SMART CAR PARKING SYSTEM USING ARDUINOUNO

[1]B Obulesu, [2] Kotipalli Nivas,[3]S Mohammed Aijaz, [4]T Pavan Kumar Yadav, [5]Katta Sai Bharath,
[6]Golla Premnath,
[1] Assistant Professor [2,3,4,5,6] B.Tech Scholar,
[1,2,3,4,5] Department of Electronics and Communications Engineering
[1,2,3,4,5,6] G. Pullaiah College of Engineering and Technology, Nandikotkur Rd, near Venkayapalle, Pasupula
Village, Kurnool, Andhra Pradesh 518002, India.

Abstract—Nowadays, smart cities are full of more population due to availability of technology and basic needs.so we proposedSmartParking system which consists of an on-site deployment of an IOT module which is used to check, monitor and signalize the availability of parking spaces or slots in busy areas.This project with combination of IOT and coordinated framework for efficient and easy way of parking the vehicles without searching for empty places. The mainintention of this Smart Parking system is to comprise the IOT module whichis utilized for signaling the driver of vehicle and mainly its condition of accessibility of single parking spot or place.Theprojectadditionally contains an abnormal state perspective of theframework engineering.At the end, the project clearly examines the working of the framework in type of an utilizationcase that demonstrates the rightness of the proposed show. The Ultrasonic Range DetectionSensor which is utilized with Arduino Uno to indicate the empty slots with indication.By measuring the distance using ultrasonic sensors, vehicle drivers are able to find the empty space in the parking lot. which helps thedriver to find the slot very easily and can minimize the searching time. As the parking slot in parking area is if found empty immediately it is detected using ultrasonic sensors which is reported further. We achieved this with help ofprogramming the aurdino uno, sensors and components. The main foremost inspiration of this idea is to minimize the clog of vehicles in urban areas effectively. In the daily news papers, we have seen many articles with respect to the vehicles stopping issues and parking place issues all over India and mainly in the cities like Delhi, Mumbai, Chennai, Bangalore and numerous metropolitan urbanareas. In a recent study, many researches have found that for one year, the vehicles like cars and bikesare consuming approximately 186823.5 liters of fuel and releasing almost 825 tons of carbon dioxide.Every one are responsible for this so,the aimless driving should come to an end in the parking areas.where this project is highly suitable to save the nature and parking problems all over the world.

Key words—Object Detection System, Arduino, Ultrasonic Sensor.

I.INTRODUCTION

whenaurdino and IoTis usedwithsensors,servo motors,lcdsandactuators,then theinnovation will definitelyturnsintoa bigprojectof themorebroadclassof digital physicalframeworks,whichlikely willincorporates the advances for the future. For Example: if we consider the keen networks, virtual power plants, brilliant homes,and the urban communities areas. Among this the difficulties that arises ineverydaylifeis oneofmostunavoidabletask isparkingthecarwhereverpeoplego. As our needs expand our setting out also increments rapidly however because of this extreme increment in utilization of vehicles likecars, bikesand increment in popular this project confront the intense assignment of parkingcar especially amid in the busy hours of day. Amid pinnacle hours of weekends the majority of the savedparking zone gets completely full and this leaves the client to scan for empty parking among other parking areas majorly.whichmakesmore abandonsand wastes time of themwith nosignonaccessibilityofparking spots. To overcome this major issues there is certainly a requirement for composed parking in businesscondition at the malls,shopping areas and parks. To outline such parking there is need of parking space with idealparking spot which relies upon public cost and time. However this project mainly composes the time drivengrouping strategy which takes proper care of the issue of parking in busy hours and utilizing opening assignmenttechnique.

The fundamental approach of this project is to decrease the clogging movement that occurs daily in and around theparking areas of urban zones which is found that the vehicles are looking for parking slots to park their vehicles.The best way of providingthe destination to a specific driver within the located parking place.A vehicle parking scenario gives a visual output indicating an unfilled parking
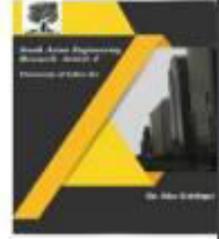
spot in parking place rather than searching for place. The vehicle driver looks up the LED lightscolor and then he deducts a result of determining the parking slots availability in that area.

