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IOT Based Multilevel Smart Car Parking System

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ABSTRACT: In current years the variety of automobiles accelerated considerably and many instances the automobile proprietor's war to discover the acceptable parking house inside the city. IOT has magnificent viable in imposing many of the clever metropolis infrastructure requirements. Traffic congestion and the shortage of auto parking area have given a lot of probability for the lookup pupils to work in this field. In this paper we have proposed a clever automobile parking and reservation system. The proposed machine is being managed by means of an android app so as to decrease human intervention. This device reduces the site visitor's congestion and therefore gas consumption. To e book the free slot for parking in enhance is being finished with the assist of net software both the use of PC or cellular phone. This device can be used to e book a free vehicle parking slot inside city.

KEYWORDS: NODEMCU, ARDUINO, IOT, CLOUD, IR SENSORS

I. INTRODUCTION

Car parking has been, and nevertheless is, a developing trouble with growing automobile sizes in the luxurious segment. This is specifically authentic when bearing in idea the restrained parking areas in parking a lot and cities. A multi-level auto parking is in reality a constructing with variety of flooring or layers for the automobiles to be parked. The specific stages are accessed thru indoors or exterior ramps. An computerized vehicle parking has mechanized lifts which transport the automobile to the distinctive degrees at a sure position. These vehicle parks want much less constructing quantity and much less floor house and as a result keep on the value of the building. Car parking is an trouble of importance each at the neighborhood and at the strategic stage of planning. In order for parking coverage selections to be nicely founded, the evaluation of parking conduct and the outcomes of parking insurance policies ought to be completely built-in With the different factors of the transport planning and modeling process.

HISTORY OF MULTISTAGE CAR PARKING SYSTEM

The earliest recognized multistage automobile parking device used to be constructed in 1918. It was once constructed for the Hotel La Salle in Chicago. IL at 215 West Washington Street in the West Loop place of downtown. It used to be designed through Halberd and Roche. The Hotel La Salle used to be demolished in 1976, however the parking shape remained due to the fact it had been unique as preliminary landmark repute and the shape used to be positioned various blocks from the inn it was once constructed to service. The Hotel LaSalle multilevel was once demolished in 2005 after failing to obtain landmark popularity from the metropolis of Chicago. Jupiter Realty Corp. of Chicago is establishing a 49-level rental tower in its location with development underway as of March 2008. During the 1920's and 1930's a sequence of different patents had been granted however it was once no longer till the late 1940's that the Bowser, Pigeon Hole and Roto Park structures grew to be operational and mounted in several locations. Some of these early structures had been vertical elevator elevate modules that positioned motors on higher tiers of a shape to be moved through attendant and others mechanical units that ought to pass motors into "slots" in a framework constructed round a central corridor. Capacities ranged usually from much less than one hundred areas to extra than six hundred automated automobile parks be counted on comparable science that is used for mechanical dealing with and report retrieval. The driver leaves the vehicle in an entrance module. It is then transported to a parking slot with the aid of a robotic trolley. For the driver, the method of parking is decreased to leaving the vehicle inner an entrance module. At height intervals a wait can also be concerned earlier than getting into or leaving. The wait is due to the truth that loading passengers and baggage takes place at the entrance and exit place instead than at the parked stall. This loading blocks the entrance or exit from being handy to others. Whether the retrieval of cars is quicker in an automated auto park or a self park vehicle park relies upon on the plan and number.

UNIQUE CHARACTERISTICS

- The area for parking 3 automobiles can preserve extra than nine cars.
- It adopts rotating for mechanism so as to limit the vibration and noise.
- Flexible operation.
- No caretaker is needed, key urgent operation.
- High safety, whole inspecting gadget
- Stable and dependable

It is easy to function with the driver parking and leaving the automobile in the device at the floor level. Once the driver leaves the included protection area the automobile is mechanically parked via the machine rotating to raise the parked automobile away from the backside central position. This leaves an empty parking area accessible at the floor degree for the next vehicle to be parked on. The parked automobile is without difficulty retrieved by way of pushing the button for the applicable function wide variety the auto is parked on.

