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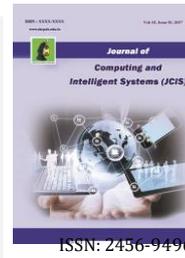
SMART PARKING SYSTEM USING IOT

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Abstract —*This paper describes the smart parking system model.Since everything in the contemporary world is going automatic, I built a system that will routinely notice the entrance and leaving of cars through the gate and then display the number of cars in the parking lot.This smart parking system uses infrared (IR) sensors at the entrance and departure to decrease the time it takes to look for vacant parking spaces by displaying the open spaces on an LCD displayer. The microcontroller (Arduino UNO) is used in this project.*
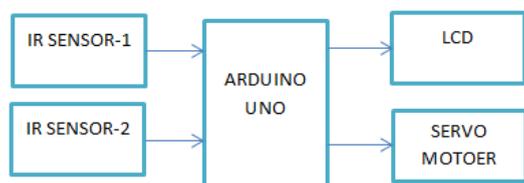
I. INTRODUCTION

Fig: 1 BLOCK DIAGRAM

The old way of car parking has several issues, such as how to constrain the number of cars that can be stopped there, and how to keep track of them. Keep an eye on what's going on in and out of the parking lot, how to see if there's enough space inside for more. Cars or no cars, and parking protection. With the high number of vehicles currently owned, seeking a vacancy in big plots of car park similar those in colleges, shopping malls, the airport is a fact. For a large number of people, this is a significant issue. During the holiday season or at other times of the year, the lack of parking spaces is becoming a more problem during the festival. Availability of parking slots will reduce the life quality besides; also like the driver maintains that the parking spot is located and there are higher chances of having an accident are greater. The basic strategy for searching for a parking is manual, and the driver finds a parking spot most often on the street or in a shopping centre through chance and familiarity during holidays and festivals. This practice consumes both resources and time, and the worst-case scenario is the driver would not be willing in a heavily populated area to locate parking spots. To address the above issue and create a parking management scheme, the Internet of things technology has transformed some life areas like intelligent parking.Smart cities make use of technology to improve organizational productivity for the general population, which contributes to the advancement of residents' quality of life. Smart city adoption is fueled by innovative advances such as the Web of things (IoT),and machine learning as well as cloud computing. Car parking services and traffic control schemes are two of the most important challenges that smart cities face. Finding an accessible parking space in today's cities is normally tough for commuters, and it is only becoming harder as the number of personal car users grows. This technology effectively eliminates traffic congestion in smart cities and makes it simple to locate open free parking spaces in surrounding areas. Parking issues and circulation mobbing will remain resolved if motorists ought to be told ahead of time around the accessibility of stopping spaces at and close their goal. The development of low-cost, low-power embedded systems is developing modern Internet of Things applications. As the transmitter technology advances, many urban towns have opted to deploy IoT-based systems and around their cities for surveillance. And so many issues are there. This development aims to resolve these issues via developing a microcontroller-based schemetoward monitor the spacezone. The microcontroller is used by way of a software designdevicetoward manage the entire process, minimize costs associated with requirements such as job opportunities, and improve security. Furthermore, this device is quicker, more versatile, and capable of meeting business demands.

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II. Related works

The Intelligent Parking Service proposed by H. Zafar forms part of intelligent transport systems (ITS) This article examined various smart parking services used for parking instruction and the maintenance of parking facilities and provides an insight into their economic study. The systems addressed will mitigate the problems caused by the lack of a safe, effective and modern vehicle parking system [1].

Automatic parking system eliminates the amount of time required to verify vehicle space by highlighting available parking space. This is an 89c52 microcontroller prototype. The system will sensor the arrival and departure of cars through the gate automatically, and then display the number of cars in the car park. The aim is to minimise demands such as opportunities for work and improve safety for Mohmmed Ahmed[2].

Focused on efficiency metrics, this paper suggests a method that assists consumers in automatically finding a permittedspace spot on the lowest price. The algorithm increases the likelihood of a good parking and reduces the amount of time users have to wait. We also succeeded in putting the proposed system into practise[3].

[4]The system is intended to keep highly restricted areas safe, such as housing areas, military bases, and parliament buildings. A camera is used to enter a copy of the car driver's license plate number. The device has an embedded portion that manages the security gate's opening done by G. Subhashini, Mohamed ElfatihMarkhi, Raed Abdulla.

[5] The Smart Parking System suggested by Rishi Anand involves installing an IoT on-site moducle that tracks and reports the condition of each parking space. IoT tackles problems such as obstruction in roads, insufficient parking spaces and road safety.

