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IOT Based Smart Parking And Weather Monitorin System

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Abstract:

Every car has to park somewhere, and as the population has grown, so have the number of cars on the road. Finding a parking spot in public spaces has become more difficult as the number of vehicles in cities has increased. Finding a parking space during peak hours is a significant issue in metro cities. Right now Because they don't know where the parking places are, drivers have trouble parking. I created a system using the Internet of Things (IOT), sensors, an At mega 328 microcontroller, and the Thinkspeak programme to solve this issue. In this study, we design a weather-monitored smart parking system that allows users to check parking availability before arriving at a specific parking area. The system also deals with monitoring environmental conditions like temperature, rain, humidity, air quality, etc. This technology will speed up the process of finding parking spaces and prevent needless travel through crowded lots when parking, which will minimize fuel use and, in turn, the amount of carbon dioxide in the atmosphere.

Keywords — Parking problem ,Internet of things , micro controller, cloud , weather inspection.

I INTRODUCTION:

As more people reside in metropolitan areas around the world, cities are now fully occupied, which has led to an increase in the number of automobiles there. According to a recent poll, the number of cars being used has increased by 7.64% annually. There is a significant parking issue as a result of the rise in car usage. Finding a parking space requires additional time from the driver. Finding a parking spot takes a lot of time, and the toxic gas emissions that are mistakenly released during that period have an impact on the environment. Monitoring parking is a crucial solution as a result. The parking issue might be solved if vehicles were informed in advance about the availability of parking spaces at their preferred location. This issue can be resolved by putting in place a system that gives information on parking space availability in a particular location as well as weather-related data for that location, such as temperature, humidity, air quality, light intensity, etc., and processes the data in real time to facilitate simple vehicle parking.

II. IMPLEMENTATION:

The sensors and Thinkspeak application are used to bring the suggested system into operation. The number of available parking space is found using infrared sensors and the Think speak application algorithm. Using the IR sensor and Think speak application, number of parking spaces in parking lot may be seen from anywhere in the world. First we connect arduino with Think speak application, after connecting arduino with Think speak application , sensors and servo motor are connected with ardui no . After the hardware connections, we are setting up the ESP 8266 Wi-Fi network connection, and then we create an account on the thinkspeak Platform. Now If the sensor is activated in the parking lots or near the parking lot (weather monitoring related sensor) , send the data to the thinkspeak cloud and update the status over IOT. The proposed system consist a gate, which open automatically when car is detected. If the parking lot is full ,no more cars are allowed to enter the parking lot. The parking availability and weather conditions of the parking lot displayed on the LCD , so that the user can see the status of parking zone.

III. BLOCK DIAGRAM:

Figure depicts the system's block diagram. The atmega 328 microcontroller, esp8266 Wi-Fi module, and ThingSpeak application are used to construct this system. The parking spaces may be watched from anywhere in the world using the esp8266 Wi-Fi module and ThingSpeak programme. Additionally, we are going to build an Internet of Things (IoT) based weather monitoring system using an Arduino that will provide real-time weather status reports for the parking area, including temperature, humidity, air quality, light intensity, etc.