This motive the required vehicle to rotate down to floor degree prepared for the driver to enter the security quarter and reverse the vehicle out of the system. Except vertical automobile parking device all different structures use a massive floor area, vertical vehicle parking machine is developed to make use of most vertical location in the reachable minimal floor area. It is pretty profitable when hooked up in busy areas which are properly set up and are struggling with scarcity of location for parking. Although the development of this gadget looks to be easy, it will be par from grasp besides the understanding of materials, chains, sprockets, bearings, and machining operations, kinematic and dynamic mechanisms Imagine the time that computerized multistage parking structures would keep you. Every time you enter your workplace constructing you has to locate a parking area and spend time taking walks in and out of the lot as well. Imagine how plenty time it is costing you. Even if you simply spend five minutes a day to park that interprets to you spending greater than a entire day simply parking each and every year. If you calculate the time you spend taking walks in and out of the parking lot, looking out for house and such it will be without problems extra than the above amount. A utterly computerized gadget mimics a futuristic meeting line shape the place the motors are moved to an empty platform. The platform beneath the auto strikes to a specific spot and all the different systems are organized so that no vehicles are stuck.

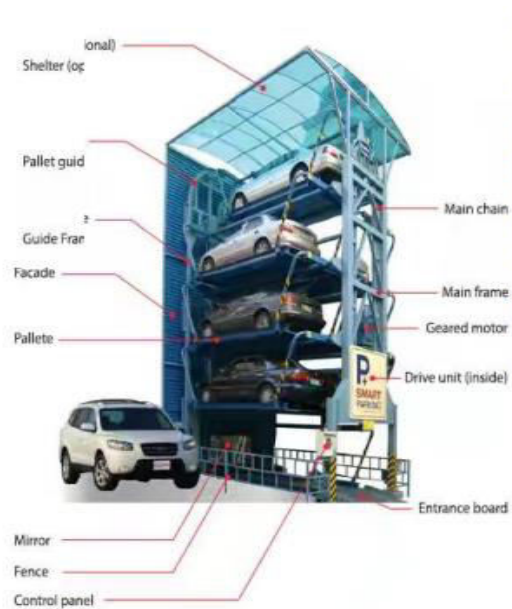
II. EXISTING SYSTEM

At current some international locations have portals which customers can reap facts about parking areas by the internet. This machine can provide person the records about parking space however it won't be in a position to provide which parking slot is vacant and occupied. Hence, such gadget can't neatly cope with the issue. Car lifts alongside with computerized robotic system, which automatically takes automobile to a precise parking spot as quickly as the vehicle enters on a platform. This gadget can no longer be set up by way of medium scale buying malls, film theatres as it can fee them a large amount. At many public places, the machine solely suggests the availability however it can't exhibit the precise slot and course to the slot available. Hence, there is the want to well discover the direction to the vacant spot.

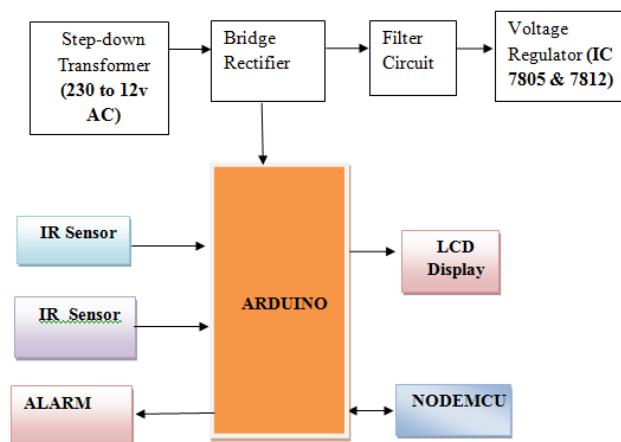
III. PROPOSED SYSTEM

ASSUMED: It is assumed that driver have clever cellphone and have set up the android app and have web connection. Moving in the direction of clever parking is a very suitable instance for a frequent citizen of how the IOT can be successfully and successfully used in our day to day lifestyles it offers exceptional offerings to extraordinary users. Conventional reservation primarily based automobile parking technique has a hassle of area and time. Proposed clever parking gadget offering the free parking slot successfully that saves times, gasoline and reduces surroundings air pollution and congestion in cities. This plan "IOT based totally vehicle parking system" was once designed such that the repete of the parking slot can be regarded and it can be reserved from somewhere in the users clever phone.