[6] An adaptive parking metre is used to solve the abovementioned problems by the proposed E-parking scheme. It would also provide actualfinding of indecorousspace and automatic group of space charges.

[7] Proposed work is an example of how IoT and cloud computing can be used together. E-Parking is a smartphone application that was created with Android Studio and runs on Android 4.3. For real-time data collection, this device usages low-price IR devices and a Raspberry-Pi model 3b. [12] The proposed work also similar but they used algorithm for finding nearest parking system.

[8-11]The whole machine runs on a Wi-Fi network. The customer will also use an Android programme on their phone to verify the number of parking and booking free them accordingly. Thanks to the Internet of Things (IoT) and Cloud Platform, we can easily delegate available rooms. The user colud view available parking spaces and reserve a spot using an Android programme. In our experiments, we were able to detect licence plates with a 98 percent accuracy score [9].

[10] A microcontroller, Arduino Mega 2560, an ESP-8266 WiFi module, The smart parking device project includesan ultrasonic sensor, and the information stored in the cloud.

[13-16]They determine what elements are included in their paper by analysing existing papers and then proposing new papers.

[14] The 3GPP standard created the NB-IoT standard. Different modern approaches such as artificial intelligence, augmented reality, wireless sensor dependent, GPS based.

[15] In this article, we are considering soft and hard construction considerations and identify intelligent car parking systems. We stress the significance in these systems of data durability, safety, privacy and other key design factors.

[17-18] Park King is a hardware and software framework developed to handle all the parking systems on a campus. Book the parking space in advance and collect the QR code and check the QR code at the designated spot for entry to the parking complex. [18] The proposed system also smiler but it has The code is scanned by users using an Android program, which generates car parking availability as a purchase. To begin, the transaction is sent to the local block.

[19] Ibrahim Tamam's method was proposed. Is eco parking's key goal is to minimise CO2 emissions; it also has a mobile app for id authentication and an IR sensor to track room availability via MQTT.

[20]For people in any country, finding a free parking spot is a daily activity. The key goal of this paper is to create a framework that allows people to access real-time data regarding parking lot availability done by Vinay Raj Tripathi

[21] The parking scheme for smart cars is covered in paper. In this case, we'll usage the IR device to detect the car and assist the owner cutting-edge finding a suitable parking space. This initiative would aid in the resolution of parking issues.

[22] The suggested VTD sensor would be implemented without new components being required to be installed in each parking lot. Instead of a suggested radio frequency, the sensor is activated as the car enters a parking space (RF wake-up technique).

III. PROPOSED SYSTEM

The Internet of Things (IoT) has evolved into a leading data collection and processing tool. The majority of areas have smart parking system is a mechanism that will mechanically detect the entrance and departurecars around the gate and

the number of cars on the car park, so everything in the new world is automated. This automatic car parking system uses infrared (IR) devices at the entry and departure to minimize the time it takes to check for vacant parking spaces by viewing the open spaces on an LCD displayer. This project makes use of an Arduino UNO microcontroller.
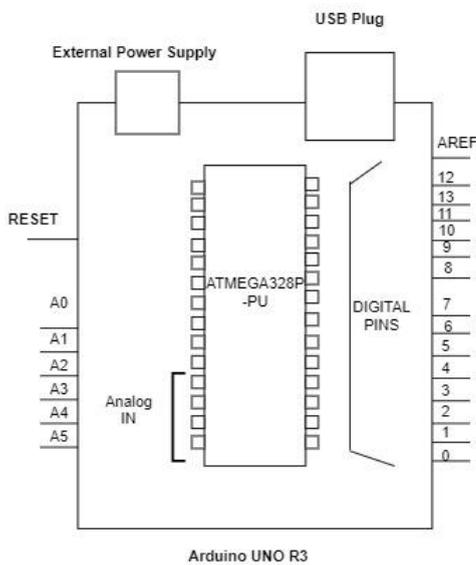
ARDUINO UNO

Fig: 1

The microcontroller board of Arduino Uno uses ATmega328. The device has a 16 MHz resonator, a USB interface, a power port, an ICSP header and a reset button. It has a total of 20 input/output optical pins (including 6 for PWM and 6 for analogue input), a USB link with an ICSP header and a reset button, as well as a power jack. The microcontroller comes with anything you need to support, simply connect it to a unit through USB, or power it to get started using an AC-to-DC adapter or battery.
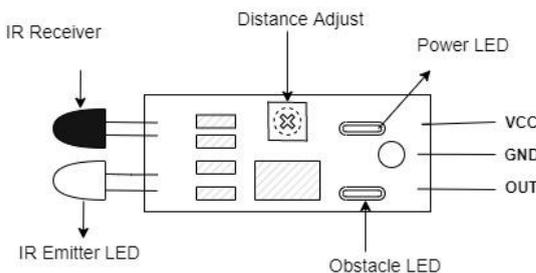
2. IR Sensor

Fig: 2

An IR (infrared) sensor is anmicroelectronicmodule that detects objects by detecting radiation from infrared emitted by them. It primarily consists of an IR LED transmitter and a photodiode receiver. It measures infrared radiation with wavelengths ranging from 700 nanometers to one millimeter.

