



Arduino Based Automatic Car Parking Empty Slots Detection

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ABSTRACT:Due to increasing urbanisation, Car parking is a big issue now a days everyone facing . Considering this we have designed a System that detects the empty slots required for car parking. This paper demonstrates the techniques, schematic and algorithm to be used. Our system consists of an LCD display that is used to demonstrate as a parking gate entrance display.The display displays empty slots to new car arriving at gate of parking area. If no parking space is available the system does not open the gate and displays parking full.If the slot is empty system allows car to enter the lot and displays empty slots where user can park. To detect vehicle slot occupancy the system uses RFID sensors. Also we have used RFID sensors to detect vehicles arriving at parking gates to open the gates automatically on vehicle arrival. The microcontroller is used to facilitate the working of the entire system.

KEYWORDS: Arduinouno, LCD Display, RFID Reader, Servo Motor.

I.INTRODUCTION

Due to population and their busy working schedule, people require vehicles it can be 2wheeler or four-wheeler, depending upon their requirements. The vehicle parking is most important thing to use road with its full length. In many cities the parking is done in both sides of road, that’s why we cannot use road with its full capacity.

Using the automated and safety parking system we can avoid this type of wrong parking system. As the parking system consist required number of cars which has been kept in parking zone. Parking cars identification and about its bill payment.

We implement here project which satisfy the above requirement. It detects the valid or invalid car by RFID reader technique. If car is valid gate is automatically opens for few seconds and if invalid gate can’t open. If card is provided for particular entry, say monthly 25 days car parking then after that it will not open the gate. That car parking required to perches the new RFID card or pay bill for previous card to make that card valid again 25 days.

II.ARDUINO UNO (system Model)

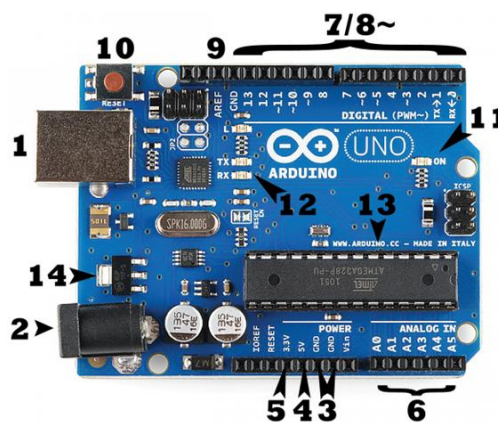


Fig1.ARDUINO UNO

Arduino is a single-board microcontroller meant to make the application more accessible which are interactive objects and its surroundings. The hardware features with an open-source hardware board designed around an 8-bit Atmel AVRmicrocontroller or a 32-bit Atmel ARM. Current models consists a USB interface, 6 analog input pins and 14 digital I/O pins that allows the user to attach various extension boards.



The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller. In order to get started, they are simply connected to a computer with a USB cable or with a AC-to-DC adapter or battery. Arduino Uno Board varies from all other boards and they will not use the FTDI USB-to-serial driver chip in them. It is featured by the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.



This is a Cable For Arduino UNO/MEGA (USB A to B)-1feet, you can use it to connect “Arduino Uno”, “Arduino Mega 2560” or any board with the USB female A port of your computer. Length is approximately 52 cm. Cable color and shape may vary slightly from image as our stock rotates. This is a standard issue USB 2.0 cable. the kind that’s usually used for printers, Arduino, etc. Compatible with most SFE designed USB boards as well as USB Arduino boards like the Uno.

