

Smart Parking and Weather Monitoring System

Prof. D G Chougule¹, Rukhsar Sattar Shaikh² and Prof. A. S. Mali³

¹Professor, Department of E&TC Engineering, Tatyasaheb Kore Institute of Engineering & Technology, Warananagar, INDIA

²M. Tech. Student, Department of E&TC Engineering, Tatyasaheb Kore Institute of Engineering & Technology, Warananagar, INDIA

³Assistant Professor, Department of E&TC Engineering, Tatyasaheb Kore Institute of Engineering & Technology, Warananagar, INDIA

²Corresponding Author: ruks4388@gmail.com

ABSTRACT

Every vehicle faces a parking situation, As the number of people has increased, the number of vehicles on the road also increased. Increasing the number of vehicles in cities has led to problem of finding the parking space in public areas. In metro Cities during peak hours drivers faces real problem of finding parking space. At instant Drivers are not knowing where the parking spaces are available, this causes them parking difficulty. To resolve this problem I have developed a system using Internet of Things (IOT), sensors, At mega 328 micro controller, and thinkspeak application. In this study we design a smart parking system with weather monitoring which enables the user to give availability of parking slots in advanced before reaching to that respective parking area, the system also deals with monitoring the environmental conditions like temperature, rain, humidity, air quality etc. This system will reduce the time in finding the parking lots and also will avoids the unnecessary travelling through filled parking lots in a parking area thereby reducing the fuel consumption which in turn will help reduces carbon footprints in atmosphere.

Keywords-- Parking, IOT, Sensors, At Mega 328 Micro Controller, Thinkspeak App, Weather Monitoring

I. INTRODUCTION

More of the world population lives in the urban areas so the cities have reached its full occupancy, because of this number of vehicles in the cities has also increased. In a recent survey it has been observed that an increase of 7.64% of usage of cars per year. This increase in the usage of cars has resulted in a serious parking problem. Drivers takes more time to find a parking slot. A lot of time is wasted in searching for parking slot and while searching, unintentionally it effects environment by the emission of harmful gases. Therefore, monitoring of parking is important solution. The problem related to parking can be solved if driver can be informed in advanced about the availability of parking space to their intended destination. The solution for this problem can be achieved by implementing a system which provides information regarding the availability of parking slot in a particular area as well as provides weather related information like temperature,

humidity, air quality, light intensity etc. in that particular area and process the data in real time to facilitate easy vehicle parking.

II. EXISTING SYSTEMS

A. Smart Parking Management System [1] that helps users to automatically find a free parking space with a smaller amount. Smart Parking consist of Ultrasonic sensor, ESP8266-01 Wi-Fi Module, Arduino Uno, Cloud server. IOT based new parking system connects, analyses and automates data gathered from devices and execute smart parking. Smart parking enable vehicle tenancy, monitoring and managing of available parking space in real-time that reduces the environmental pollution. Proposed system [1] provides optimize usage of parking space and get considerable revenue generation.

B. IOT based parking system is implemented with the use of sensors and android app using algorithms [2]. IR sensors are used to sense the position of the available parking space. Blynk application algorithm are used to find the nearest and suitable parking space that is occupied or unoccupied by car. With the help of the IR sensor and Blynk application, parking spaces can be viewed from anywhere around the world. The IR sensor is used to detect car detection in parking Slot. These IR sensors are connected to Arduino uno. Whenever a car is parked in a building or a parking area, the Arduino uno sends a command signal to the IR sensor, and these sends the command signal to the Blynk app.

C. In the Comprehensive study of Smart Parking System using Internet of Things (IoT) [3] uses the IR sensors Wi-Fi module, RFID detector etc. the IoT maintains the database of the parked vehicles with the help of a shared server. With the use of shared server drivers can find parking space through message on his/her mobile.

D. The main reason of the system [4] to give the solution related to problems that are faced by people during the parking of their vehicle. Finding a car parking in big cities is a major problem. This system can be implemented or can be used by way of malls, companies, airports, and many different places where we have a massive range of vehicles. This automatic parking

device in most cases are normally divided into 5 one of a kind sorts (PGSI) Parking Guidance and Information System, Electronic Parking, Automated Parking, Smart Payment System, Transit Based Information System.

E. The system proposed [5] is an advanced solution for monitoring the weather conditions at a particular area and make the information visible anywhere around the world. The technology behind this is Internet of Things (IoT), which is an advanced and systematic solution of connecting the things to the internet and to connect the entire world of things in a network. Here things might be whatever like electronic gadgets, sensors and automotive electronic equipment, household appliances etc. The system deals with monitoring and controlling the environmental conditions like temperature, rain, humidity, air quality and CO level with sensors and sends the information to the web page and then plot the sensor data as graphical statistics using

algorithm. The data updated from the implemented system can be accessible in the internet from anywhere around the world.