There are two main colors which are red and greendeterminesfilled and non filled spots respectively. These lights are safely placed at the entrance of each parking slot and when the driver enters he looks up and follows the LEDs placed and then he searches for a green color one. These all lights are usually controlled automatically itself as programmed with sensors and the information is provided through the color of the LED to the driver of vehicles when a vehicle is detected sharply. This project not only makes the searching easy but also manages mainly the congestion of vehicles by avoiding long search of drivers.

a) To build up a clever, simple to know robotized automotive stopping framework that diminishes the labour and movement blockage.

b) To supply secure and secure stopping openings within affected territory.

II. LITERATURE SURVEY

[1] Deepthi.S, Anil AR presented an Internet of Things research mainly based on fully intelligent parking device.In contemporary lifestyles, human beings no longer depend on public cars.They use their personal car to get around. Thus, visitors increase.When humans drive through a metropolis, the biggest difficulty is parking the vehicle. Not handiest does this waste time and gas for drivers trying to park, it makes it also results in a greater lack of time and fuel for many drivers due to visitor traffic jams. Let's start by using PGI (Parking Guidance Information) for better parking control. Parking data can be displayed on VMS (Variable Message Sign) at principal roads or streets or it is able to be disseminated thru the internet. In PGI structures e- parking is an progressive platform which lets in drivers to acquire parking data earlier than or all through a experience and reserve a parking spot.

[2] D J. Bonde Jan2012 proposed "carmatized vehicle parking device controlled by Android utility", the intention of this assignment is also car and vehicle parking.A miniature version of a carmatized parking device capable of setting and managing the widevariety of cars that may be parked in given area at any given time primarily based totally at the availability of parking slot. Parking is a technique of parking and current motors the use of a monitoring device.

[3] "A fully intelligent cloud-based parking vector for smart cities" In thisIOT subsystem consists of a sensor layer, a communication layer and an alert layer.The main purpose of the smart parking device is to find, allocate and reserve the available quality parkinga consumer who drives a vehicle to a positive location and gives orders to reach that terrain. Layer of sensors that detects parking occupancy. A vehicle automobile parking space detection technique is proposed primarily based totally on carmatic threshold set of rules.A fully multi-agent device based mainly on an information terminal facilitating a vehicle parking location vector is proposed.Obtain admission to manage the device to reduce offered ready instances.At the utility level, a clearinghouse provides a fully cloud-based carrier.

[4] Abhirup Khanna-2016 has labored on IOT primarily based totally clever parking device.Recent cases, the idea of smart cities has received great popularity. Thanks to the evolution of Internet of factors the concept of clever metropolis now appears to be achievable. In the sphere of IoT, steady efforts are made to maximize the productiveness and reliability of city infrastructure. The IoT solves issues consisting of visitors congestion, limited parking and street safety.In this article, we introduce a fully cloud-integrated smart parking device mainly based on IoT.The proposed Smart Parking device involves the implementation on the web page of an IoT module used to filter and save the availability status.The idea of Smart Cities has always been a dream for humanity. Over the beyond years, fantastic strides were made in making clever towns a reality. The boom of the Internet of Things and cloud technology has created new opportunities in phrases of clever towns.Smart parking and visitor control facilities have always been at the heart of building smart cities. In this article, we address the hassle of parking and introduce an IoT-primarily based totally incorporated cloud-primarily based totally clever parking device. The device that we recommend gives actual time data concerning availability of parking slots in a parking place.Remote customers can book a parking spot for them using our mobile app. The efforts made on this file intention to enhance the parking centers of a metropolis and therefore intends to improve the pleasant lifestyles of its inhabitants.

[5] A Cloud-Based Smart-Parking System Based on Internet-of-Things Technologies.This file provides a very unique rule set that augments the capabilities of the state-of-the-art cloud-based fully intelligent device. parking device and it additionally develops a community structure primarily based totally at the Internet of Things technology. This device helps customers find loose parking at minimum value primarily based totally on new overall performance metrics, that's carmatic.This metric will calculate consumption zones in each vehicle fleet. To beautify the parking control, an clever parking device became evolved which decreased the motive of hiring humans to hold the parking device.

[6] R.Yusnita, Fariza Norbaya and Norazwinawati Basharuddin2012 proposed "Intelligent parking detection system based on image processing".This paper aims to present an intelligent system for parking space detection based on
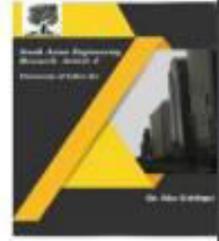
image processing technique that capture and processing the brown rounded image drawn on the parking lot and producing the empty parking space information. It will be displayed on the real-time seven-segment display.The seven-segment display shows the number of parking spaces currently available in the parking zone.This proposed system has been developed on a software and hardware platform.