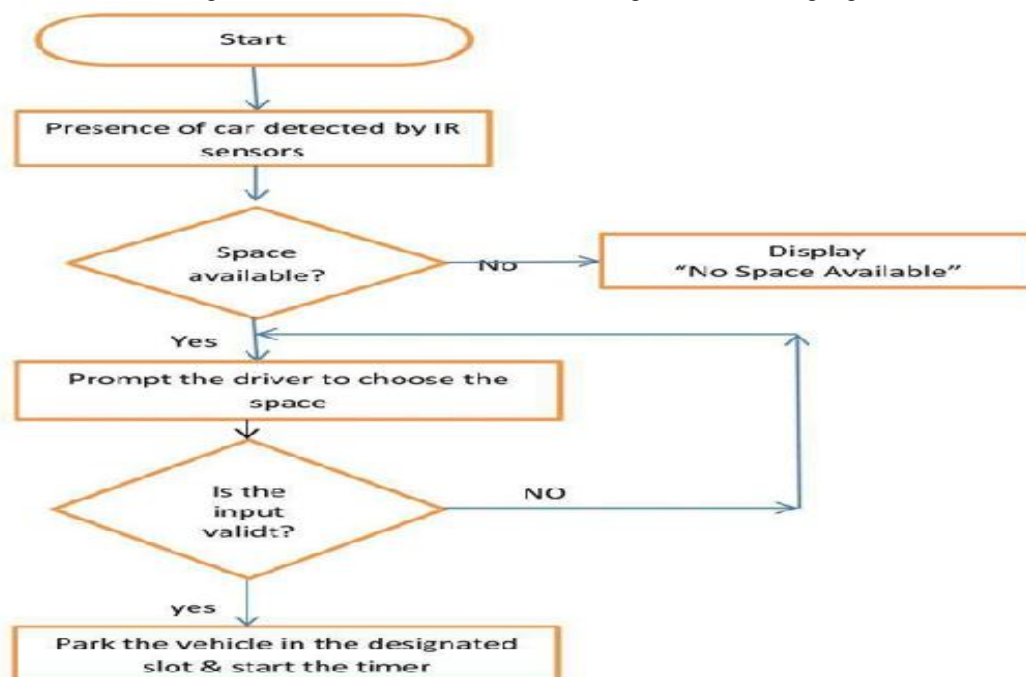
It is very important to understand the cheap USB cables or faulty USB cables may harm your Printers and cause errors again and again while printing important data. For the error-free and long life of your printers, you must use high-quality USB A to B printer cables. We are selling highly robust and high-quality USB 2.0 Printer cable at a reasonable price.

III.ALGORITHM

After the admin starts the system, the driver is prompted to choose either to park or retrieve a car. On selecting the option for parking, the driver is then prompted to choose a vacant spot that is available, input given will be checked for accuracy and the spot will be made available to the user.

The car is placed on the rotating platform, after that, the program sends the signals to the microcontroller to move the forklift to the designated space this will be accomplished by sending continuous movement instructions to make smooth movement

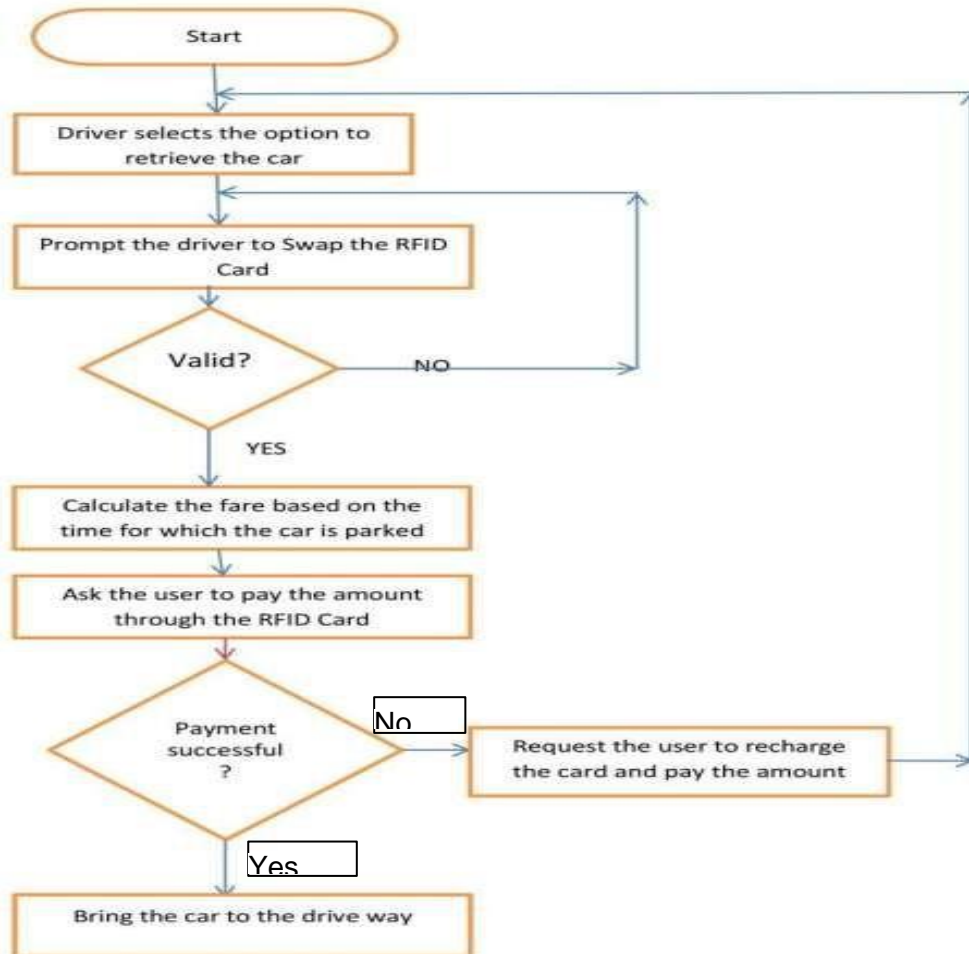
The commands for the working of the forklift will be written according to the following algorithm.





