GSM BASED AUTO SECURED CAR PARKING SYSTEM

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ABSTRACT

Automatic car parking system is used to reduce the traffic in the parking place. Normally we can see in the multiplexes, cinema halls, large industries, and function hall there is a problem they have to go and search for which place is empty to park the vehicle, for parking then they need workers for parking in the correct position. It is the money consumed process. So to avoid this problem, The proposed system offers safe and secure parking without human intervention. Based on the availability of the slot user registration is allowed and based on the slot allocated OTP will be issued to the corresponding user. Parking is mandated at shopping malls, multiplexes, function halls, and industries. Using GSM, Servo and stepper motors, vehicular parking is proposed. IR sensors are used in identifying the empty parking slots. Allocation of slots is starting from layer one in a sequential manner done by the Arduino system. This system handles users with the same platform one after another manner. Users can get retrieve their vehicle by feeding OTP to the system as a password. Simply parking at the entrance of the venue and mobile registration is required from the user end, rest of the thing will be taken care by the proposed system. The proposed system will solve the parking issues, with the advanced parking slot booking.

Keywords: Arduino, Stepper motor, GSM, Keypad, Servo motor, IR sensors

1. INTRODUCTION

Automated parking is a method of automatically parking and retrieving cars typically using a method of allocating the slots to the cars. As the system removes the need for driveways and ramps, the floor area and the volume of the parking station itself can be more efficiently used. Automated parking systems can be designed to fit above or below ground, allowing for flexible usage of land space; this means the footprint can be reduced to one-third of the land
required by conventional car parking solutions. Cost effective on a number of fronts, automated parking, offers sufficiently great improved service to the people. With more environment influence and time impact, theses problems are reduced opportunities for theft and vandalism. Auto parking is the new concept in urban planning.

Automatic Parking Systems introduces the first semi-automated parking system providing the easiest and safest way to park the vehicle by using sensors[2].It indicates which slot will be empty, with the presence of footprint. It takes much time to park a number of vehicles at a time[1]. And especially there are provide parking places in multiplexers, cinema halls, large industries.

Due to the increase in the number of vehicles on the parking place, traffic problems are trouble to exist[3]. Due to the fact that the current transportation infrastructure and car park facility developed are unable to struggle with an arrival of vehicles on the parking places[11]. To alleviate the above-mentioned problems, the secured auto parking system has been developed. With the implementation of the parking system, the protector can easily locate and secure a vacant parking space at any epoch. In this parking system, there are two types of parking systems; one is allocating a slot for parking, and another one is tagging.

This proposed system is mainly comprehended of low manual power as well as efficient equipment can be installed any of the industrial, institutions/universities, etc. Hence it is a low-cost apparatus as it mainly uses a microcontroller which is programmable, which is easy to install in any of the above places mentioned.

2. NEED FOR SYSTEM DEVELOPMENT

In predominant parking system, with the presence of human being to park the vehicle at available place. It is very difficult for a human to continuously the flow of vehicles to the parking place[12]. In predominant parking system, anyone can touch the vehicle so many problems can occur. Due to insufficient security because of accusation of plagiarized personal items in the vehicle. So there is a need to develop Auto secured Car Parking System. Simply parking at the entrance of the venue and mobile registration is required from the user end, rest of the thing will be taken care by the proposed system. The proposed system will solve the parking issues, with the advanced parking slot booking. The proposed system will solve the parking issues and reduced space occupation.

3. OBJECTIVES OF PAPER

- User Registration
- OTP Generation
- Servo controlled platform
- Slider arrangement
- Parking Slot identification starting from the first layer