The IR rays are transmitted as a certain positive voltage is applied across the transmitterLED. If these rays penetrate an object, the object returns the IR rays to the receiver photodiode, where the receiver photodiode absorbs. The voltage produced through the terminals of the receiver diode is proportional to the amount of light reflected by the object. In general, IR receiver LEDs is darker (black), while IR transmitter LEDs are translucent.

1. LCD and its Working

Fig: 2

16×2 LCD is named so on the grounds that; it has 16 Segments and 2 Lines. There are a great deal of blends accessible like, 8×1, 8×2, 10×2, 16×1, and so forth however the most utilized one is the 16×2 LCD. Thus, it will have (16×2=32) 32 characters altogether and each character will be made of 5×8 Pixel Dabs. A Solitary character with every one of its Pixels is appeared in the above picture.

The LCD is used in this paper to show how many parking spaces are available in the parking area. as well as the average parking space.
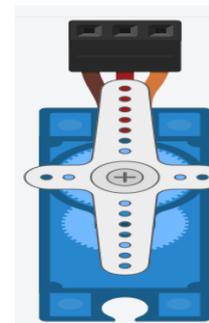
2. SERVO MOTOR

Fig : 3

Servo motors come in a number of sizes and three standard configurations. The three types are positional rotation, constant rotation, and linear rotation. Positional rotating servos spin 180 degrees. Stops in the gear system are commonly used to prevent the output shaft from spinning too quickly. The servo motor used to open and close the gate. And also when the car is entered into the gate if the space is available in the parking area it will open otherwise it will close the gate.

3. Electricity supply

High voltage is converted by power suppliers.Examples of electronic circuits are AC power supplies with low voltage, suitable for circuits and other applications. A source of fuel may be divided into several blocks, each performing a specific purpose.

(i)Transformer – reduces high voltage alternating current mains to medium voltage alternating current

(ii) Rectifier – an alternative current interface (AC) transformed into a direct current (DC).The performance varies.

(iii) Flattening – smoothes the varying DC.

From a huge wave to a small wave.

(iv) Controller – reduces wave by adjusting the DC voltage. input to a constant electrical energy.
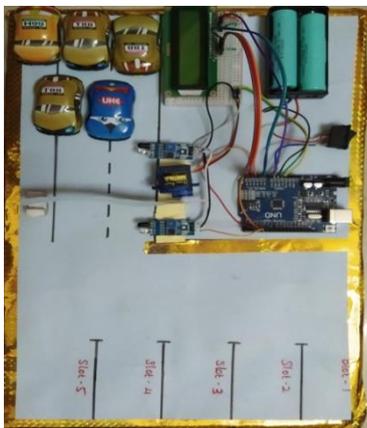
Overall Connection Looks like:

Fig 4

IV. METHODOLOGY

 A working technique for IoT-enabled Smart Parking System, I could also increase the maximum capacity for cars using the operatorline provided in the aspect of switches in the machinery,ensuring that traffic is not clogged. I installed a microcontroller that detects car movement and determines if there is enough space for cars to park before deciding whether or not to unlock the doors. It's also possible to open or close a gate as a vehicle approaches or exits the parking lot. The first gate (entry door) is connected to one sensor and the other at the second gate (exit gate).

The microcontroller receives the signal from the input sensors as a vehicle reaches the entrance and decides if the car is sufficient.Infrared transmitters and receivers are used to detect vehicle entrance and departure. The infrared transmitter is located on one side of the entrance, and the receiver is positioned directly across the door from thetransmitter.

