



GSM Based Car Parking System

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ABSTRACT

In general, we can notice a problem in multiplexes, cinema halls, huge companies, and function halls where they must go and look for an empty parking spot. For parking, they'll need staff who can park in the proper spot. It is an expensive procedure. To address this issue, the suggested solution provides safe and secure parking that does not require human intervention. The goal of this project is to assist users in obtaining real-time information about parking slots and saving time. Vehicle parking is proposed using GSM, Servo, and Stepper motors. IR sensors are used to detect unoccupied parking spaces. This application provides information on the occupancy status of parking spaces equipped with sensors that detect the presence of vehicles in the parking lot. A centralised system is exhibited, in which the car driver is able to determine which parking place is available, reducing human effort and saving time.

KEYWORDS: Arduino UNO, Global System for Mobile Communication (GSM) modem, IR sensors.

1. INTRODUCTION

Finding a parking place has become increasingly challenging as vehicle availability and usage have increased in recent years, resulting in a number of practical issues. In every large city, parking issues are becoming uncontrolled and escalating at an alarming rate. To some extent, the requirement for centralised systems with possible automations overcomes the problem. Multi-storeyed parking systems are one of the methods that can achieve full parking automation, however such projects will require a significant financial commitment. Smaller cities may not be able to justify the cost of such a system.

The proposed work focuses on single-story or multi-story parking with partial automation. The primary goal is to assist the motorist in determining the closest and most congested locations.



Fig: Single Level Parking System



Fig: Multi-Level Parking System

To get to the parking spot, there is a clear way. For airports, railway stations, and hospitals' subterranean

parking Universities, educational institutions, and corporate headquarters are just a few examples. The environment has sensors in the parking spaces that communicate data on the occupancy status in real time, and vehicle drivers can use their mobile phone to look for parking availability. As a result, the driver will be able to find an available parking spot in less time, saving energy consumption and pollution.

This type of Smart Car Parking System assists drivers in making informed decisions that reduce congestion and maximise available parking spaces. Finding a parking spot has become a daily worry in recent years, which is where the idea for this project arose. Smartphones, IR sensors that detect the presence of any object, and a system where parking spaces are fitted with these sensors that talks about the occupancy status of the parking spots have all evolved as a result of technological advancements.

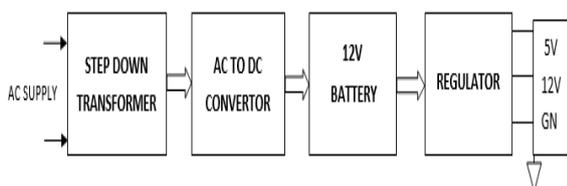
The GSM module is utilised to provide advance notice of a vacancy in a parking area. Not only does a smart automobile parking system regulate parking in a specific region, but it also maintains manual control to a minimum.

2.METHODOLOGY

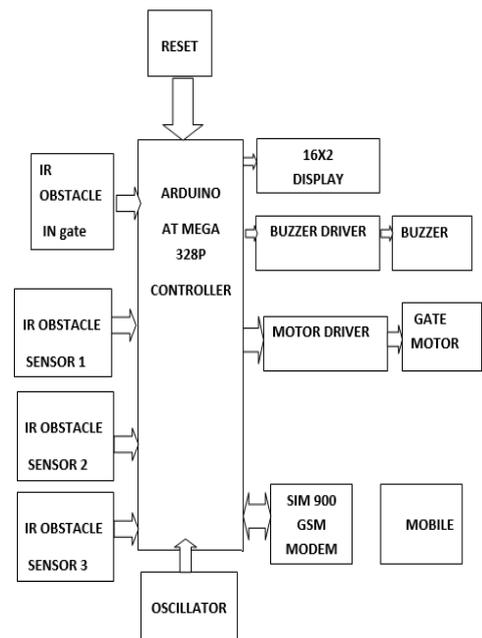
The goal is to make car parking more convenient while also reducing traffic congestion caused by hunting for a parking spot. With our method, a driver can get advance notice of parking spot availability in a parking lot. As an illustration, suppose take, for example, a mall with a parking area number to which the driver must send the SMS "STATUS" then driver will receive an SMS about the slot availability there at present. Primarily the gate will be closed, when car reaches the gate, the IR sensor placed at the gate detects the vehicle and the gate opens and the vehicle is parked at near available slot. A LCD screen is located next to the gate and displays the available parking spaces.

