

Remote Controlled Floor Cleaning Robot

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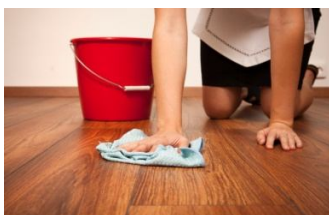
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Abstract- In big hostile environments certain inspection and cleaning work is needed to be done into time duration limit. Robots are increasingly being advanced into working tasks to replace humans. So purpose of using Remote Controlled Floor Cleaning Robot is to reduce human effort and give a better efficiency during operation. In the paper, research is carrying over floor cleaner which contains moisture cotton brush which cleans the floor and dried it with aid of small blower. Very simple mechanism was used in construction so that it can be easily operate by any person. In the paper, main aim is to build and program the cleaner so it can move freely a specific area by the cleaning process. The objective of this research to provide a substantial solution to the problem of manufacturing robotic cleaner utilizing local resources under different working principles by keeping low cost of device was fulfilled

Keywords- Sponge, Floor cleaner, Floor cleaning Robot.

I. INTRODUCTION

Cleaning of floors in big homes, hospitals, hotels, restaurants, offices, workshops, houses, colleges, universities and public places with large spaces is a complex task with high efforts regarding time and personnel costs. Now days number of applications human workers are replaced by machines mostly because of their ability to do monotonous task without getting tired and their more efficient, precise works.



With the development of science and technology, rapid development of robotic equipment's has been increasing from years to years. Using robot to fulfill human requirement is a part of life. Manual work is taken over the robot technology and many of the related robot appliances are being used extensively. Usually an electromechanical machine that is guided by computer and electronic programming. Robots can be autonomous, semi-autonomous or remotely controlled.

In recent years, robotic cleaners have taken major attention in robotics research due to their effectiveness in floor cleaning application with safe and secure working of devices. This trend is not only associated with the revolution in robotics and automation but is primarily because of the escalating concern over the human and environmental safety. In the modern era, the Automatic Floor Cleaner is required and due to its modern and simple working ability it can be operated even by children's without any kind of risk.

Each cleaning and operating mechanism of robotic floor cleaners has its own advantages and disadvantages. Earlier, big floor cleaning machines are available for domestic and industrial use. But their operations are non autonomic type and these can perform only some specific functions of cleaning. So to overcome the disadvantages of floor cleaners' researchs was continued into developing and testing tele-operated mobile robots mainly to avoid unnecessary dose to human operators and ensure the safe operation which require unexpected inspections, repairs, or replacements.

Here the research works represents the technology that proposed the working of robot for Automatic Floor cleaning. Basically, robotic cleaners are distinguished on their cleaning knowledge like floor mopping and dry floor cleaning. Thus, the cleaner was designed in such a way that it should be capable of cleaning the area and reducing the human effort just by starting the cleaning unit. We were conducting a research over the device which contains moisture cotton brush which cleans the floor and dried it with aid of small blower. In our project a very simple drive mechanism was used in construction so that it can be easily operate by any person. The size of the machine is small and it was portable, so it can be easily transfer from one place to another place. In the paper, main focus is to build and program the cleaner so it can move freely a specific area by the process.

The main objectives of this project were

1. To provide a substantial solution to the problem of manufacturing robotic cleaner utilizing local resources while keeping it low costs under the different principles of working.
2. To ensure user friendly floor cleaning robot.

3. To reduce the time requirement for cleaning with human efforts.
4. To keep the low cost of construction, working and maintenance.

II. REVIEWS OF LITERATURE

A remote controlled floor cleaner is an electronic device that is intelligently programmed to clean a specific area through a floor cleaning assembly. Some of the available products have brush around sharp edges and corners while others include a number of additional features such as wet mopping. Some of the available products are discussed below.

