SMART PARKING SYSTEM

Abstract – Many problems occur for the car parking system in big theatres, Malls, Auditorium areas, Sensational tourist places of car traffic and need some advanced solution for that. Smart car parking system obtains information about available parking spaces it saves the time and efforts and also fuel wastage it could help bring order out of the chaos that exist at present in the car parking issue

I. INTRODUCTION

A car parking system is a mechanical device that multiplies parking capacity inside a parking lot. Parking systems are generally powered by electric motors or hydraulic pumps that move vehicles into a storage position. Car parking systems may be traditional or automated. Automatic multi-storey automated car park systems are less expensive per parking slot, since they tend to require less building volume and less ground area than a conventional facility with the same capacity. In the long term, automated car parking systems are likely to be more cost effective than traditional parking garages. Car parking systems reduce exhaust gas cars need not drive around in search of street parking spaces.

II. LITERATURE SURVEY

Finding a suitable parking space has become a significant concern for people residing in metropolitan cities.. The traditional parking methods cannot be used today as they are ineffective at utilizing space; hence it is vital to find alternative parking systems. The cost of land has grown exponentially in cities, so it becomes essential that the parking solution requires the least possible space and can accommodate the maximum amount of vehicles. The biggest issue with owning a car in a metropolitan city in India is finding a suitable parking space due to a lack of parking space. The number of cars in India is more than 40 million, which corporations and personal individuals own.

III. DESIGN SYSTEM

III.1. BLOCK DIAGRAM

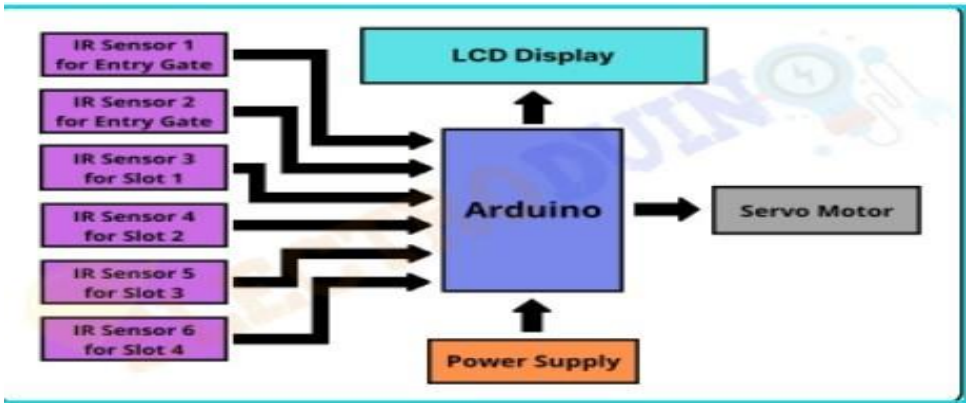

Figure 1. Smart Car Parking System

Initial stage of the project began from the literature review along with the assembly of the components followed by block diagram, studying its circuit, etc. Ardiuno is programmed through Ardiuno IDE software. When a car arrives, the IR sensors sends signal to Ardiuno and it decodes the signal and then the servo motor opens the gate for the car to pass. The second IR sensor is used to indicate the cars which are going outside and the value of the spots is incremented by Ardiuno. When the parking is full, the servomotor will not be used unless the second IR sensor sends the signal to Ardiuno i.e. until a car passes and goes outside. Ardiuno has ADC (Analog to Digital Converter) which encodes and decodes the signal received by IR sensors.

IV. COMPONENTS LIST AND SPECIFICATION.

IV.1. ARDUINO UNO

Figure 2. Arduino Uno Board

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.[1] The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.[4] It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo.[5][6] The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

IV.2. LCD DISPLAY

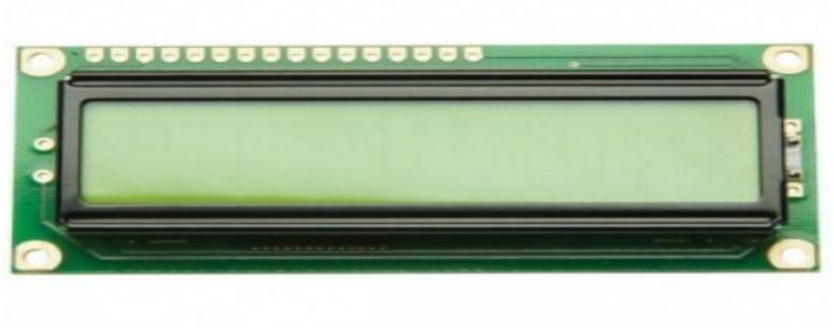

Figure 3. LCD Display

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light directly,[1] instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden. For instance: preset words, digits, and seven-segment displays, as in a digital clock, are all good examples of devices with these displays. They use the same basic technology, except that arbitrary images are made from a matrix of small pixels, while other displays have larger elements. LCDs can either be normally on (positive) or off (negative), depending on the polarizer arrangement. For example, a character positive LCD with a backlight will have black lettering on a background that is the color of the backlight, and a character negative LCD will have a black background with the letters being of the same color as the backlight. Optical filters are added to white on blue LCDs to give them their characteristic appearance.