III. METHODOLOGY

Arduino UNO style parking system, the creation and provision of onboard parking spaces for the largest number of vehicles in rest areas is defined as sensitive parking. it's principally the vehicle stopping framework Associate in Nursingd it helps the drivers to find an empty spot in any style of parking places. the employment of inaudible sensors within the project, it indicates the non group action of a vehicle within the specific slot. simpler Parking framework is intended with an accurate, sturdy and value effective approach to ensure the vehicle drivers of that street individuals recognize exactly wherever empty automobile parking spots area unit present. The elements that area unit employed in this project area unit 3D modelled and so written in Solid works code in line with the size for correct utilization.This gives America a preview of what the model can seem like once grouping all the elements exploitation the chosen dimensions.The schematic is intended for Eagle code
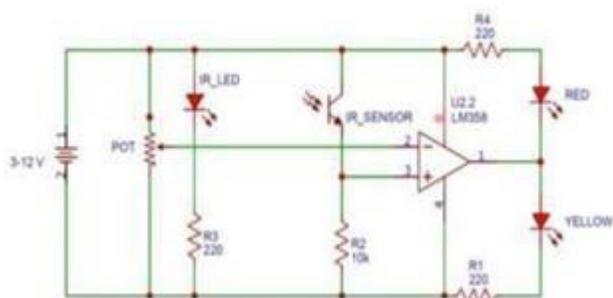
Figure3.1: Main schematic approch of Smart Parking

operation and offers America a summary of everywhere the unit area elements located inside the circuit. The Infra-Red rays area unit inconsistent and area unit gift all over.To stabilize this inconsistency, Associate in Nursing IR electrode is employed to project the sunshine radiation. the sunshine waves that area unit emitted can not be seen within the spectrum. Once the emission becomes consistent the IR receiver receives these radiations Associate in Nursing and converts them into an electrical signal so making a possible distinction. because the radiations increase, the voltage will increase inflicting additional current to flow. to get this the gap of reflection of waves should decrease. To summarize this the voltage of the circuit will increase once any object comes

nearer. The epitome are going to be run within the needed conditions and can be tested consequently.

IV.ComponentsUsed

4.1 IR PROXIMITY SENSOR:

Proximity sensors contains all sensors that perform non-contact detection mistreatment infra- red waves.Proximity sensors detect the movement or presence of the Associated Object in Nursing Associate in Nursing and convert it into an electrical signal. There are two LEDs, one being the infra-red electrode emits rays Associate in Nursing and the different the infrared receiver receives these rays and converts them into an electrical signal that creates a possible distinction.Proximity sensors will

Figure3.2:ProximitySensor

include all sensors that perform non-contact detection using infrared waves.Proximity sensors detect the movement or presence of an object and convert it into an electrical signal.There are 2 LEDs, one is the ray-emitting infrared transmitter and the other is the infrared it receives these rays and converts them into an electrical signal that creates a potential difference. IR sensor module or infrared (IR) sensor is a basic and most popular sensor in electronics.It is used in wireless technology as functions of remote control and detection of surrounding objects / obstacles.IR sensors mainly consist of an infrared (IR) LED and a photodiode, this pair is usually referred to as an IR pair.An IR LED is a special purpose LED, it can emit infrared rays ranging from 700nm to 1mm in wavelength

4.2 LCDMODULE:

16×2 LCD display is a type of electronic device used to display messages and data.The full-term LCD is a liquid crystal display.The display is called 16×2 LCD because it has 16 columns and 2 rows.A total of 32 characters (16×2=32) can be displayed, and each character will consist of 5×8 Pixel Dots.These displays are mainly based on multi-segment light-

emitting diodes.There are many display combinations available in the market such as 8×1, 8×2, 10×2, 16×1, etc.but 16×2 LCD is widely used.These LCD modules are inexpensive and easy to program, so they are used in various DIY circuits, devices and integrated projects.
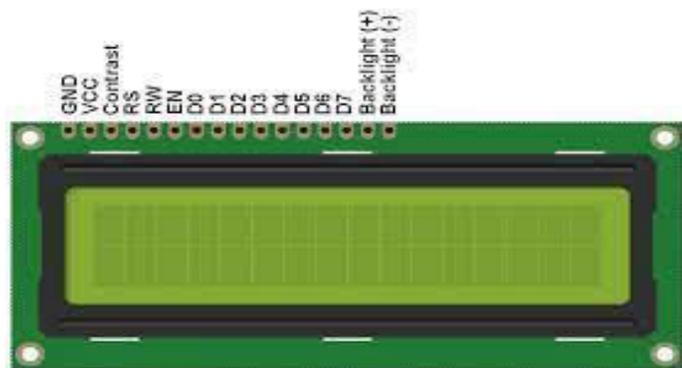