III. BLOCK DIAGRAM

The block diagram is shown in figure. This system is implemented with atmega 328 microcontroller, esp8266 Wi-Fi module and ThingSpeak application. With the help of esp8266 Wi-Fi module and ThingSpeak application, the parking slots can be monitored from anywhere around the world. we are also going to construct an IoT based weather monitor system using Arduino which can report us weather status like temperature, humidity, air quality, light intensity etc. of parking locality in real time.

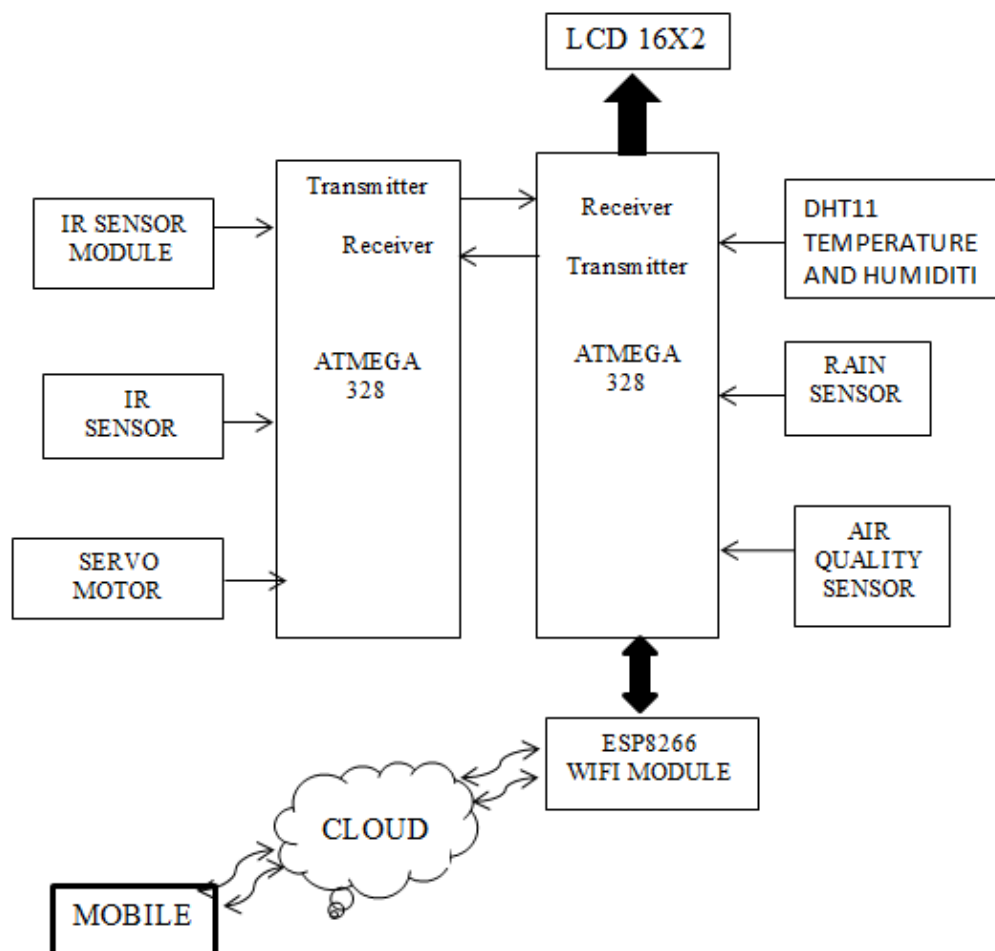


Figure 1: Block Diagram of system

A. TMEGA 328P

ATMEGA 328P is an 8-bit microcontroller based on RISC architecture that combines 32 KB Flash memory with read write capabilities, 1 KB EEPROM, 2 KB SRAM, 23 general purpose I/O, 32 general purpose

registers. In the proposed system this ATMEGA 328P is connected to could server though internet connection to transfer the data from parking lot area.

B. IR SENSOR

The IR Sensor is used widely in wireless technology like remote functions and detection of surrounding obstacles or objects. We have used this IR Sensor to detect whether the parking slot is empty or not.

C. DTH11 Temperature and Humidity

The DHT11 is a commonly used as Temperature and humidity sensor that comes with a dedicated Negative temperature coefficient to measure temperature. We have used this DHT11 to detect weather conditions status like temperature and humidity.

D. Rain Sensor

We are using rain sensor for sensing the rain . It contains two modules, one is the rain board that detects the rain and second is control module, which compares the analog value, and converts this analog value to a digital value.

E. Air Quality Sensor (MQ135)

Gas sensor MQ135 is used for monitoring the air quality. It measures the level of oxides of nitrogen , ammonia, alcohol, Benzene, smoke, CO2 in the air. We

have used this Gas sensor MQ135 to monitor and detect the toxic gases.