IV.3. I^2C MODULE

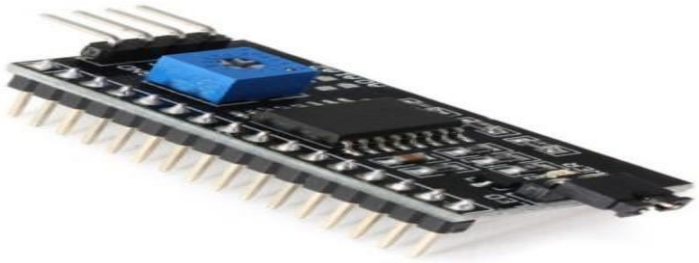

Figure 4. I^2C Module

I^2C (Inter-Integrated Circuit, *eye-squared-C*), alternatively known as I2C or IIC, is a synchronous, multi-controller/multi-target (controller/target), packet switched, single-ended, serial communication bus invented in 1982 by Philips Semiconductors. It is widely used for attaching lower-speed peripheral ICs to processors and microcontrollers in short-distance, intra-board communication. Several competitors, such as Siemens, NEC, Texas Instruments, STMicroelectronics, Motorola, Nordic Semiconductor and Intersil, have introduced compatible I^2C products to the market since the mid-1990s. System Management Bus (SMBus), defined by Intel in 1995, is a subset of I^2C, defining a stricter usage. One purpose of SMBus is to promote robustness and interoperability. Accordingly, modern I^2C systems incorporate some policies and rules from SMBus, sometimes supporting both I^2C and SMBus, requiring only minimal reconfiguration either by commanding or output pin use.

IV.4. SERVO MOTOR

A servomotor is designed to move to a given angular position. A typical servo motor has three connections. Two of them are the positive and 0V supply lines. The third connection carries the control signal pulses from the control circuit (the Arduino in this case).Servo motors may be classified, according to the torque it can withstand, as mini, standard and giant servos. Usually mini and standard size servo motors can be controlled by Arduino directly with no need to external driver. The rotor of the motor has limited ability to turn. Generally it can turn 60-90° on either side of its central position. The control signal is a series of pulses transmitted at intervals of about 18 ms, or 50 pulses per second.

The angle (of mechanical rotation) is determined by the width of an electrical pulse that is applied to the control wire. This is a form of pulse-width modulation, however servo position is not defined by the PWM duty cycle (i.e., ON vs. OFF time) but only by the width of the pulse. The width of the pulse will determine how far the motor turns. For example, a 1.5 ms pulse will make the motor turn to the 90 degree position (neutral position)as shown in Figure 5 ms turn as far as possible to the left. A2 ms turn as far as possible to the right. Intermediate pulse lengths give intermediate positions; this is very useful for controlling robot arms.

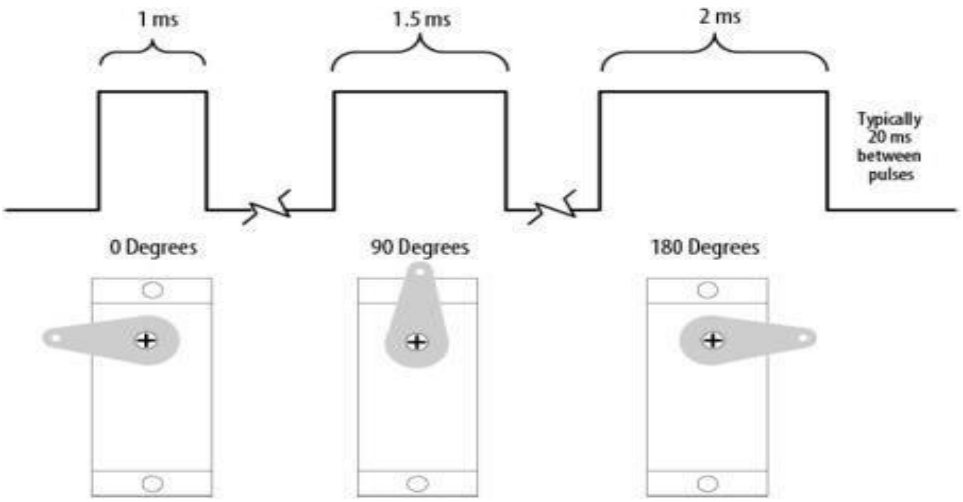

Figure 5. PWM Duty Cycle

IV.5. IR SENSOR

Figure 6. IR Sensor

An infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on who or what moved. For that purpose, an imaging IR sensor is required. PIR sensors are commonly called simply "PIR", or sometimes "PID", for "passive infrared detector". The term *passive* refers to the fact that PIR devices do not radiate energy for detection purposes. They work entirely by detecting infrared radiation (radiant heat) emitted by or reflected from objects.

4.6. BERG STRIP

Figure 7. Berg Strip

A pin header (or simply header) is a form of electrical connector. A male pin header consists of one or more rows of metal pins molded into a plastic base, often 2.54 mm (0.1 in) apart, though available in many spacings. Male pin headers are cost-effective due to their simplicity. The female counterparts are sometimes known as female socket headers, though there are numerous naming variations of male and female connectors. Historically, headers have sometimes been called "Berg connectors", but headers are manufactured by many companies.

V. RESULT AND CONCLUSION

Our project detects the empty slots and helps the drivers to find parking space in unfamiliar city. The average waiting time of users for parking their vehicles is effectively reduced in this system .It

effectively satisfy the needs and requirements of existing car. It also eliminates unnecessary travelling of vehicles across the filled parking slots in a city.

VI. FUTURE SCOPE

- In future works, this framework can be enhanced by including different applications. For Example : internet booking by utilizing GSM
- We can use wireless communication to enhance the usage of the system and can book a place from home.
- We will attempt to decrease the mechanical structure and attempt to make it eco-friendly.

REFERENCES

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[2] M. Fengsheng Yang, "Android Application Development Revelation", China Machine Press, 2010.

[3] Yanfeng Geng and Christos G. Cassandras, "A New Smart Parking System Based on Optimal Resource Allocation and Reservations," IEEE Transaction on Intelligent Transportation Systems, volume 14, pp. 1129 -1139, April 2013.