3.SYSTEM DESCRIPTION

A. POWER SUPPLY

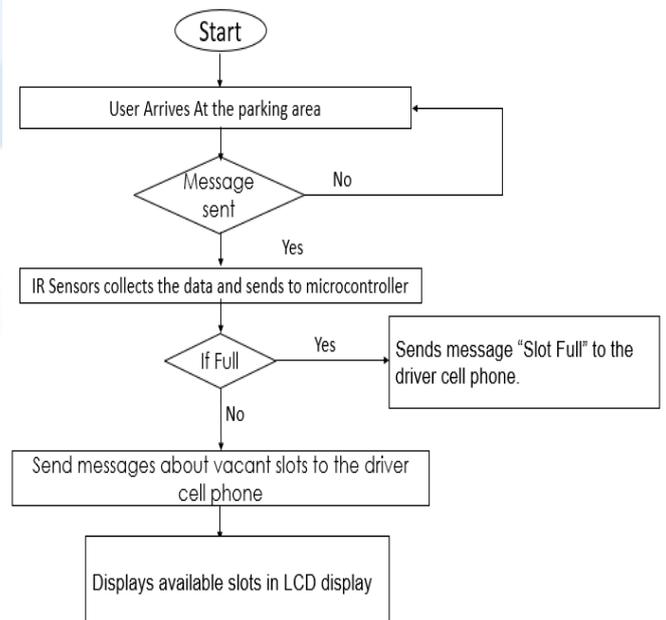


B. BLOCK DIAGRAM



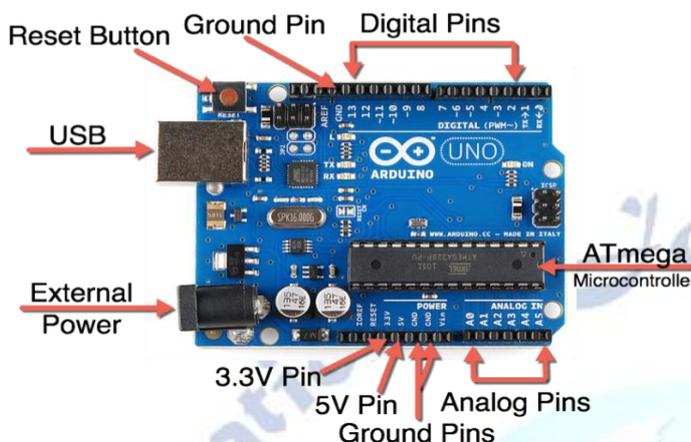
Arduino ATMEGA 328p is the microcontroller that we are using for this project. A servo motor is provided at the entry gate and it will work according to the information from the Arduino mega. The GSM module is used to establish contact between mobile devices and to send SMS messages. The proposed system includes a step-down transformer that transforms the 230V ac supply to 12V DC via an AC to DC converter; and then converts that 12V DC to 5V DC via a voltage regulator. This 5V DC supply will be connected to the Arduino's power port.

C. FLOW CHART



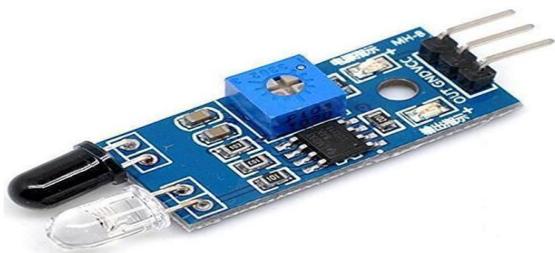
D. COMPONENTS

Arduino UNO:



The Arduino Uno is a microcontroller board based on the Microchip ATmega328P microcontroller (which is an 8-bit having RISC structure). It operates at 5V, which is of having 14 digital I/O pins of which 6 provide PWM output. On the microcontroller, there are USB ports, power jacks (connectors), an ICSP header, and a reset button. One of the most important components in the suggested system is the Arduino, which is connected to and powered by other components. It has software as well as an ATmega328 CPU, which is essential for the components' proper operation. The Arduino IDE is open-source software that allows you to write and upload code to any Arduino board.

IR Proximity Sensor:



The presence or motion of objects is detected by an infrared proximity sensor, which is an electrical component. It is made up of an emitter that sends out infrared rays, which are gathered by a receiver next to the transmitter. When the infrared transmitter sends out radiation, it hits the object, and depending on how strong

the response is, some of the energy is reflected back to the infrared receiver sensor.

GSM Modem:



A dual-band GSM/GPRS SIM900A powers it. It also uses the 900/1800 MHz frequency band, which may be modified with AT Commands. The GSM module is designed for wireless short-messaging service (SMS) transmission (SMS). This module may accept serial data from radiation monitoring devices. In both directions, data can be transmitted and configurations can be formed. The module's firmware is in charge of communication tasks between the device and the host server. In this project GSM is used to send an SMS to user to know availability of slots.

LCD Display:



A Liquid Crystal Display (LCD) is an electronic device that shows data and messages. It has 16 columns and 2 rows, as the name suggests. Here it is used to display the vacant slots.

