

Car Parking System

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Abstract— The aim of this paper is to develop a prototype For car parking in an area using the micro-controller. Aluminium foil is used as sensor in this model. When the car reaches a particular point. The system detects the car and this opens the gate for entry or exit. Seven segment display is used to show the parking space available in the area. If the parking lot is full it displays zero as the available parking lot. And the car parking gate doesn't open till the car parking is available. The aim of this project is to atomize the car park for allowing the cars into the park. 7 segment display is provided to display the information about the total number of cars that can be parked and the place free for parking. A set of aluminum foil is used in this project to identify the entry or exit of the cars into/out of park. These aluminum foils are arranged either side of the gate. The foils are arranged face to face across the road so that the foils should get signal continuously.

Keywords— 7 segment display, Internet of Things, Micro Controller, Arduino, Sensors, Stepper Motor

I .Introduction

The aim of this project is to atomize the car park for allowing the cars into the park. 7 segment display is provided to display the information about the total number of cars that can be parked and the place free for parking. A set of aluminum foil is used in this project to identify the entry or exit of the cars into/out of park. These aluminum foils are arranged either side of the gate. The foils are arranged face to face across the road so that the foils should get signal continuously. Whenever the mains are switched on, the 7 segment display displays the message parking space for 10 vehicles. The number indicates the maximum capacity of park in this project. Whenever a car comes in front of the gate, the signal gets disturbed and the microcontroller will open the gate by rotating the servo motor. The gate will be closed only after the car leaves the second foil since the microcontroller should know whether the car left the gate or not. Now the microcontroller decrements the value of the count and displays it on 7 segment display. In this way, the microcontroller decrements the count whenever the car leaves the park and displays it on 7 segment display board. If the count reaches maximum, i.e. if the park is completely filled, the microcontroller will display "0" on 7 segment display. And now if any vehicle tries to enter the park, the gate will not be opened since there is no space. If any vehicle leaves the park, the controller will increment the count and allows the other vehicles for parking.

II. Literature Survey

A. problem statement

In the center cities people face difficulties as increasing in number of vehicle creates congestion in roads, traffic problems and parking space problem. Every time the driver enters the parking lot and finds for the parking space, it is more effective if the particular area has a proper car parking system which displays the empty space for the car parking and reduces the time in searching of car parking lot in the area.

B. objective

The objective of this project is to design a system that can detect the number of parking space available in the place and display it. This shall be able to resolve the problem stated above. This is because this project is able to manage the parking system based on the number of parking space available there. Besides that, it also displays the number of parking space available there, which will reduce the problems faced by the driver while parking the car and also reduce the wastage of time. Detects the entry and exit of car using aluminium foil. Signal gets disturbed and the microcontroller will open the gate by rotating the servo motor. Microcontroller decrements/increment the value of the count based on the action of the car and displays it on 7 segment display.

III. Analysis

This project is a prototype to atomize the car parking system which is used in allow the cars inside the lot and display the car parking lot available. A set of aluminium foil is used in this project to identify the entry or exit of the cars into/out of park. These aluminium foils are arranged either side of the gate. The foils are arranged face to face across the road so that the foils should get signal continuously. The Arduino board is used as the microcontroller for the prototype which is programmed using Arduino software. This reduces time in search of parking lot and unnecessary mess in the parking area if there is no parking lot available.

A. Modules

a. Connecting Arduino to PC

The Arduino board is connected to system that is a computer and the Arduino software is used to code the Arduino board. This is allowed to detect the Arduino board.

b. Interfacing Arduino with servo motor

The servo motor is connected to the Arduino board using the male to male jumper wires. The servo motor is connected to the +5v of Arduino which gives supply to the Arduino.

c. Interfacing 7 segment display with Arduino

The common anode seven segment display is used to display the available parking lot in the system.

d. Uploading the codes through Software

Software's library files are built with C and C++ and the functionality of the components are coded through this software. The codes are uploaded using the cable.

