

Self-Parking Chair Using Microcontroller 8052

Jitendra Bhandarkar¹, Ankita Ijankar², Aakansha Dalvi³, Shivani Hedau⁴, Jaya Bhattad⁵

¹²³⁴B.E. Scholar, ETC, Priyadarshini College of Engineering, Nagpur, India

⁵Assistant Professor, ETC, Priyadarshini College of Engineering, Nagpur, India

Abstract - Inspired by the technology and learning behind its self-parking cars, we designed what it calls the "Self-Parking Chair". "By day, these chairs are inanimate objects. By night, they park!" While motorized human transporters have yet to truly take off. We have come up with something more practical for the time being, self-parking office chairs. With a single click on a switch, these futuristic furniture will automagically tuck themselves back into their rightful positions, thus keeping your office or meeting room neat and tidy. And of course, it's also fun to watch, as you can see in real. These modified chair is actually tracked by the walls in order to detect magnetic reason, and then they are simultaneously controlled via microcontroller.

Key Words: System, Microcontroller 8052, Ultrasonic Sensor, Electronics Components.

1. INTRODUCTION

As all the teachers/faculties are aware with the problem of untidiness of laborites that is after completion of two hours of practical laborites gets untidy. A unique solution to the problem of tidying up rows of chairs after office meetings. We are inventing self-powered office chair that park themselves back into their original position by click on a wireless switch. Two motors and a free wheel fitted to drive the wheels at its base, themselves which direct the chair position. The chair includes Ultrasonic sensors separately fitted with a chair to automatically move in search of a minimum distance with a system, that indicates the target location (default position).

1.1 Problem Definition

There's a fine line between making our lives easier and making us lazy, and as of late, technology is really toying that line. It's now too difficult to push your own seat in when you get up. Seriously, it's like we're celebrating slovenliness. - The chair, which was inspired by the slightly more useful self-parking car technology, is able to make 360-degree turns, zero in on a target location, and then literally put itself away. Only instead of formerly animate animals coming to life, this is an inanimate chair moving around of its own accord [3]. These high technology based chairs which is made up on image processing concept are so costly that every local or small firms cannot afford to have it. This technology required separate specific rooms for the alignment of chairs and IR receiver block which will control the chairs movements which is difficult for every firm to arrange. Hence can be arranged in few selected institutions [5].

Hence we are inventing this chair with minimum cost and simple technology with easy use where the concept is that, system detect any object and during moving in forward and change its moving direction, As the chairs are self-arranged when it comes in the magnetic region which is nothing but a table area, what if the chairs are manually shifted for some important discussion and on a single unwanted command it starts moving and disturbs the very important talk [2]. It is so funny to imagine the chairs are moving from one room to another on a single click of a RF switch. Since the chairs are self-parking, the person may get hurt if he is coming on the way of chairs while aligning to their original position as the technology is made only to judge the aligning position of the chairs and not to check the human body [4].

2. SYSTEM BLOCK DIAGRAM & WORKING

In order to park the chair itself, press the switch which is fitted at the particular place or at the side of the existing door, this switch working on the principle of radio frequency modules which uses 433MHz of frequency for sending parking command signal to the main or controller system. At the controller side the RF receiver circuit is connected to decode this command signal and starts the programming implementation. First activating the ultrasonic sensor. The chair will move forward and detects any obstacle if it is wall. After its found, both motors will rotate in opposite direction and change the direction of chair. IR sensors use to detect the wall and it maintain the distance between wall and system. Magnet is fitted at below of the table, if magnet is found by the miniature magnetic sensor which is fitted at the system, then it will stops the system. LCD is connected to the controller for monitoring the distance at every time.

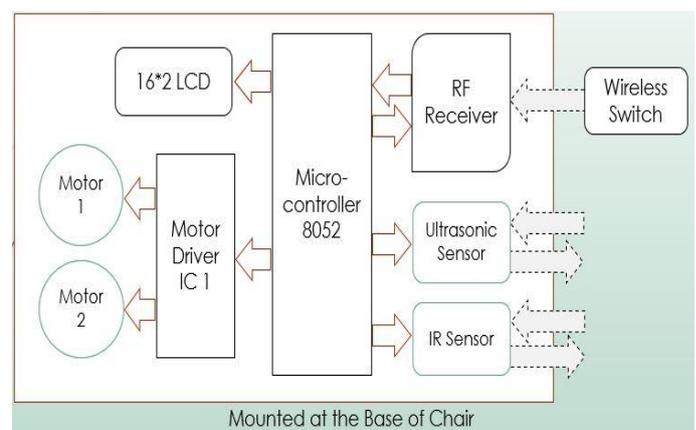


Fig -1: Block Diagram for Self-Parking Chair

3. SOFTWARE DESCRIPTION

3.1 Programming Software - Keil μ Vision

The μ Vision IDE from Keil combines project management, make facilities, source code editing, program debugging, and complete simulation in one powerful environment. The μ Vision development platform is easy-to-use and helping you quickly create embedded programs that work. The μ Vision editor and debugger are integrated in a single application that provides a seamless embedded project development environment.