1.1 Car Retrieving Algorithm:

When a driver returns to pick up his car, he is required to choose an option of “retrieving” and then system will prompt the user to swap his RFID card. In the test, the system checks in the database that lists all the parked cars. The listed car is identified; the order is sent to the microcontroller to retrieve the car, the forklift moves to the designated parking spot and delivered the car to the driveway. If the car was not parked, an error message was displayed. The forklift is programmed for retrieving the car according to the algorithm written below mean while the driver will be requested to pay the relevant parking fee using the RFID card;the car won’t reach the drive way if the payment is not settled.



IV. WORKING

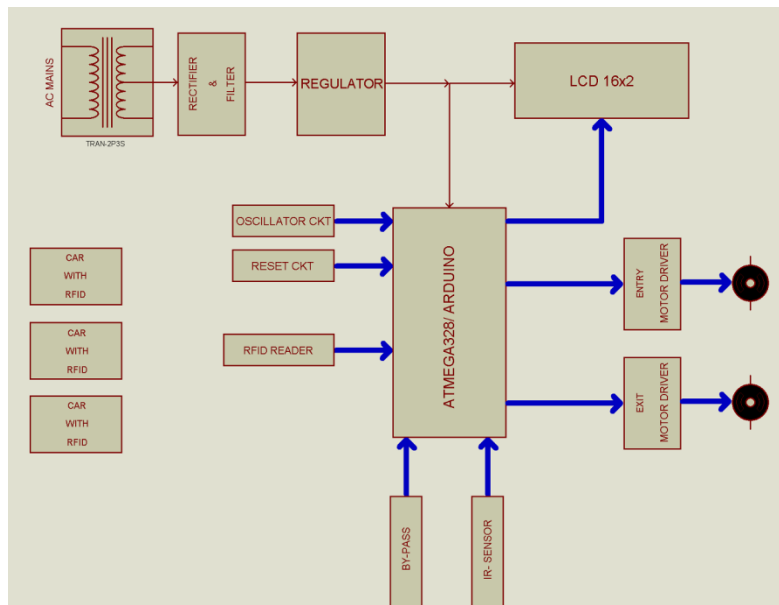


Fig3. BLOCK DIAGRAM OF AUTOMATIC CAR PARKING WITH RFID

Above Fig3 Shows block diagram of Automatic car parking ArduinoBased which consist of following blocks

- Arduinouno
- LCD 16x2
- Servo Motor
- Power Supply
- RFID Reader

the block diagram of an Automatic car parking system it depicts the interconnection between the various subsystem used in the project. In this Daigram we have tried to discuss a system using Radio frequency technology (RFID), IR(infrared)sensors, Microcontroller. RFID technology is very useful in automation of vehicle parking system in mall/building as compared to the other parking system, the advantage of this system is maximum space utilization it is a safer and much more convenient. The parking slot occupancy classification stage identifies vacancies of detected parking slots using ultrasonic sensor data. Parking slot occupancy is probabilistically calculated by treating each parking slot region as a single cell of the occupancy grid. The parking slot marking tracking stage continuously estimates the position of the selected parking slot while the ego-vehicle is moving into it After analyzing and processing the data, the information and Management center would distribute the parking information by LCD screen and displays for the drivers. And the results of the experiment show that the performance of the system can satisfy the requirements of parking guidance.