Figure3.3:16×2LCDDisplayModulePinDiagram/Pinout

4.3 Potentiometer:

A potentiometer is defined as a 3-terminal variable resistor where the resistance is changed manually to control the flow of electric current.It is a passive electronic component that works by varying the position of the rotating contact on a uniform resistance.The entire input voltage is applied across the entire length of the resistor and the output voltage is the voltage drop between the stationary and sliding contact.The rotary type potentiometer is mainly used to obtain an adjustable supply voltage of part of electronic circuits.This type of potentiometer has two terminal contacts between a uniform resistance and a semicircular pattern.The device also comprises a central terminal which is connected to the resistor by means of a sliding contact integral with the rotary button.By turning the knob, the voltage between the end of the contact resistance and the sliding contact is taken.

Figure3.4:Potentiometer

4.4 Infra-RedSensor:

An infrared sensing element is a device, that emits infrared rays thus on notice many components of the surroundings. An IR sensing element will gauge the heat of an object moreover as detects the motion. These varieties of sensors live simply the actinic radiation that falls on them, as against transmission it that's referred to as a passive IR sensing element. Most of the objects radiate some kind of heat radiations. These varieties of radiations are unobservable to our eyes. It will solely be known by an infrared sensing element.

Figure3.5:IREmitterandReceiver

The electrode is simply an IR LED (Light Emitting Diode) and also the detector is largely an IR photodiode that is delicate to

the IR lightweight of a similaran identicalan Analogous the same wavelength as that discharged by an IR LED. They need terribly low power and don't need any reasonably contact for detection, they're not suffering from reaction or corrosion. IR sensing element is employed during this project by considering of these advantages.

4.5 Aurdino UNO Board and USB Cable:

Arduino is a device which plays major role by storing code where we can use it without connecting to laptop also. Majority of the connections are passed from the arduino to the used components with help of jump wires.

The complete project is centred particularly on the design of microcontroller boards. The board has digital and analogue input/output (1/0) pins that can be accomplishedfor the connection of various types ofArduino boards (also known as shields) and other circuits. For loading applications from personal computers, the boards provide serial connection interfaces, including USB on the UNO variant.

The Arduino systemgives an completely integrated development environment (IDE) for programming mainly the microcontrollers, by making it very simple and user friendly to write code and upload fastly into the arduino board with cable wire. It is compatible with maximum alloperating systems like

windows. The code in IDE is written in Java programming and is particularly based on open-source for all users. This software has the potential to be useful and can beused with any Arduino board.
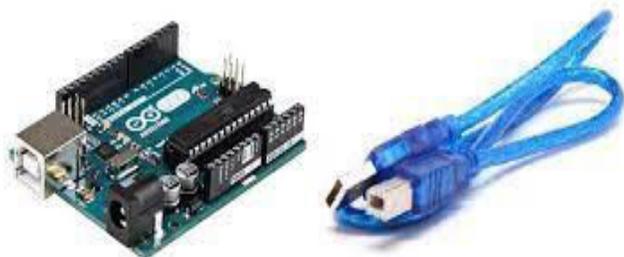

Figure3.6 : Aurdino UNO and USB cable

Power Supply: The Arduino Uno power provide often through with the assistance of a USB cable or Associate in Nursing external power provide. The external power provides in the main embrace AC to DC adapter otherwise electric battery. The adapter are often connected to the Arduino Uno by plugging into the ability jack of the Arduino board. Similarly, the battery leads are often connected to the Vin pin and also the GND pin of the ability connection. The advised voltage vary are seven volts to twelve volts.

Input & Output: The fourteen digital pins on the Arduino Uno are often used as input & output with the assistance of the functions like pinMode(), digitalWrite(), & Digital Read().

Pin1 (TX) & Pin0 (RX) (Serial): This pin is employed to the

transmit &receive TTL serial information And,these areperfectly connected to the Atmega8U2 USB to TTL Serial chip equivalent pins.

Pin 2 & Pin 3 (External Interrupts): External pins are often connected to activate Associate in Nursing interrupt over an occasional worth, amendment in worth.

Pins 3, 5, 6, 9, 10, & 11 (PWM): This pin offers 8-bit PWM output by the perform of analog Write().