Comparison between standard vehicle parking and multistage automobile parking system:-



IV. METHODOLOGY



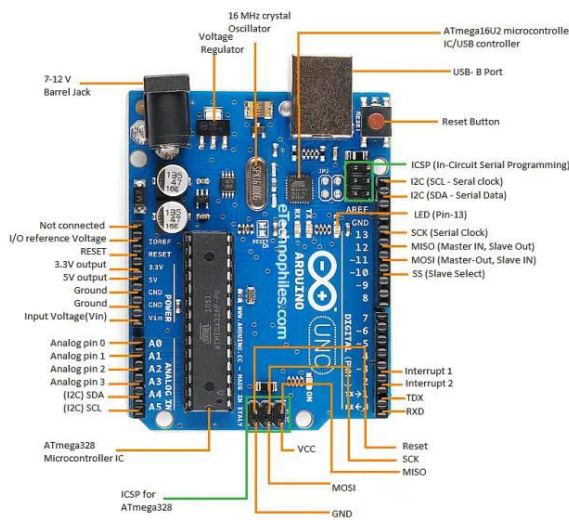
1. Microcontroller:

Arduino Uno is primarily based on AVR microcontroller referred to as Atmega328. This controller comes with 2KB SRAM, 32KB of flash memory, 1KB of EEPROM. Arduino Board comes with 14 digital pins and 6 analog pins. ON-chip ADC is used to pattern these pins. A sixteen MHz frequency crystal oscillator is geared up on the board. Following parent indicates the pinout of the Arduino Uno Board.

Pin description

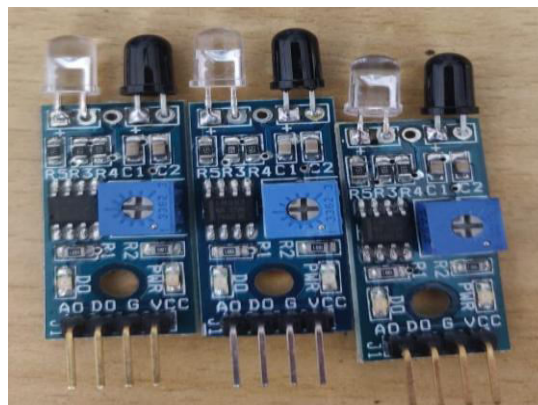
There are various I/O digital and analog pins positioned on the board which operates at 5V. These pins come with fashionable running scores ranging between 20mA to 40mA. Internal pull-up resistors are used in the board that limits the modern-day exceeding from the given running conditions. However, too lots enlarge in present day makes these resistors vain and damages the device.LED. Arduino Uno comes with built-in LED which is related thru pin thirteen Providing HIGH price to the pin will flip it ON and LOW will flip it OFF. Vin. It is the enter voltage supplied to the Arduino Board. It is unique than 5 V provided via a USB port. This pin is used to grant voltage. If a voltage is supplied via electricity jack, it can be accessed thru this pin.5V. This board comes with the capability to grant voltage regulation. 5V pin is used to