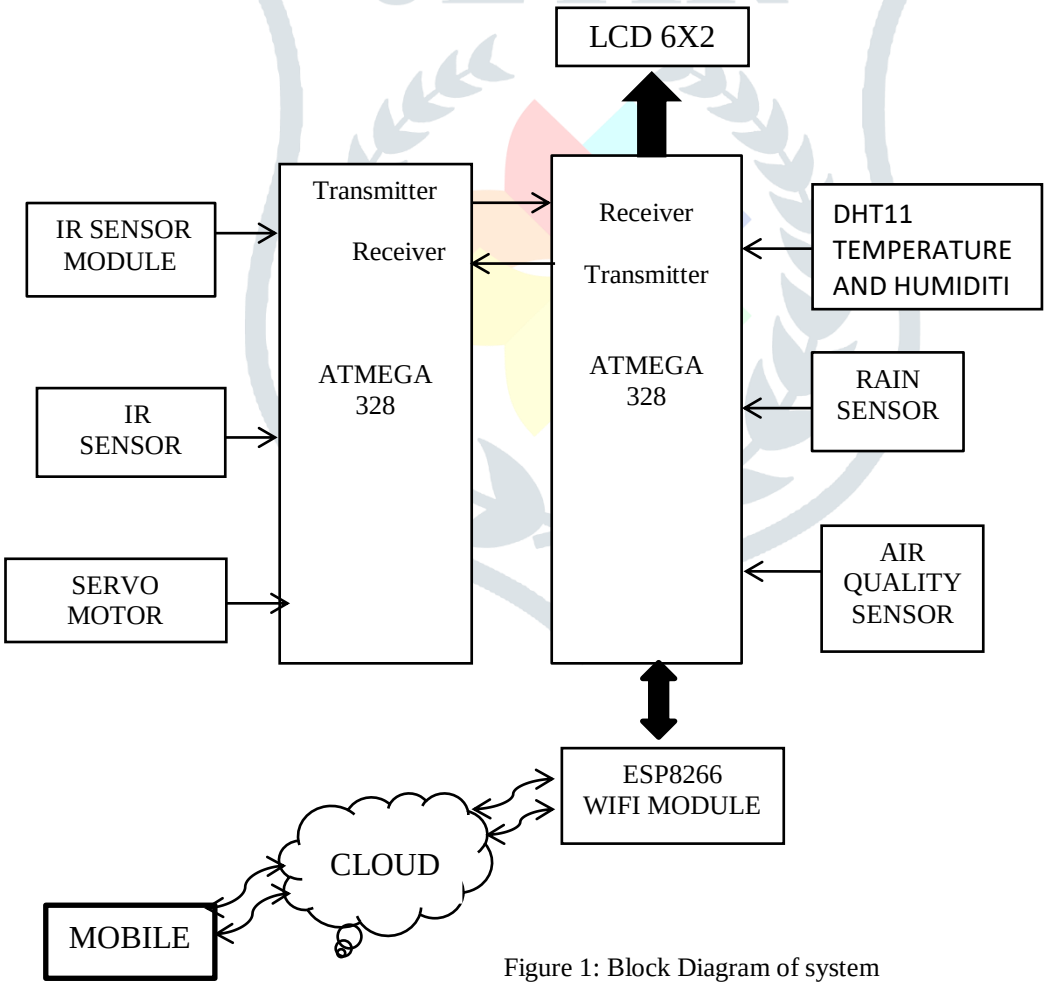

Figure 1: Block Diagram of system

Figure 2: Flowchart of the system

The figure displays the flowchart. Before arriving at the specified parking lot location, a smart vehicle parking system that links to the internet will assist a car driver or any vehicle owner in determining whether a vacant parking spot is present or not. The proposed technology determines whether or not the parking space is vacant. Only new vehicles are permitted to enter the parking space if the slot is empty; otherwise, the entrance is blocked by a servo barrier employing a servo motor. The system allows for remote monitoring of the parking spaces using an esp8266 Wi-Fi module and the ThingSpeak application. We are going to build an Internet of Things (IoT) based weather monitor system using an Arduino Uno that can provide us with weather conditions status such as temperature, humidity, light intensity, air quality, etc. of the parking locality in real time. The data from the IR sensors are logged to an IoT cloud service called Thingspeak for monitoring and analysis.

IV. RESULT AND DISCUSSION:

To get proper understanding of the system it is mandatory to analyse all kinds of results we are receiving from the system . Figure 3 shows the experimental configuration of the proposed system. We constructed a building imitating a parking place with a gate using servo motors to put the concept into practise. With the aid of this project, we are able to constantly monitor the parking spaces to see if they are empty. The arrival of vehicles is detected by an IR sensor, and the information is then sent to the cloud (Thingspeak) so that the officials may continuously check to see if the slots are open or not.