SPI Pins (Pin-10 (SS), Pin-11 (MOSI), Pin-12 (MISO), Pin-13 (SCK): These pins maintain SPI-communication, despite the fact that offered by the elemental hardware, is not presently enclosed at intervals the Arduino language.

Pin-13(LED): The built-in LED are often connected to pin-13 (digital pin). because the HIGH- worth pin, the sunshine emitting diode is activated, whenever the pin is LOW.

Pin-4 (SDA) & Pin-5 (SCL) (I2C): It supports TWI-communication with the assistance of the Wire library.

AREF (Reference Voltage): The reference voltage is used only for the analog inputs with analog Reference().

Reset Pin: This pin is employed for reset (RST) the microcontroller.

Memory: The memory of this Atmega328 Arduino microcontroller which includes flash memory-32 Kilobytes for storing code, SRAM-2 Kilobytes, EEPROM-1 Kilobytes.
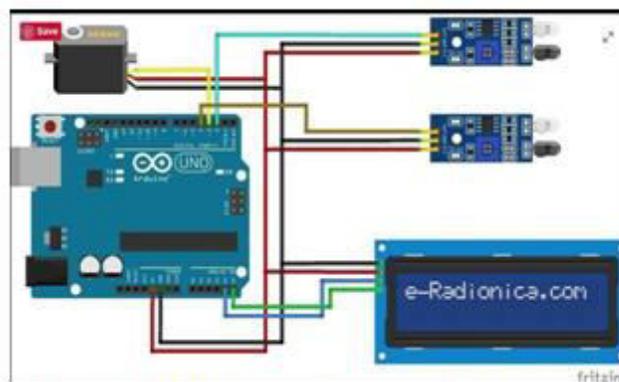
V. CircuitDiagram

Figure3.7:CircuitdiagramofSmartcarparkingsytem

VI. Working

The good automotive parking system works mainly on the straight principle of detective work and causing a visible feedback to the driver. The proximity device is mounted on the ceiling of the automobile parking space that consists of AN Infra-Red electrode and a receiver. The IR electrode emits infra-red rays and these rays typically bounce off objects. The IR receiver receives these rays and converts them into an electrical signal making a possible distinction. The ensuing electric potential helps complete the circuit. The LEDs area unit placed on the road and turn on supported the input received by the device. A threshold distance is mark victimization the potentiometer to mend a specific distance supported the typical height of vehicles for causing and receiving the radiations. Resistors area unit provided to confirm the safe operating of LEDs and IR sensors. For this project supported size a 12V battery is employed to power all the parts.

Case 1: once the parking zone is empty, the IR electrode emitting the rays won't get better AN object (vehicle) isn't detected. The rays won't strike the IR receiver and therefore there'll be no rise in electric potential. The feedback of this result makes the Yellow semiconductor diode turn on indicating the provision of a parking zone.

Case 2: once the parking zone is occupied, the IR rays emitted by the electrode is bounced back because the vehicle height is
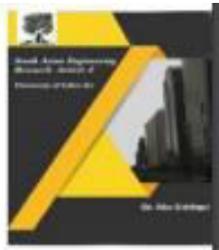
among the edge distance and also the rays strike the receiver and these waves area unit reborn into an electrical signal making a possible distinction. The feedback of this result's indicated by the Red semiconductor diode turning on and therefore specifying the motive force that the actual parking zone is crammed. there's continuous emission of IR waves therefore the feedback is instant. As presently because the vehicle exits the parking zone, the rays don't come back back and also the Yellow semiconductor diode switches back on.The smartcar parking system works on the simple principle of detecting obstacleand sending a visual feedback.

VII.Advantages

a) Cost Effective.
b) Environment Friendly.
c) Freeflow of traffic in parking areas.
d) Time saving.
e) Manpower can be reduced.

VIII.CONCLUSION

It are often terminated that with correct association of some easy electrical parts, it's doable to make associate automatic sensible automotive parking system, therefore decreasing aimless driving, fuel and time, likewise as creating the method of parking significantly easier.

XI.FUTURE SCOPE

This work with effort can be extended to detect the avalability of parking lots easily as well as accepting different payment methods from drivers of vehicles.The system may be linked to smartt phones and tabs through android apps.The system could also be connected to GPS systems in order to allow public to search for empty parking lots in different parking areas remotely while driving thus saving theirsearching time in parking areas.

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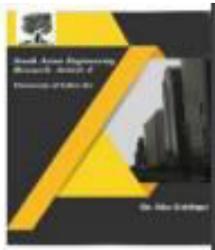
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