furnish output regulated voltage. The board is powered up the usage of three approaches i.e. USB, Vin pin of the board or DC energy jack. USB helps voltage round 5V whilst Vin and Power Jack guide a voltage stages between 7V to 20V. It is endorsed to operate the board on 5V. It is vital to notice that, if a voltage is furnished thru 5V or 3.3V pins, they end result in bypassing the voltage law that can injury the board if voltage surpasses from its limit. GND. These are floor pins. More than one floor pins are supplied on the board which can be used as per requirement. Reset. This pin is integrated on the board which resets the application walking on the board. Instead of bodily reset on the board, IDE comes with a characteristic of resetting the board via programming. IOREF. This pin is very beneficial for supplying voltage reference to the board. A protect is used to examine the voltage throughout this pin which then pick the applicable strength source. PWM. PWM is furnished via 3,5,6,9,10, 11 pins. These pins are configured to provided 8-bit output PWM. SPI. It is acknowledged as Serial Peripheral Interface. Four pins 10(SS), 11(MOSI), 12(MISO), 13(SCK) grant SPI verbal exchange with the assist of SPI library. AREF. It is referred to as Analog Reference. This pin is used for imparting a reference voltage to the analog inputs. TWI. It is known as Two-wire Interface. TWI verbal exchange is accessed via Wire Library. A4 and A5 pins are used for this purpose. Serial Communication. Serial conversation is carried out via two pins known as Pin zero (Rx) and Pin 1 (Tx). Rx pin is used to acquire information whilst Tx pin is used to transmit data. External Interrupts. Pin two and three are used for imparting exterior interrupts. An interrupt is known as by means of offering LOW or altering value.



2. IR SENSOR:

An infrared sensor is basically an electronic device which is used to detect the presence of objects. Infrared light is emitted by this device. If this device does not detect any IR light reflected back that means there is no object present. If the light is detected by the sensor there is an object present



3. WIFI Module

It is used to send data from embedded system to the internet using URL by HTTP POST method using TCP/IP protocol. It is developed by espressif systems. It is a 32 bit microcontroller with 80kb user data. It contains 16 gpio pins.

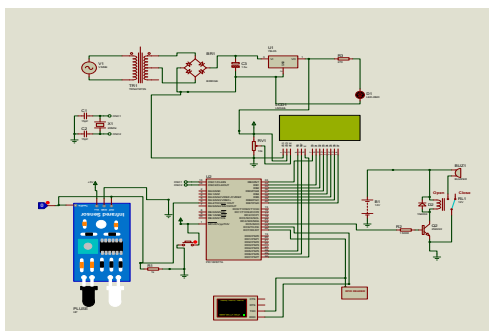


4. Alphanumeric LCD Display (16 X 2)

The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols



V. CIRCUIT DIAGRAM



VI. IMPLEMENTATION

This section contains the implementation of the proposed system. Every user who enters the parking slot contains a RFID card which contains the details of the user. When the RFID card is scanned by the reader module, the details of the user are transferred into the module. Now the IR sensor checks whether the parking space is free. If there is no space available the parking barrier gate will not open. A message is sent to the user with the help of a GSM module which sends a registered message depending upon the availability and unavailability of the parking space. The WiFi module supports the system by storing all the data in the cloud. It connects the devices with the cloud server.

Here, the user scans the RFID card provided to the user. If space is available, the user receives a message “Welcome username” the barrier gate will open and the user can park the car. When the user exits the parking space the user again has to scan the RFID and a message will be received by the user “thanks for using smart parking username”. The database about the user’s activity in the parking space will be stored in cloud database.

The user will know that a particular space is available with the help of the cloud status. When the car is parked the IR sensor detects the presence of an object and updates the cloud status from 0 to 1 and when the car leaves, the cloud status is updated from 1 to 0. So, the user can park his car where the cloud status is 0. The cloud status is updated every 2 minutes.



VII. CONCLUSION

Vertical Car Parking mannequin has been designed; all the components in it have been manufactured and assembled and examined successfully. Analysis of the mannequin has been finished and developed with the scaling of 1:9 for lifestyles dimension mannequin Such as SUV's like Fortune. As the existence cycle mannequin includes suitable layout and superior techniques are to be used to meet the necessities of the customer. Quick Automated Parking and retrieval of vehicles. Up to 12 vehicles can be effortlessly and safely parked. Surface house required equal to just two floor auto parking spaces. Most appropriate for Staff or committed person parking. Engineered to make certain Driver security through use of an digital Safety zone. Low upkeep degrees required by using the system.

VIII. RESULTS

The current auto parking gadget can be upgraded into a clever automobile parking machine the usage of IOT, Cloud Computing and Wi-Fi. In actual time software the use of this kind as a prototype which finally saves time and substantial quantity of gas consumption. The location consists of 4 slots.

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