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# Automatic Self-Parking Chair

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**Abstract -** *We believe in the simplicity of day-to-day actions. We want to make what was once difficult to perform an easy task for the average individual. Now a day's the physical work is coming into an existence since, the technologies are advancing and many technology have been developed for the automatic operation and it is being used in our day to day life such as self parking cars that avoids accidents which provides the safety of the humans. This automatic systems are being developed for the comfort and safety of the people. So for our final paper, we aim to create a chair that parallel parks itself. We can use different types of interrupts to perform the further operation the interrupts can be sound sensor, Bluetooth device, RF signal etc. In this chair we will be using one RF input to provide interrupt signal, which will feed data to an on-board FPGA that will control its motors, using a finite state machine.*

***Key Words*: *FPGA, IR LED, SMPS, Microcontroller***

## 1. INTRODUCTION

In the paper "Automatic Self Parking Chair System" we have shown the concept of an Automatic Chair Parking System. As in the modern world everything is going automatic, we have built a system which will automatically sense the start and end point location. We have deployed a microcontroller used to sense the movement of chair and check whether there is a capacity for Chair to park, then decide to move or not. There are two sets of sensors: one is installed for RF sensing which gives the interrupt to the system and wheel encoder reminds the movement of chair for its real position. If any obstacle comes between the chair and parking position IR sensor will detect the obstacle and the chair will stop until the obstacle is moves away. As soon as the obstacle moves the chair will go to its parking position. The use of this chair in this modern world is to reduce human efforts and less manpower.

## II. Literature Survey

A one of a kind answer for the issue of cleaning up lines of seats after office gatherings a notable Automakers Nissan have built up the innovation. The Japanese firm has concocted self-fueled office seats that stop the rearranged seats themselves over into their stopping position with the sound sensor. This Japanese organization utilized four movement delicate cameras toward the edges of a roof and utilized them to track general office seats on wheels this innovation is otherwise called picture handling. The Wi-Fi controlled cameras find each seat's area and it takes after the course back to its beginning stage. The room format is pre-modified into the framework, with singular seats allocated their own spot at the table. The seats have been customized to react to the sound sensor or the hints of a human applaud, with each seat consequently backpedals to its underlying position. We were really taking a gander at office seats as a theme and seek there is a need after this in some real organization, in their gathering room. "Nissan's definitive objective is self-driving (autos), and the self-stopping part is only one of the procedures en route. More than considering them just furniture, we trust individuals can consider it to be the means by which our innovation can be brought into different articles". Some even said they wished to see it in their own homes like examination room, feasting table and so forth [1] from the innovation and learning behind its self-stopping autos, Nissan planned what it calls the "Intelligent Parking Chair." The Intelligent Parking Chair can turn 360 degrees, and finds an objective position with the assistance of four cameras, put all through the room, that "produce a best view to remotely transmit the seat's position and its course to goal." [2] It is centered around accomplishing just a single errand (self stopping) by coordination of sensors and engines controlled by microcontroller and methodology arranging/coding, in this manner the vehicle stage isn't worked from the parts however from changing a RC toy auto rather to save the time. There are three sorts of stopping designs: parallel, front/back-in opposite, and with a point (45 degrees normally), and this undertaking is generally simply centered just around parallel stopping. [3] Making our ventures Wireless dependably makes it to look cool and furthermore broadens the range in which it can be controlled. Beginning from utilizing an ordinary IR LED for short separation remote control till an ESP8266 for overall HTTP control there are bunches of approaches to control something remotely. In this task we will figure out how we can assemble remote activities utilizing a 433 MHz RF module. These modules are shoddy for its capacities and are effectively accessible. They can either be utilized as independent Transmitter and Receiver or be interfaced with a Microcontroller. Here we will take in the rudiments of RF module and how to utilize it as an independent RF Transmitter and Receiver. Here we have clarified the RF Transmitter and Receiver Circuit by controlling the LEDs remotely utilizing RF[4] 8051 Microcontroller is a programmable gadget which is utilized for controlling reason. Fundamentally 8051 controller is Mask