3.2 Simulation Software- Proteus Design Suit v8.0

Proteus is a software technology that allows creating clinical executable decision support guidelines with little effort. Once a guideline for a condition has been created, it can be executed to provide stepwise advice for any patient having that condition.

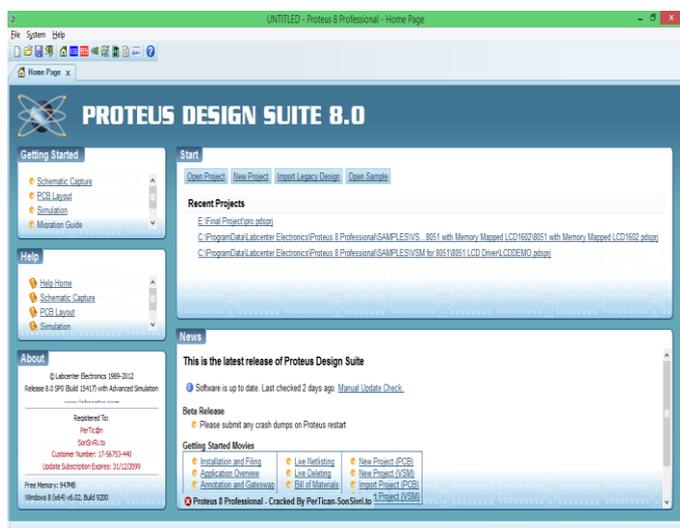


Fig -2: Screenshot for Simulation Software

3.3 Schematics Design Software- Express SCH

The Express SCH schematic design program is just as easy to use as our PCB layout software, both having the same user interface. After spending a few minutes to learn one, mastering the other takes no time at all [6].

3.4 PCB Layout Software- Express PCB

Express PCB is a very easy to use. Windows application for laying out printed circuit boards. Express PCB defaults to coordinates in inches [6].



Fig -3: Screenshot for PCB Layout Software

3.5 Micro Flash

Flash magic is a tool which used to program hex cod in EEPROM of μ C. it is a freeware tool. You can burn a hex file code into that controller which supports ISP feature. Flash magic supports several chips like ARM, Cortex M0, M3, M4, ARM7, 8051 & 8052.

4. COMPONENTS REQUIRED

Components	Specialization	Quantity
Microcontroller	8052	1
Ultrasonic Sensor	HC-SR04	1
DC Motors	12V,100rpm	2
LCD	16*2	1
IR-LED Pair	--	3
RF Modules Pair	433MHz	1
Encoder, Decoder IC	HT12E, HT12D	1
Motor Driver IC	L293D	1
Op-Amp IC	LM358-SM	1
Voltage Regulator IC	7805	1
Copper Plate	10*12cm	1

Table -1: Component List

5. DIFFERENT SECTIONS OF PROJECT

5.1 Power Supply

In most of our electronic products or projects we need a power supply for converting mains AC voltage to a regulated DC voltage. For making a power supply designing of each and every component is essential.

5.2 RF Transmitter (Wireless Switch)

Data bus (D1, D2, D3, and D4) are used as inputs ID to select the particular area or vehicle when we apply predetermined ID that data or code can be transmitted, then

the transmitter sends the code to encoder. The encoder IC can receive and encoded the data in the form of '1' and '0'. Generated code is sends to the TX-433 RF module. The encoder IC we can give address on the address pin for it does not operate on another module, during information transmission these bits are transmitted with a preceding synchronization bit. Switch is connected at the 4-bit data bits if the HT12E IC, i.e. pin 10 to 13. We are using there a switch for the sending out command to control the chair and park itself at its original or default position.

