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Automatic Chair Arrangement System using Microcontroller 8082

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Abstract--- *The present paper relates to "Automatic Chair Arrangement Systems". The idea is taken from technology of self-parking cars, therefore the work can also be titled as "Self-Parking Chair". The framework comprises of microcontroller, RF transmitter switch, and ultrasonic sensor as its major components. The system can be used in offices, schools, colleges etc. The system works on a single click of transmitter switch, and the chair will be directed towards its initial place (default location), resulting in tidy and neat place. The adapted chair system is controlled using an 8052 microcontroller.*

Index Terms— Microcontroller 8052, RF Transmitter, Ultrasonic Sensor, Keil µVision, Electronic Components.

I. INTRODUCTION

A problem of untidiness with chairs in laboratories after completion of lab hours is well known by every teacher and student. Therefore a solution to this problem can be provided by using the recent technologies[1][2]. In this paper it is tried to give solution to this problem by providing tidiness using self-arrangement of chairs after completion of office/school/college hours. Automatic parking of chair at the original place of the chairs will be done by pressing a switch button present in the system and that switch preferably would be a wireless switch[3]. The paper talks about self-powered office chair that park themselves back into their original position by click on a wireless switch. To provide the direction to the chairs a free wheel and 2 motors are fixed for operating the wheels fitted at its base. An ultrasonic type sensor is used with each chair to operate them in an automatic way to get the minimum distance that specifies the original place (default place)[4][5].

II. SYSTEM BLOCK DIAGRAM & WORKING

The projected paper works on the principle of "Radio Frequency Modules" wherein the frequency used by these modules is 433 MHZ to transmit the signal at controller[6][7]. For automatic parking there is switch in the model and one has to press that switch generally provided at the exit gate. This transmitted signal is decoded at the side of controller by the RF receiver circuit and begins the execution of programming. Initially the ultrasonic sensor is actuated[8][9]. Which results in movement of chair in forward direction then identifies any impediment. When the impediment is wall and it is detected, both the motors present on the chair will change their directions in opposite and revolution in the track of chair occurs. The system comprises an RF sensor to maintain the distance between wall and chair. A Magnet Sensor is fixed at lower side of the chair, if any magnet is detected by the associated magnetic sensor fixed in the system, then system gets stop[10]. An LCD is attached to display and monitor the distance.

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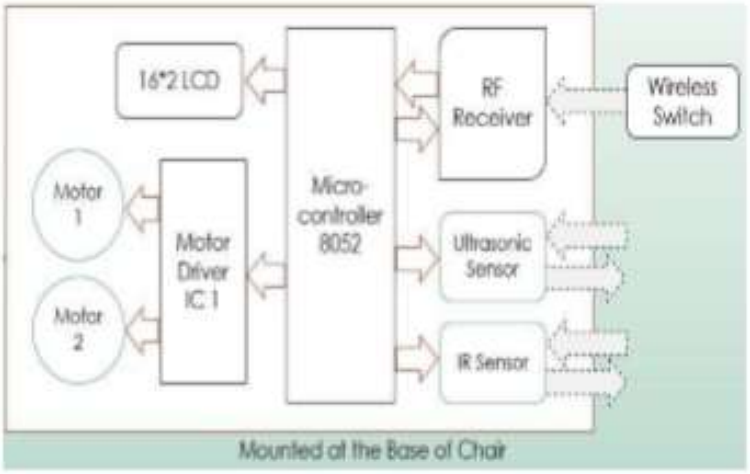

Fig -1: Block Diagram for Self-Parking Chair

III. REQUIRED SOFTWARE

For embedded programs the software which is generally used is "µVision IDE" from "Keil" that provides various function like program debugging, project management, make facilities, complete simulation, and source code editing under one dominant application .

"Proteus Design Suit v8.0" is a software that permits generating clinical implementable choice support guidelines with minor efforts. After generating the guideline of condition, its implementation is enabled for delivering stepwise assistance for any patient with that situation[11].

The "Express SCH schematic design program" is similar to "PCB layout software" and very easy in usage, the user interface shared by both the software is same. The use of "Express PCB" is really easy.

"Flash magic is a tool which is used to program hex code in EEPROM of µC. it is a freeware tool".

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Fig -2: Screenshot for Simulation Software

Fig -3: Screenshot for PCB Layout Software

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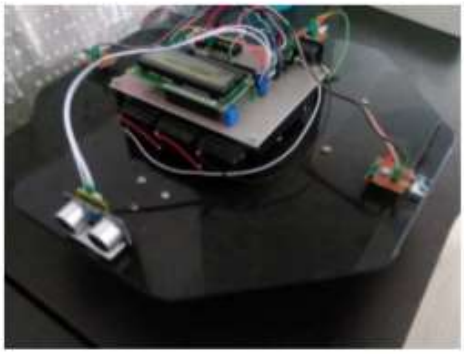
IV. REQUIRED COMPONENTS

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



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V DIFFERENT SECTIONS OF PROJECT

- Power supply is the commom requirement to run any project therefore an AC mains voltage adapted and then converted to a controlled DC form voltage. Today most of the electrical and electronic components esssentially provided with a supply point.
- "RF Transmitter" which is a wireless Switch is used to transmit the data. D1, D2, D3, and D4 act as data bus that are used as i/p ID for picking the specific part or vehicle after applying pre-specified ID that code or informational data can be passed on, After that a code will be directed towards encoder by the transmitter. The code which is received by the encoder is encoded and generated into binary form. Further the generated code is sent to "TX-433 RF module". An address pin is available on encoder IC to provide the address that it doesn't work on alternative module, throughout the communication of data information, these bits are conveyed with a previous synchronization bit. In this paper a swich is emoployed to generate a command for automatic controlling and parking of chairs at their default plcace[6].

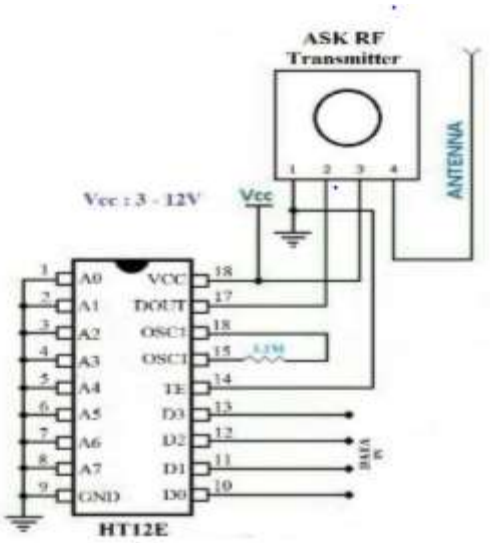

Fig -4: Schematic of Transmitter

- "ULTRASONIC sensors" work in accordance with the principle of "RADAR (Radio Detection and Ranging) which says that a RADAR transmits electromagnetic "pulse" towards the target and receives the "echo" reflected by the target"[12].

VI. CONCLUSION

The work on "Automatic arranging of chairs" has been implemented in a digitalized way by employing an 8052 microcontroller. This controller worked best when it is used with an ultrasonic sensor and radio frequency based module. Therefore it is observed that the work comprises of a RF transmitter operating switch is able to govern the chairs by using wireless communication.

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