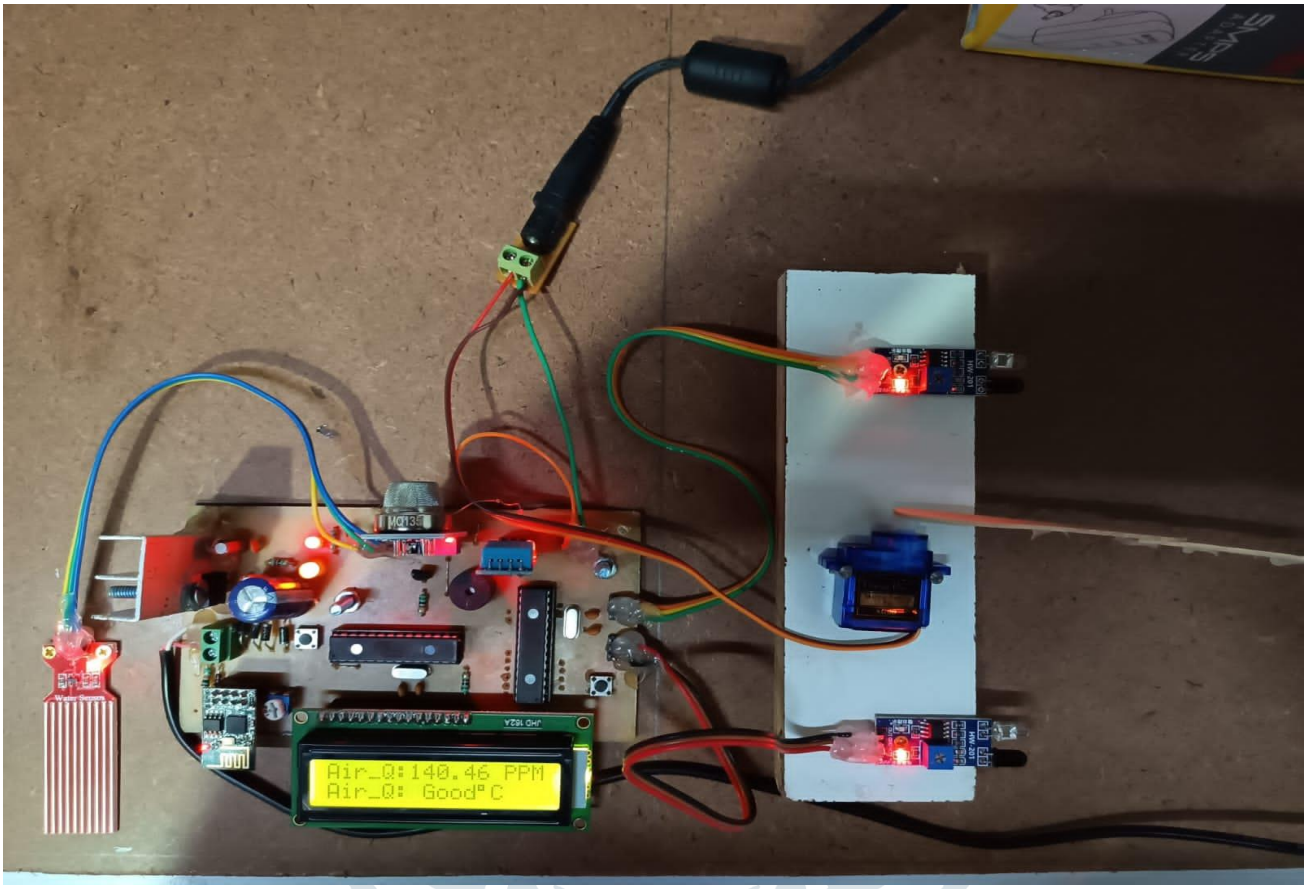

Figure 3: proposed system's experimental setup

The system's connection to an Arduino, which is then connected to the project server through IOT, is shown in the accompanying graphic.