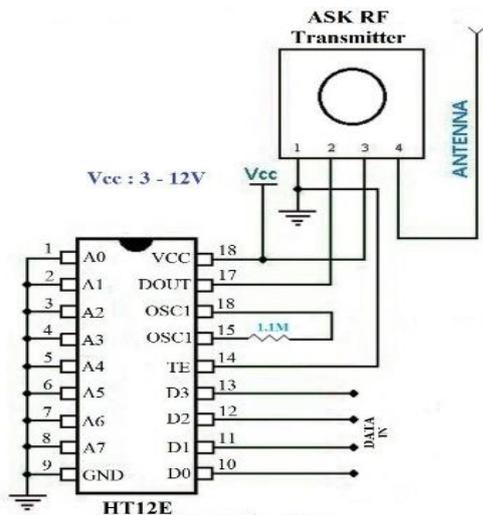


Fig -4: Schematic of Transmitter

5.3 Ultrasonic Sensor

In case of ULTRASONIC sensors they work based on the principle of RADAR (Radio Detection and Ranging). A RADAR transmits electromagnetic "pulse" towards the target and receives the "echo" reflected by the target.

Drawbacks -

Since the chairs are self-parking, the person may get hurt if he is coming on the way of chairs while aligning to their original position as the technology is made only to judge the aligning position of the chairs and not to check the human body.

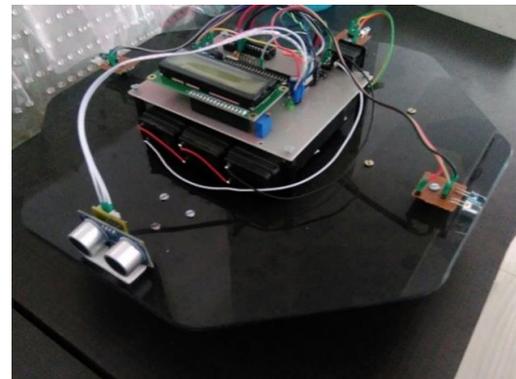
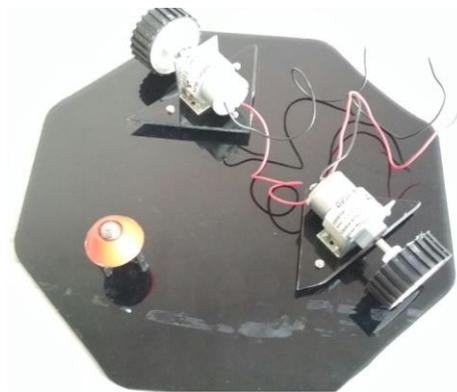
No doubt it reduces the human efforts but on the other hand it requires human effort to click on the switch and to check the process of alignment.

6. ADVANTAGES & ITS LIMITATION

- This technology reduces the human effort to arrange the chairs after a long day works or lengthy.
- It reduces the works of peon who has so many other works like to arrange the files clean the rooms which can be done simultaneously.
- It is less time consuming as these self-parking chairs arrange themselves automatically just on a single

click on a wireless button. This technology helps to maintain the order and discipline in the institute as there is no stress on arrangement of the chairs and the meeting can be arranged frequently as per the needs without any.

7. PHOTOGRAPHS



7. CONCLUSION

In designing of this project we came to know that there is a digitized way to use of Self-Parking Chair by using Microcontroller 8052 without Wi-Fi. Thus Microcontroller being a small yet useful device can work efficiently in the system connected with RF Modules and Ultrasonic Sensor. Hence a RF transmitter switch can provide control signal with wireless communication.

ACKNOWLEDGEMENT

Priyadarshini College of Engineering is a well-established & renowned institute and follows a goal of creating technocrats and brings it into reality, which will perform challenging endeavor in technical field for welfare of human being. We wish to avail this opportunity to express our sincere thanks to our Guides Prof. (Mrs.) J.M. Bhattad who continuously supervised our work with utmost care and zeal. She always guided us in our endeavor to present our project.

It's a great pleasure to express our deep sense of gratitude and the whole hearted thanks to our principal Dr. M.P. SINGH, Priyadarshini College of Engineering, Nagpur.

We offer special thanks to our Head of the Department Dr. (Mrs.) S.W. Varade, for giving us the opportunity to undertake this project. Lastly, we express our deep sense of gratitude to all teaching and non-teaching staff of the Institute and all our friends, family members, who directly and indirectly helped us to complete our project successfully and to bring it into reality.

REFERENCES

- [1] Kirkland, Kevin "Pittsburgh residents are using chairs, different items to stake out parking spots". Pittsburgh Post-Gazette, February 10, 2015.
- [2] "Straight Dope Chicago: How did parking-spot 'dibs' start in Chicago, and what are the rules?". straightdope.com.
- [3] O'Neill, Brian, "Traditional practice of using parking chairs raises new reservations". Pittsburgh Post-Gazette. Retrieved December 9, 2013.
- [4] "Eminent Domain Abuse: If They Can't Tax It, They'll Just Take It". ntu.org. Archived from the original on June 2, 2016
- [5] <http://www.expresspcb.com/ExpressPCBHtm>