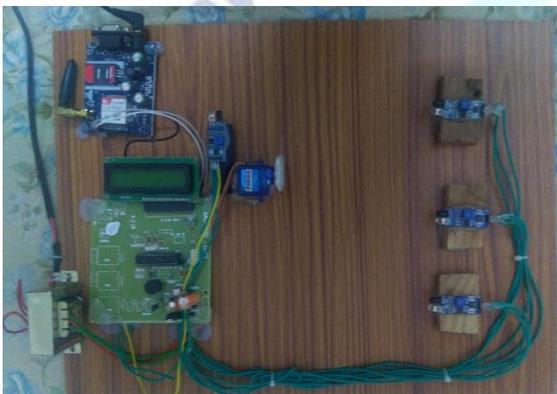
Stepper Motor:



An electro-mechanical device that translates electrical pulses into discrete mechanical movements is known as a stepper motor. When electrical command pulses are supplied in the right sequence to a stepper motor's shaft or spindle, it turns in discrete step increments. The applied input pulses have various direct links with the motor's spinning. The direction of rotation of the motor shafts is directly related to the sequence of applied pulses.

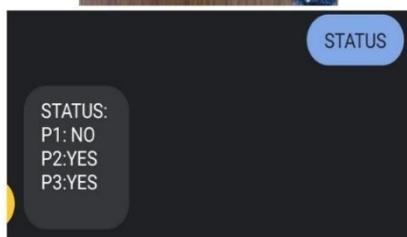
4.RESULTS AND DISCUSSION

The proposed system's prototype is shown below:



The following are some outcomes of the prototype:

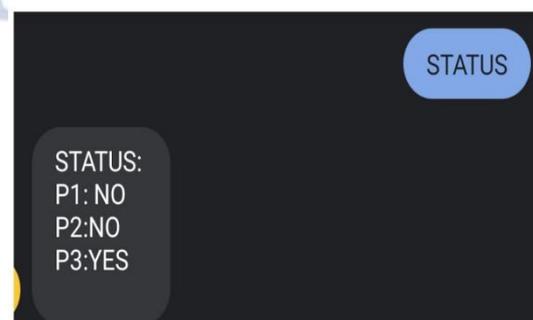
Case-1: Figure showing that slots 2 and 3 are available and the same is also shown in the LCD display.



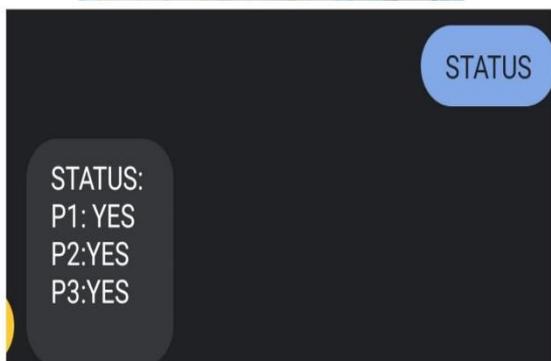
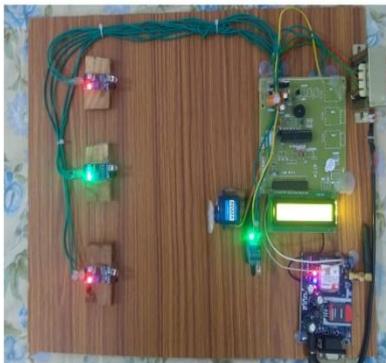
Case-2: Figure showing that all slots are full.



Case-3: Figure showing that only slot 3 is available.



Case-4: Figure showing that all slots are available.



Conflict of interest statement

Authors declare that they do not have any conflict of interest.

REFERENCES

- [1] Noor Hazrin Hany Moham, Mohd Hafiz Badiozaman, Hanita Daud, " Smart Parking Reservation System Using Short Message Services (SMS)", IEEE ,ICIAS, June 2010.
- [2] Yusnita Rahayu and Fariza N. Mustapa, "A Secure Parking Reservation System Using GSM Technology", IJCCE, Vol. 2, No. 4, July 2013
- [3] Hemant Chaudhary, Prateek Bansal, Dr. B. Valarmathi, "Advanced Car Parking System Using Arduino", IEEE 4th ICACCS, January 2017.
- [4] B. Ramya Sri, A. Monika, G. Gowry Naga Sravanthi, D. Drona Akshay Kumar CH. Papa Rao, "Automatic Car Parking System using IR Sensors", IJESC Volume 7, Issue No.4, April 2017.
- [5] Balwant Patil, Avinash Deshpande, Vilas Patil "PLC Based Instinctive Car Parking System" International Conference on Advances in Engineering (ICAE-2016) Bengaluru, INDIA .
- [6] M.F. Ismail, M.O. Reza, A.A. Rokoni and M.A.R. Sarkar (2019), "Design and Development of an Advanced Vehicle Parking System" IEEE/OSA/IAPR International Conference on Informatics, Electronics & Vision, 978-1-4673- 1154- 0112/\$31.00 ©2012 IEEE