programmable means it will customized at the season of assembling and won't modified once more, there is a subsidiary of 8051 microcontroller, 89c51 miniaturized scale controller which is re-programmable. 89c51 is 8-bit gadget implies it can do 8-bit tasks. It have 4 ports which are utilized as information or yield as per your need. This gadget likewise have Timer, Serial Port interface and Interrupt controlling you can utilize these as per your need[5] Auto parking areas are a critical protest class in numerous rush hour gridlock and non military personnel applications. With the issues of expanding urban movement blockage and the consistently expanding lack of room, these auto parking areas are should have been all around outfitted with programmed stopping Information and Guidance frameworks. Objectives of shrewd parking garage administration incorporate checking the quantity of stopped autos, and distinguishing the accessible area. This work proposes another framework for giving stopping data and direction utilizing picture preparing. The proposed framework incorporates checking the quantity of stopped vehicles, and recognizing the slows down accessible. The framework recognizes autos through pictures as opposed to utilizing electronic sensors implanted on the floor. A camera is introduced at the section purpose of the parking garage. It will catch picture groupings. Setting picture of an auto as reference picture, the caught pictures are consecutively coordinated utilizing picture coordinating. For this reason edge location has been done utilizing Prewitt edge identification administrator and as per level of coordinating direction and data is given to the approaching driver [6]. Microcontrollers resemble microchips, yet they are expected to fill in as a real single chip structure by organizing each one of the devices required for a system on a singular chip. The major viable units of a microchip will be ALU, a game plan of registers, timing and control unit. The microcontroller will have these handy squares and moreover may have IO ports, a programmable clock, RAM memory and EPROM/EEPROM memory. Some microcontrollers may even have internal ADC and furthermore DAC.[7] In composing analyzing chip, we consistently watch the term embedded system. Chip and microcontrollers are extensively used as a piece of introduced structure things. An embedded thing uses a microchip or microcontroller to finish one endeavor and one task in a manner of speaking. In spite of the way that microcontrollers are the favored choice for some introduced structures, there are times that a microcontroller is insufficient for the errand. along these lines, of late various makers of extensively valuable chip, for instance, Intel, Freescale semiconductor Inc. furthermore, Cyrix have concentrated on their chip for the high end of the embedded market. The in particular standard in picking a microcontroller is that it must address the activity that issues to be done profitably and cost suitably. In analyzing the necessities of a microcontroller based exercises, we should first watch whether a 8-bit, 16-bit or 32-bit microcontroller can manage the figuring needs of the task for the most part feasibly.[8]

## III. Existing System

In our system we have used microcontroller IC with RF transmitter and receiver which is generally works on 5V and 6V.

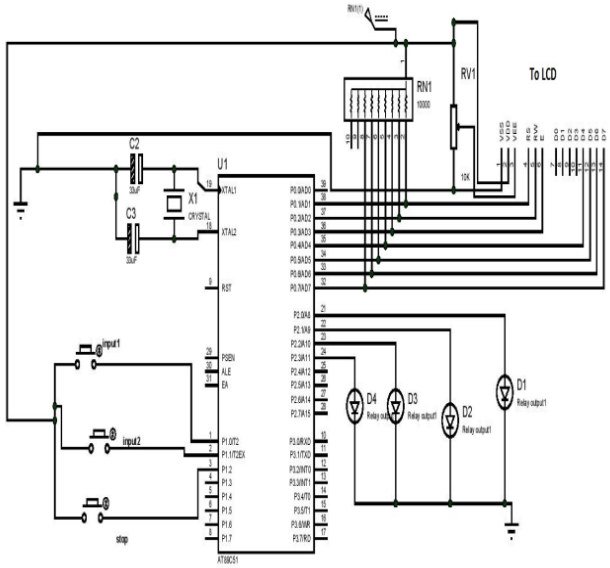


Fig.1

The main specialty of our system is that we have not used SMPS in it because it works on different voltages, since we do not have continuous power supply, we used 7805 IC on which our system is working which convert the 12V power into 5V due to which our whole circuit is working.

Image 1

A 12 volt supply is used for the motor driver. In this system first we power on the supply due to which microcontroller will on and then we have given an interrupt as soon as we gives an interrupt to chair it will start rotating in 360 degree to find its position.

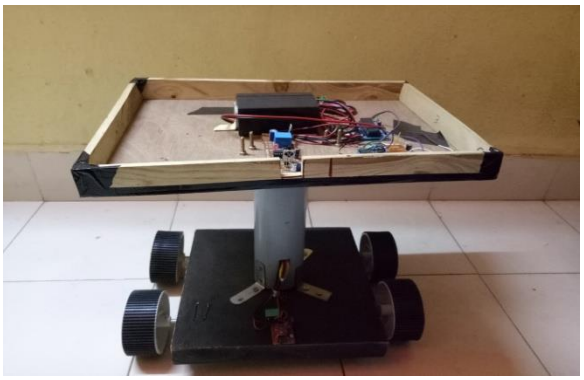

Image 2

As soon as chair finds its parking path it will moves towards its respected parking position.

Image 3

If any obstacle comes between the chair and to its position the obstacle sensor will detect the obstacle and will stop at its position until the obstacle moves. As the obstacle moves chair will starts moving towards its respected parking position.

## IV. Proposed System

The paper is focused on achieving a single task (automatic parking) by integration of sensors and actuators controlled by microcontroller and strategy planning/coding, therefore the vehicle platform is not built from the parts but from modifying a RC toy car instead for saving the time. There are generally three kinds of parking patterns: parallel, front/back-in perpendicular, and with an angle (usually 45 degrees), and this project is just focused on the parallel parking. The modified toy car is expected to do the following tasks in a complete automatic parking process:

1. Once the length of a parking space larger than the length of the car plus a buffering distance is detected, the chair will stop automatically.