 When a vehicle approaches, the infrared beam is blocked through the car, leaving the absence of infrared rays in the receiver and changing the voltage. The microcontroller receives this update message and raises the count and opens the door if there is an empty spot. The protocol for exiting a vehicle is somewhat similar to the process for entering one.
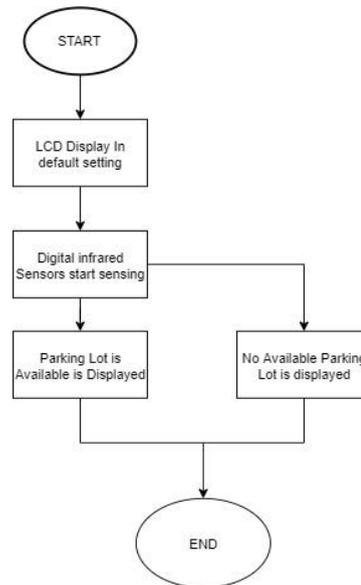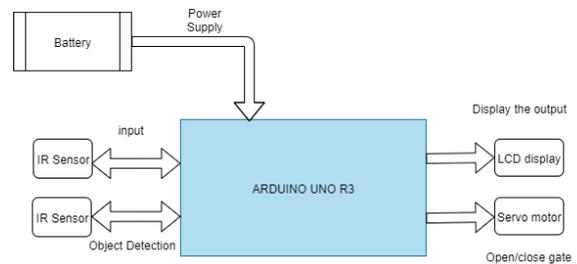

Flowchart of System:

Step 1: Get the weather data from the IR Sensor.

Step 2: Check the weather data Range is Less than equal to 5

Step 3: If the statement is true,

Step 4: And it send the data to servo motor then gate will open.

Step 5: If the statement is false,

Step 6: Then gate does not open,

Step 8: And finally it display the parking details in LCD display screen.

**Step 9:** And device display data to screen, then exit
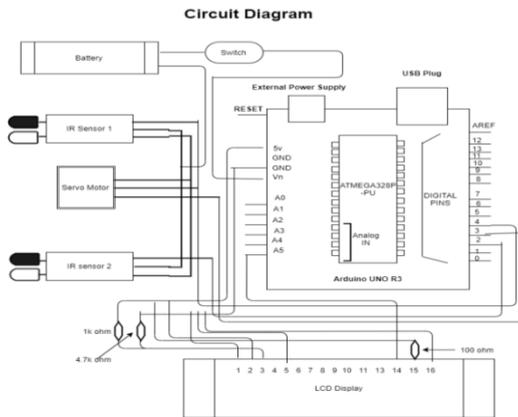
The circuit diagram portrays the relation of a Smart Parking System, which consists primarily of an Arduino UNO, LCD, IR sensor, Resistors, and Servo Motor. The LCD Connected to the Arduino UNO analog pins A0 to A5 and then three resistance connected between LCD to the Arduino UNO ground and 5V. Then IR sensors connected their respective pins and also connected with arduino digital pins. The servo motor connected to IR sensors Ground and out pins and another pin connected with arduino digital pin, and it acts as a gate. Next, the battery positive end connected with switch another end connected with servo motor and then switch another end connected with arduino UNO Vn pin.

Output: 1
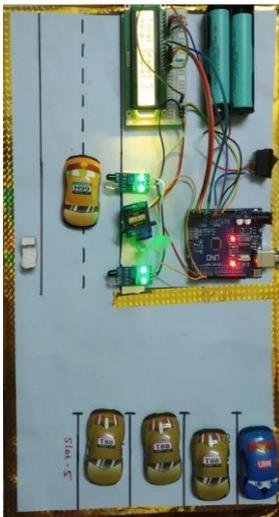
Output: 2
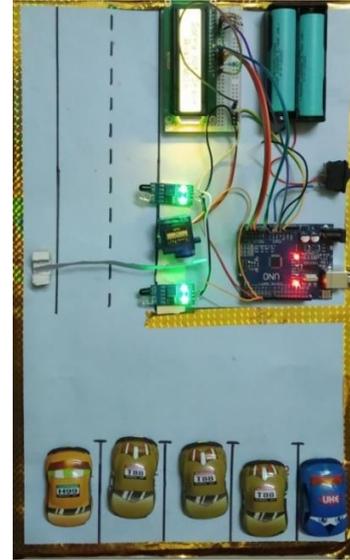
VI. CONCLUSION

The machine can be used everywhere, from the home to the industrial field. The ease of use of the circuit encourages it to be used by a vast number of users, as people with no understanding of hardware will even use it without issue. This smart parking system allows vehicles to be parked and hence reduces the time needed to search for available parking spaces by showing the location of available parking spaces on an LCD monitor through IR sensors at the entrance and also exit.

VII. FUTURE ENHANCEMENT

Number plate recognition is another function that can be implemented to improve the parking lot's protection.

Checking and tracking of the facts repeat visitors to the parking lot so that discounts can be offered to them.

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