4. HARDWARE DESIGN

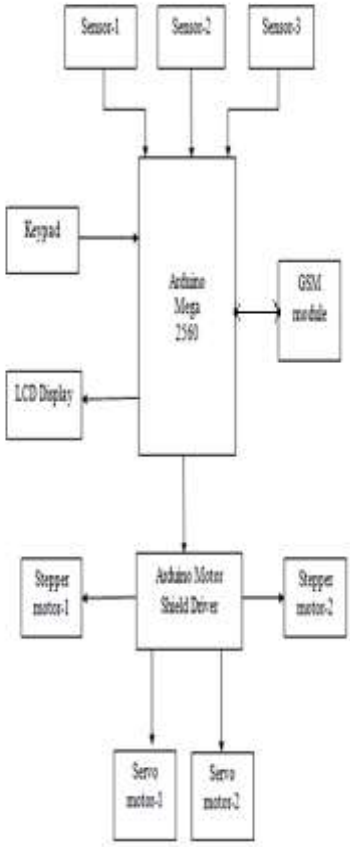

Fig1:Block diagram

5. WORKING PRINCIPLE

Arduino Mega 2560 is the heart of the total hardware, and here every component is interconnected with the Arduino Mega 2560[15]. In this process, three sensors were used, and each sensor was placed on each floor by that it can sense and move by floor by floor. In this, we are using two stepper motors which were connected to Arduino so that it can move by floor by floor in upward and downward motion. In this we are using two servo motors which were also connected to the Arduino actually, one servo motor can move 180 degrees rotation but here in our process we need 360 degrees rotation so to avoid this problem, we connected two servo motors by that it becomes (180 degrees +180 degrees = 360 degrees) so that it can move in a circular way in 360 degrees rotation. Here there is a GLCD display which is used by the user to enter details like car number and mobile number on the display. There is a keypad provided there which is used to enter the OTP that was given to the user .Here we are using GSM for security purpose. IR5mm,to identify the slots for the park the car as well as retrieve the car. By using this secured car parking management system, we can park a number of vehicles.

6. FLOW CHART FOR PARKING THE CAR

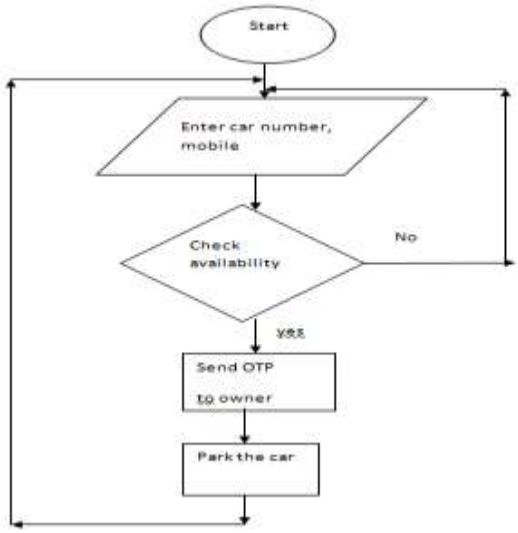

Fig2: parking car

7. FLOW CHART FOR RETRIEVE THE CAR

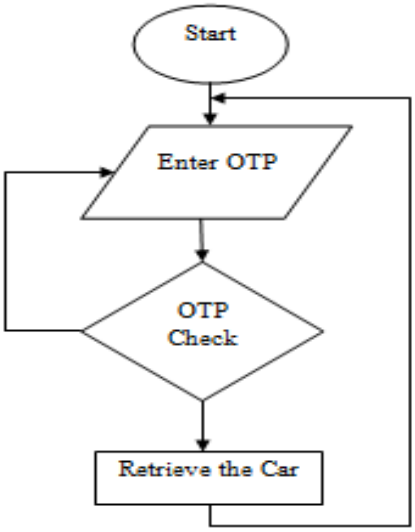

Fig3:Retrieve the car

8. ARDUINO MEGA 2560

Arduino is an open source prototype platform it is easy to understandable language in software. and easy to interface a number of modules on the board. In my proposed system, the interfacing modules are GSM, Keypad Servo motor, Stepper motor, IR sensors .the main advantage of Arduino is to depot the program number of times and program can be removed easily .In Arduino having 54 general purpose pins and 16 analog pins. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. Allocation of slots starting from layer one in a sequential manner done by the Arduino system.