2. Perform a smooth and efficient parking behavior according to the relative positions of the car and the parking space.

**The automatic chair parking system has the following major components:**

The chair consists of 12V DC a servo motor in the front and 12V DC power supply

Microcontroller 89c51, L293D motor driver interfaced with the servo motor and microcontroller.

**L293D motor driver**:

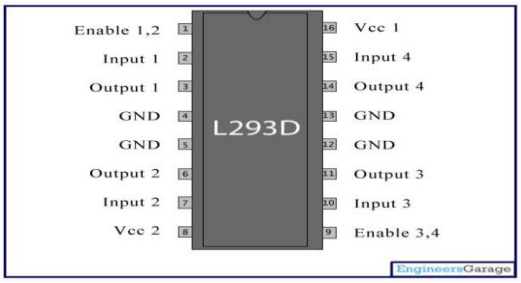


Fig 2 L293D motor driver

Fig 2 shows L293D motor driver. L293D is a double H-connect engine driver coordinated circuit (IC). Engine drivers go about as momentum intensifiers since they take a low-flow control flag and give a higher-ebb and flow flag. This higher current flag is utilized to drive the engines. L293D contains two inbuilt H-connect driver circuits. In its basic method of task, two DC engines can be driven at the same time, both in forward and invert heading. The engine activities of two engines can be controlled by input rationale at pins 2 and 7 and 10 and 15. Info rationale 00 or 11 will stop the comparing engine. Rationale 01 and 10 will turn it in clockwise and anticlockwise bearings, individually. Empower pins 1 and 9 (comparing to the two engines) must be high for engines to begin working. At the point when an empower input is high, the related driver gets empowered. Thus, the yields wind up dynamic and work in stage with their sources of info. Thus, when the empower input is low, that driver is incapacitated, and their yields are off and in the high-impedance state.

**IR sensor:**

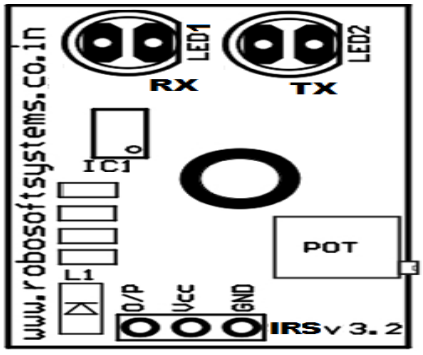


Fig 3 IR sensor module

The IR Sensor-Single is a general purpose proximity sensor. Here we use it for collision detection. The module consists of an IR emitter and IR receiver pair. The high precision IR receiver always detects an IR signal. The module consists of 358 comparator IC. The output of sensor is high whenever it IR frequency and low otherwise. The on-board LED indicator helps user to check status of the sensor without using any additional hardware. The power consumption of this module is low. It gives a digital output.

Image 4 IR Sensor Module

The sensitivity of the IR Sensor is tuned using the potentiometer. The potentiometer is tunable in both the directions. Initially tune the potentiometer in clockwise direction such that the Indicator LED starts glowing. Once that is achieved, turn the potentiometer just enough in anti-clockwise direction to turn off the Indicator LED. At this point the sensitivity of the receiver is maximum. Thus, its sensing distance is maximum at this point. If the sensing distance (i.e., Sensitivity) of the receiver is needed to be reduced, then one can tune the potentiometer in the anti-clockwise direction from this point

**Detecting a proper size parking space**:

After the switch is turned on, the chair starts moving in a constant speed along the "conference hall" with a fixed distance from the other "parked chairs". Once the chair passes an empty space, the two side sensors will judge if the "depth" of the space larger than the chair width for parking. If the parking space is not wide enough, the chair will continue moving; while even if the space width is large enough, the chair will still keep on moving to measure the space length. The ultrasonic sensors collect real-time distance measurements and record the moments of sudden distance changes. The information will be sent to the micro controller 8051 to calculate the length of the empty parking space.

## V. Future Scope :

i. In corporate companies like board room after completion of meeting the employees moves away without arranging the chairs thus, this system automatically arrange the shuffled chairs to their respective position.

ii. It may used in schools and colleges like in the practical labs the students moves away without arranging the shuffled chairs hence, by giving the interrupt to the system it arrange the chairs in their original destination.

iii. In conference halls the people goes away after completion of conference without arranging the displaced chairs. This system helps in arranging the displaced chairs in their located position.

## VI. Conclusion :

Using this system we can reduce the human effort. It is a self-parking system because of this there is no manual operation required. Due to this we can easily arrange the chairs in their respective places just by giving the interrupt to the chair.

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