B. Architecture diagram

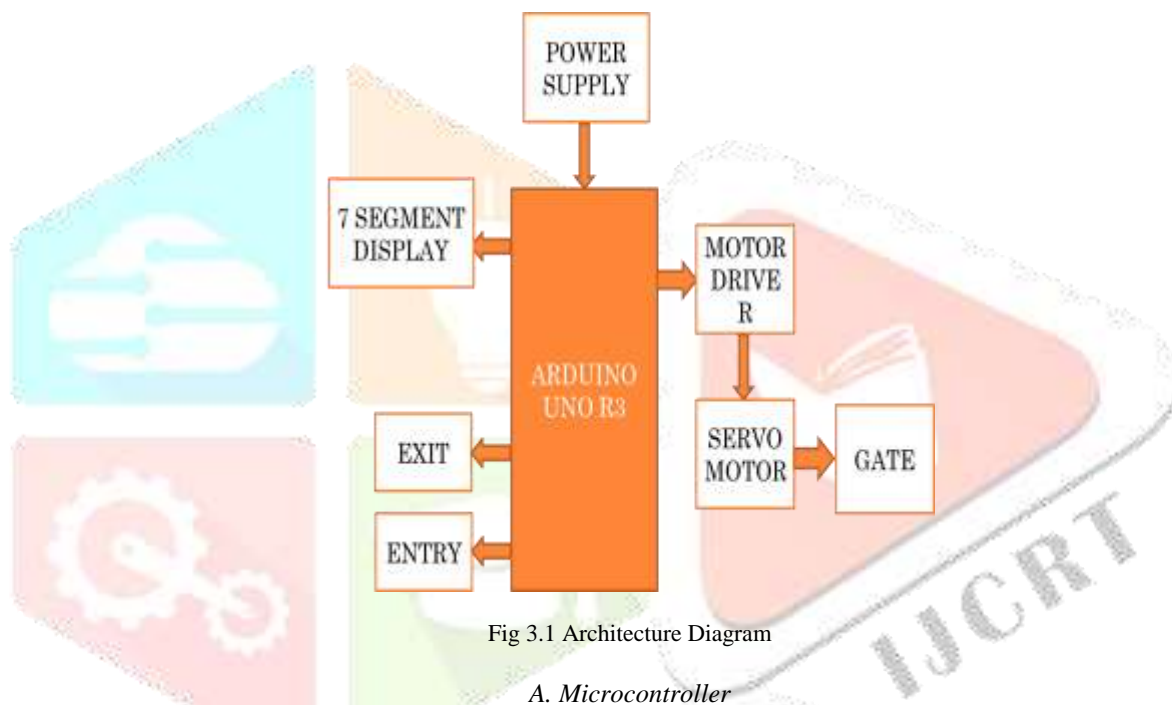


Fig 3.1 Architecture Diagram

A. Microcontroller

AT89C52 microcontroller is used in this framework. The micro-controller is a small computer on a single integrated circuit. Generally, a micro-controller is a System on a Chip i.e. SoC and one or more CPUs are embedded along with memory and programmable input/output peripherals.

B. Servo motor

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Servomotors are not a specific class of motor although the term servomotor is often used to refer to a motor suitable for use in a closed-loop control system.

C. Arduino board

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, An ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

D. 7 Segment Display

A seven-segment display (SSD), or seven-segment indicator, is a form of electronic display device for displaying decimal numerals that is an alternative to the more complex dot matrix displays. Seven-segment displays are widely used in digital clocks, electronic meters, basic calculators,

and other electronic devices that display numerical information. The seven elements of the display can be lit in different combinations to represent the Arabic numerals. Often the seven segments are arranged in an oblique (slanted) arrangement, which aids readability.

E. Arduino integrated development environment

Arduino software is different from windows to windows. The software should be downloaded the code of arduino is encrypted as shown in the fig 1. The task that should be done is given to the arduino software. The code is in c program. Ip address and password should be entered and saved according to the internet source we using. The saved changes should be uploaded.

