. When the car is parked in the slot the cloud will automatically save the data of that slot Whenever the car is taken out of the slot, the cloud will again notice the changes and saves the report.
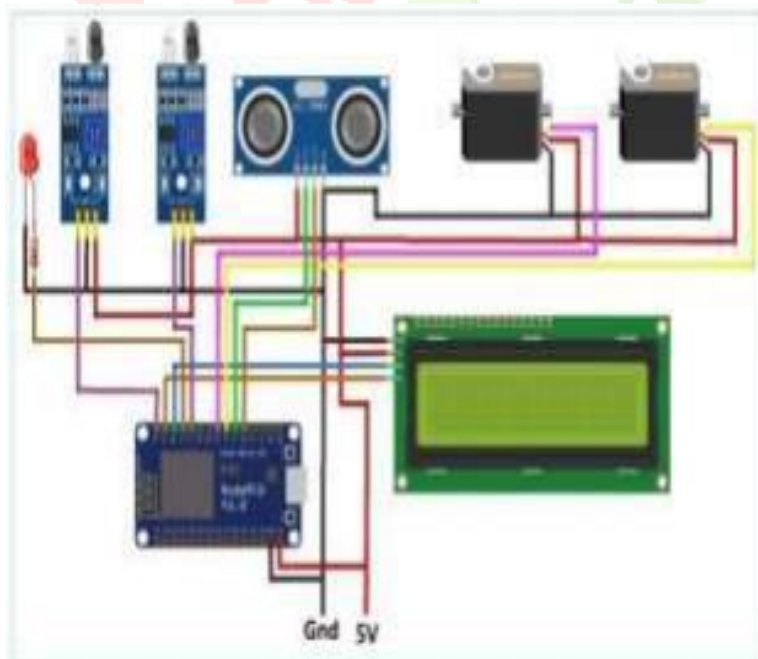

Figure 4 Proteus Diagram

It can be used to manage apps that are commonly pre-installed on other platforms such as Android and iOS. This approach satisfies the driver and keeps their daytime under control in the act of interest, providing maximum assistance by relieving tension in consideration of a pleasant parks place nearby and driving towards it. He can keep track of the authorised fine points as well as how the deposits process is handled on a regular basis. The fine points described above will be aggregated within the cloud index.
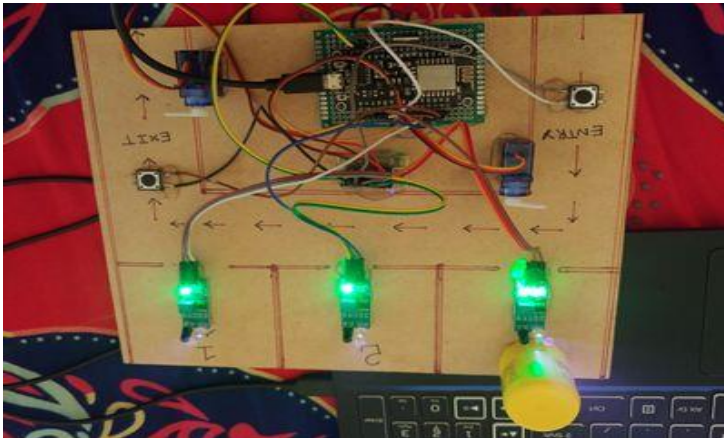

Figure 5 circuit in working conditions

The ultrasonic sensor in the parking space that continuously measures the distance between the ceiling and the ground. Apart from reducing the growth in exhaled vapour, there are currently no benefits identified for traffic pollution. The preservation of a certain unit of fuel appears to be a significant distinction between civilization and commerce. Observing traffic bottlenecks in addition to the benefits of IoT setup continue to provide a more resourceful city. Customers are driven towards large amounts as automated money transactions continue to redeem. Computerized banknotes, rather than printed paper money, may eventually replace the enormous quantity of papers mishandled. After all, paper slips are not used in the current ideology, and no attendant is used to collect slips.
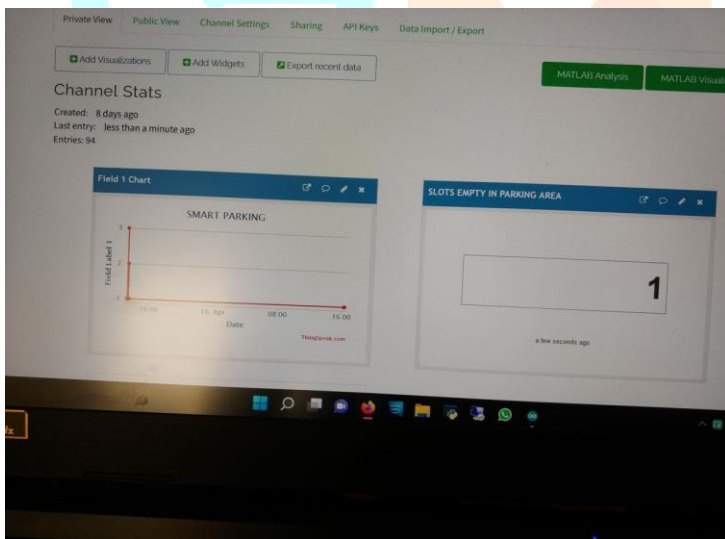

Figure 6 Thinks speak data handle

With the help of this initiative, we will be able to verify whether parking spaces are vacant or not on a regular basis. An infrared sensor detects vehicle arrival, and an ultrasonic sensor installed in parking slots detects whether the slot is full or unoccupied. If a slot becomes available, the data will be sent to the cloud (Thingspeak) so that officials can keep track of whether the slots are available on a routine basis.

Conclusion

The smart parking system will assist in reducing traffic by tracking the number of available spots for persons arriving in their vehicles. People who are going to park can experience more relaxed and decide what to do next as a result of this. The smart auto parking system is expected to be in high demand soon. The widespread use of standardised IEEE 802.11p, which has previously been thoroughly investigated, may also provide a dependable system for traffic infrastructure administrators, such as traffic signals, and fleets, such as emergency cars and construction site vehicles. Knowledge of traffic flow, accidents, roadworks, and other important circumstances and occurrences can potentially be made available in the local region in this manner. The development of smart parking systems within a city reduces the problem of pollution. Fuel-saving (According to a recent report, Smart Parking could save 2,20,000 gallons of gasoline by 2030 and around 3,00,000 gallons of gasoline by 2050). The proposal was excellent, as well as less expensive and more convenient.

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