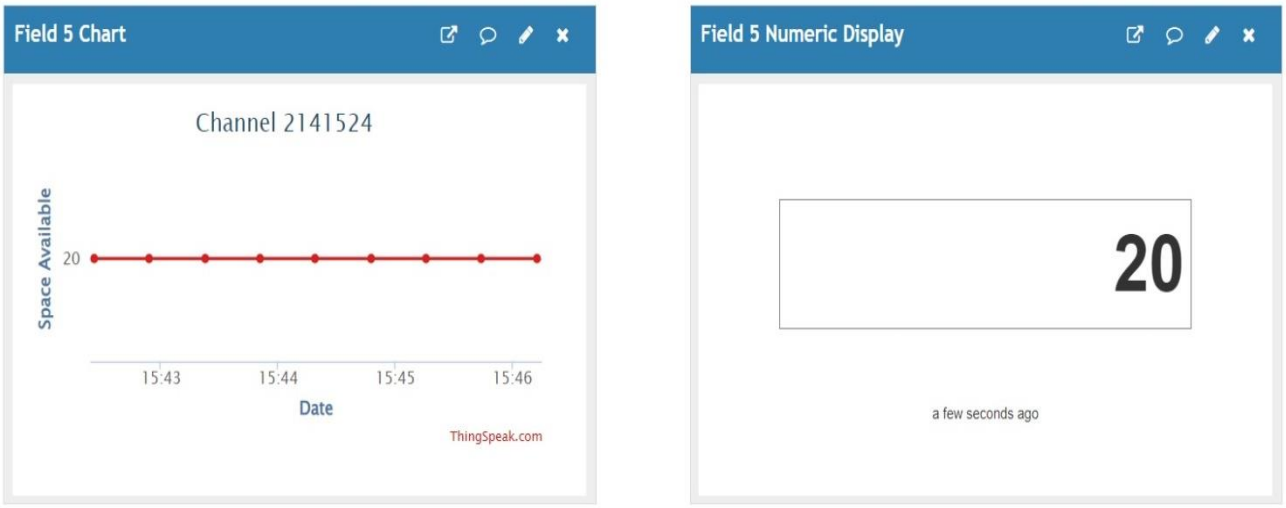

Figure 4 :Result of ThingSpeak Field 5 Chart showing availability of parking slots

The result is shown in Figure 4 here 20 parking spaces are completely available. Depending on the demand, we can increase the number of parking spaces.

Based on the inputs from various sensors, the outcome of various weather conditions, such as temperature, humidity, rain, and gas, can be measured. We have chosen from a variety of ThingSpeak fields for this study. According to figure 5, we assigned temperature to the second field and humidity to the first field.

Figure 5: Result of ThingSpeak Field 1 and 2 for for humidity and temperature monitoring

The third field is for rain sensor and forth field is for Air quality as shown in the figure 6.

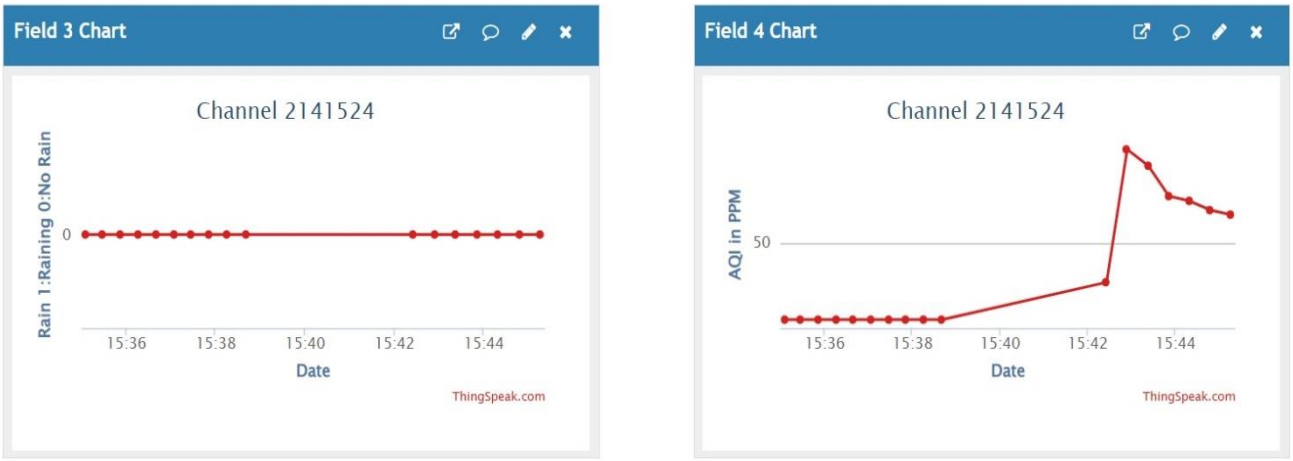

Figure 6: Result of ThingSpeak Field 3 and 4 for for rain and air quality monitoring

The results of the research led to victimisation ThingSpeak Matlab demonstrates how amazingly simple and understandable it is to analyse weather data. Through an experiment evaluated for monitoring parameters, the internet of things (IoT) idea may be used to monitor the temperature, humidity, rain and CO value. Additionally, it uploaded the device parameters to Google Spreadsheets on the cloud. Future research will find this material beneficial, and it can be easily distributed to other end users..

V. CONCLUSION:

The primary goal of developing a smart parking system is to improve the efficiency and usability of the parking lot for the benefit of the entire neighbourhood. The proposed system created using an IR sensor, an Arduino Uno, an ESP8266-01 Wi-Fi Module, and a cloud server. This idea of a smart parking system can address numerous parking issues. By reducing unnecessary driving, it improves built-up area traffic flows. This system, which directs drivers to parking spaces, decreases CO2 emissions, noise, and other pollutants, providing numerous environmental advantages. The system also deals with keeping track of environmental factors like air quality, humidity, rain, and temperature. We will be able to significantly control parking issues once we put this technology in place.

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