V. RESULT AND DISCUSSION

Case 1: A lift mechanism is used to park the car on the parking zone which is implemented using motor. Motor is rotated clockwise it stops when it reaches on the parking zone. The car is parked on the parking zone successfully.

Case 2: The car which was parked on the parking zone, was successfully retrieved & also the parking fee was collected successfully

Case 3: A user tried retrieving a car which was never parked in actual or a wrong RFID card was swapped up, in both the cases, an error message was displayed on the LCD screen



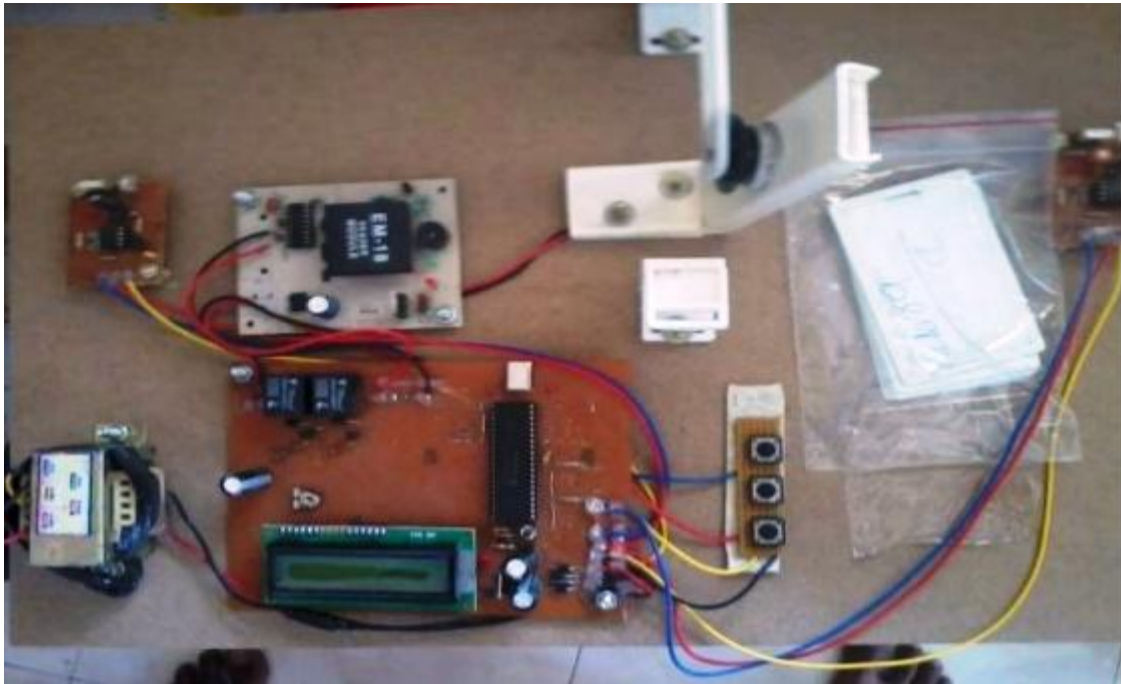
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Case 4: A user tried retrieving a car which but the parking fee was not paid by the user and in this case, an error message was displayed on the LCD screen and the car was not brought to the drive way



VI. CONCLUSION

Nowadays implemented sensors and microcontrollers in some parking lot systems only count the cars parked in the slot but it can't detect the empty space. Develop a smart vehicle parking lot using smart phones ,ARDUINO microcontroller, RFID sensor .

The proposed system can be implemented in the future vehicle and can be used to avoid the traffic problem in heavy parking areas. This system save the time in searching a place.

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