9. SERVO MOTORS

A servo motor is an electrical device which can push or rotate an object with great precision. if you want to rotate an object at some specific angle, then we are using a servo motor. In my proposed system using dc motor 30rpm[16] .the position of a servo motor is decided by an electrical pulse and its circuits. For dc servo motor generally have separate dc source for field wind winding and armature winding. The servo motor controlled by field current and armature current.

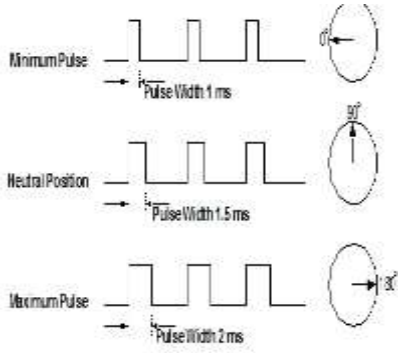

Fig4: Angle indication with respect to pulse

10. STEPPER MOTOR

The stepper motor is a special type of electric motor that means that moves up and down rotating the motor[14]. In this stepper, the motor number of teeth increases the performance of stepper motor increases .it rotates step by step process .the speed of the motor is determined by the time delay between each incremental movement. In my proposed system using dc 10rpm to rotate up and down mechanism .the speed of the motor is determined by the time delay between each incremental movement[13].

Fig5: stepper motor

11. GSM MODEM SIM900A

GSM modem just accepts certain commands through a serial interface and acknowledged .these commands are called AT commands. There is a list of AT commands to instruct the modem to perform its functions. Every command starts with "AT" That's why they are called as AT commands. In my proposed system is used to GSM modem to register the user phone number on a keypad. Using GSM modem OTP will be generated and transmit to that particular person Ph number.

12. IR SENSORS

In my proposed system using IR5mm, to identify the slots for park the car as well as retrieve the car

Fig6: IR5mm

13. RESULT

By using this secured car parking management system, we can park a number of vehicles in small space by providing security and safety to the vehicles. The user can only retrieve the car by using an OTP provided to the user.

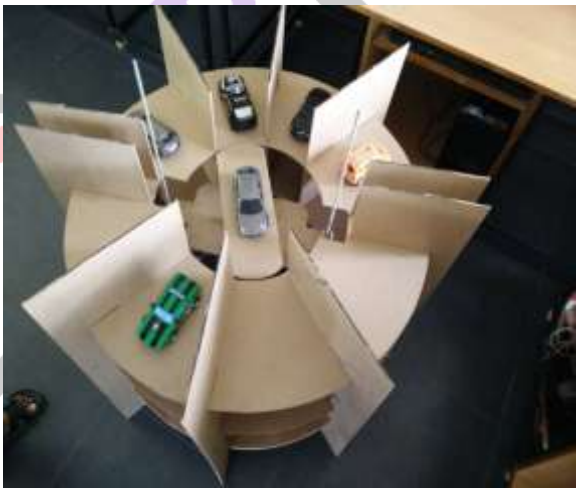

Fig7: Top view of the project

Fig8: Side view of the project

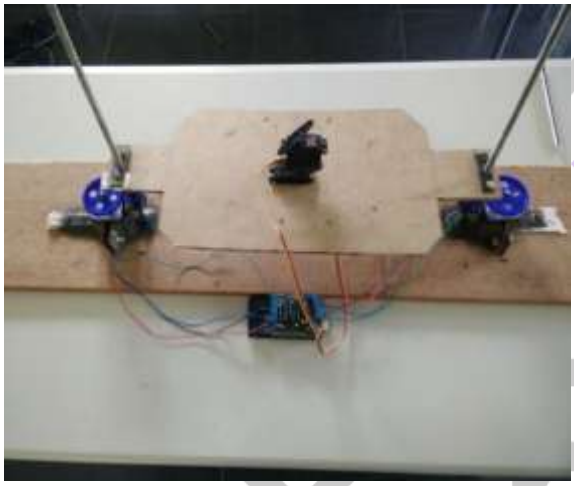

Fig9: Central mechanism

14. CONCLUSION

Auto secured car parking is one of the major role in traffic area, multiplexes, apartments and industrial areas, etc.; in this system that is discussed here, it provides security to the vehicle without a human being.

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