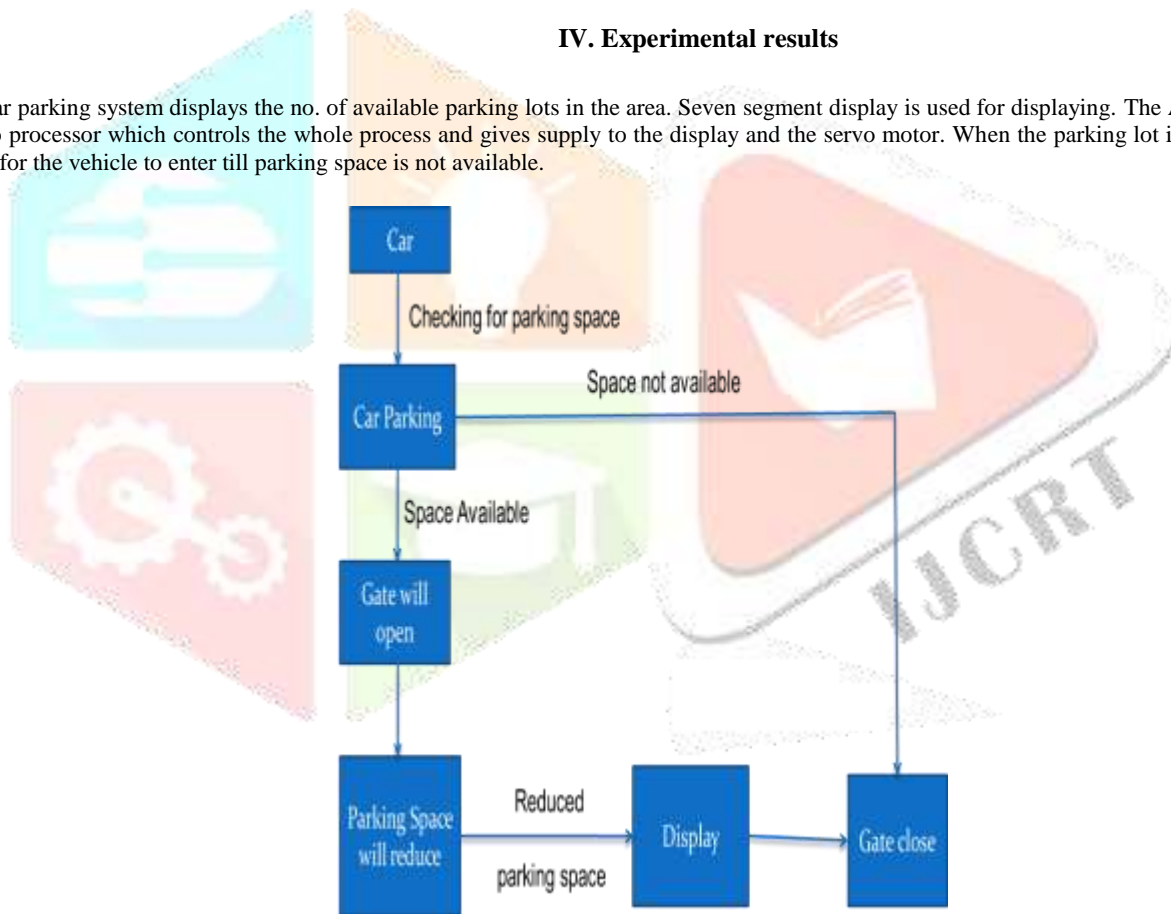
“the arduino integrated development environment (i.e., arduino ide) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the arduino and hardware to upload programs and communicate with them”.

Problem statement:

The existing system is using GPS (Global Positioning System) system if the connection is lost the railway gate system will also not work. Another system is using GSM it is impossible to install such system at each and every places. Some of the systems are using many gadgets which let to consumption of very high energy which is also not affordable. Most of the systems are using man power which is very time consuming and can also occur many human error.

IV. Experimental results

The car parking system displays the no. of available parking lots in the area. Seven segment display is used for displaying. The Arduino is used as the micro processor which controls the whole process and gives supply to the display and the servo motor. When the parking lot is full the gate does not open for the vehicle to enter till parking space is not available.



4.1 Workflow Diagram

```

car_parking_system / Arduino IDE / Windows (last 14.0.0)
File Edit Tools Help
car_parking_system
Sketch: car_parking_system
Serial Monitor
Function: void setup() {
  pinMode(12, OUTPUT);
  pinMode(11, OUTPUT);
  pinMode(8, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(17, OUTPUT);
  pinMode(18, OUTPUT);
  pinMode(16, OUTPUT);
  pinMode(15, OUTPUT);
  pinMode(14, OUTPUT);
  pinMode(13, OUTPUT);
  pinMode(12, OUTPUT);
  pinMode(11, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(8, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(4, OUTPUT);
  pinMode(3, OUTPUT);
  pinMode(2, OUTPUT);
  pinMode(1, OUTPUT);
  pinMode(0, OUTPUT);
}

void loop() {
  digitalWrite(12, HIGH);
  digitalWrite(11, HIGH);
  digitalWrite(8, HIGH);
  digitalWrite(9, HIGH);
  digitalWrite(17, HIGH);
  digitalWrite(18, HIGH);
  digitalWrite(16, HIGH);
  digitalWrite(15, HIGH);
  digitalWrite(14, HIGH);
  digitalWrite(13, HIGH);
  digitalWrite(12, HIGH);
  digitalWrite(11, HIGH);
  digitalWrite(10, HIGH);
  digitalWrite(9, HIGH);
  digitalWrite(8, HIGH);
  digitalWrite(7, HIGH);
  digitalWrite(6, HIGH);
  digitalWrite(5, HIGH);
  digitalWrite(4, HIGH);
  digitalWrite(3, HIGH);
  digitalWrite(2, HIGH);
  digitalWrite(1, HIGH);
  digitalWrite(0, HIGH);
}

```

Fig 4.2 Arduino Coding

V. CONCLUSIONS

This report introduced user friendly system for drivers. The main idea of this project is to create a parking system for cars. With the increasing number of population and reducing price of cars, it is becoming easy for mostly everyone to buy one or more car(s). So with the increasing number of cars the big problem is of parking it. One cannot find a proper parking place and has to drive a long distance, which results in more fuel consuming, more air pollution and wastage of time. In today's fast forward life no one can afford wastage of time.

This project is aimed to create a system which will show if there is any parking space available or not, and if available then how many. By using this system the drivers can find if any space is available or not and need not to drive the entire parking lot in order to find one parking space.

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