F. ESP8266 Wi-Fi Module

The ESP8266 is low cost device to provide internet connectivity to the project. This module can easily get data and upload it to the internet. We have used this module to provide internet connectivity to the system.

G. Servo Motor

A servomotor is a rotatory actuator that permits exact control of angular position, It is made up of motor and a position feedback sensor. Using such motor in the system help to open and close the main entrance gate.

H. 16x2 LCD Module

16×2 liquid crystal display is used to display the status of available parking slots. the named 16X2 because, it has 16 Columns and 2 Rows to display the character . In liquid crystal display every character is displayed in 5x7 pixel matrix.

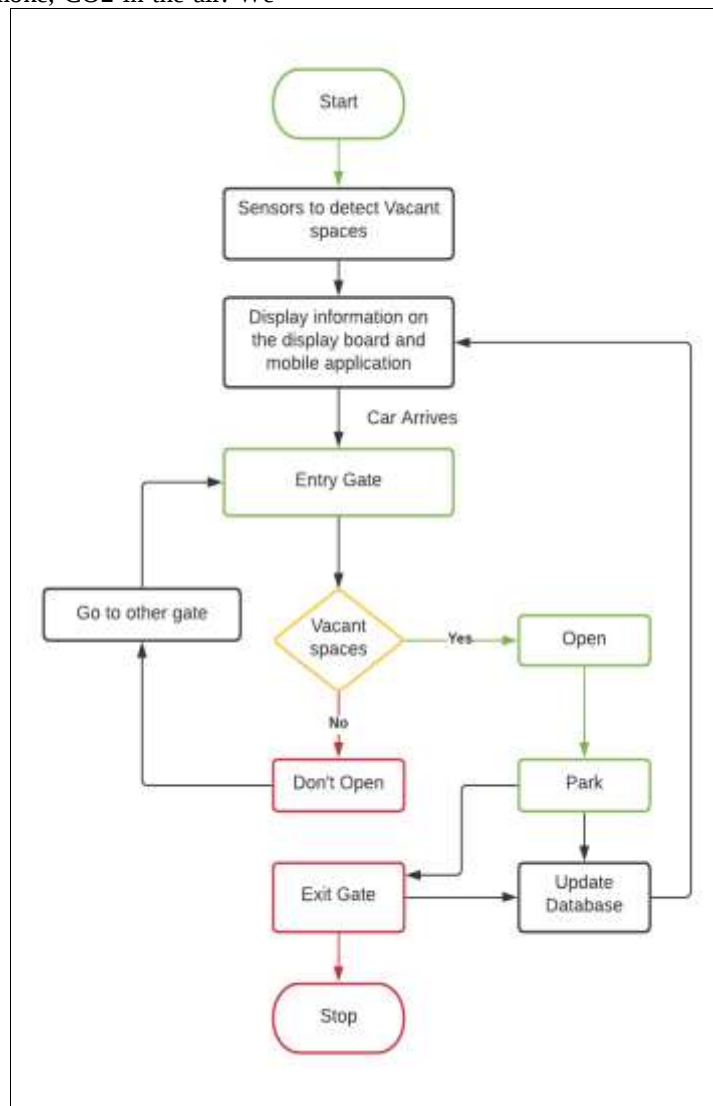


Figure 2: Flowchart of the system

The flowchart is shown in the figure. A smart vehicle parking system that connects to internet will help a car driver or any vehicle owner to check if there is a vacant parking spot exist or not in a parking lot before the driver reach the located parking lot destination. The proposed system detects whether the parking slot is empty or not. If the slot is empty in the car parking then only new vehicles are allowed to enter otherwise the entrance is blocked by the servo barrier using servo motor. In the system with the help of esp8266 Wi-Fi module and ThingSpeak application, the parking slots can be monitored from anywhere in the world. we are going to construct an IoT based weather monitor system using Arduino uno which can report us weather conditions status like temperature, humidity, light intensity, air quality etc. of parking locality in real time and the data from the IR sensors are logged to an IoT cloud service called Thingspeak for monitoring and analysis also status of parking slots displayed on 16 x 2 lcd display.

IV. CONCLUSION

The main motive of making smart parking system is to make parking area more effective and easy, so that entire community can get benefit. Proposed system has developed from Internet of Things (IOT) IR sensor, Arduino Uno, ESP8266-01 Wi-Fi Module, Cloud server. This concept of smart parking system can solve so many parking problems. It reduces unnecessary driving therefore optimizes traffic flows in built-up areas. This system direct a driver to parking slot, has many environmental benefits as it reduces CO2 emissions, noise and other pollutants. the system also deals with monitoring the environmental conditions like temperature, rain, humidity, air quality etc. Once by implementing this system, we can be able to control parking problems to great extent.

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