2.1 Scoobais

- Launch Date: 2005
- Manufacturer: iRobot (American)
- Type of Use: Wet Washing of Floor
- Technology: IR with virtual wall accessories
- Price: \$500

2.2 Braava:

- **Launch Date: 2006**
- **Manufacturer: iRobot, KITECH, Sony**
- **Type of Use: Floor moping for hard surfaces/Dry clean**
- **Technology: IR with virtual wall accessories for industrial cleaning**
- **Price: \$700**

III. PROPOSED SYSTEM REQUIRED HARDWARE

1. DC Motor:



Fig. DC geared motor

We used 3,12V DC geared motor with 5Kg torque. It has 30rpm speed. This motors for movement of robot car.

We used another 1 , 12V DC geared motor with 5Kg torque. Is for the lateral shifting purpose

2. IR Sensor:

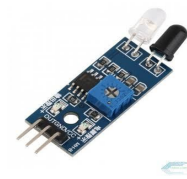


Fig. IR Sensor

We used 4 IR Sensor pairs for obstacles detection purpose. It has 5cm range accuracy.

3. Relay driver circuit:

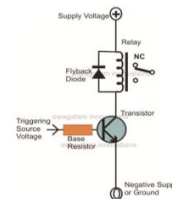


Fig. a) Relay Driver Circuit

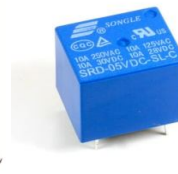


Fig. b) Relay

We used 6 Relays for constructing H-bridge. It is used for the motor driving circuitry.

These relay operates on the 5V 100mA dc supply.

4. Cleaning Scrubber:



Fig. Cleaning Scrubber

We used the Scrubber for cleaning the surface of the floor.

5. Controller :



Fig. PIC16F886 microcontroller

We used the PIC16F886 microcontroller. This is the microchip controller. This is the 8 bit microcontroller, which is used for the controlling purpose of the whole movement of the robotic car.

6. RF transmitter and receiver module :



Fig. RF module

RF module frequency range varies between 30 kHz & 300GHz. RF transmission is more strong and reliable than IR transmission. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434MHz. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps.

7. **Wooden chassis:**

We used wooden chassis as a cart. It has 4 wheels which are connected to motors.

8. **Battery :**



Fig. 12V DC Power Supply

We used Battery as a power supply. This is the 12v DC power supply.

IV. **BLOCK DIAGRAM**

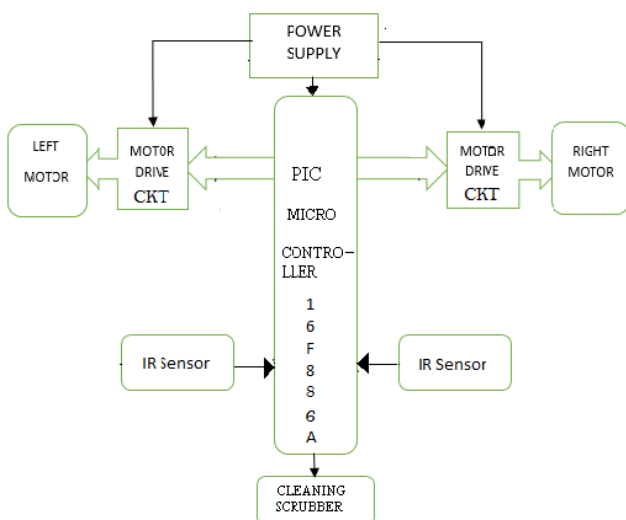


Figure 1: Block diagram of proposed system

V. **C CODE FOR THE CONTROLLER**

```

int L,A;

void main() {
    ANSEL = 0x07;           // Configure AN2 pin as analog
    ANSELH = 0;            // Configure other AN pins as
                           // digital I/O

    TRISA = 0x00;          // PORTA is input
    TRISC = 0x00;          // PORTC is output
    TRISB = 0xff;

    portA=0;
    portB=0x00;           // PORTB is output
    portC=0x00;

    Lcd_Init(&PORTC);
    Lcd_Cmd(Lcd_CURSOR_OFF);

    Lcd_Out(1, 1, "FLOOR CLEANING");
    Lcd_Out(2, 3, "MACHINE");

    L=0;
    A=1;

    delay_ms(2000);
    Lcd_Cmd(LCD_CLEAR);
    //Lcd_Out(1, 1, "ready to move");
    while(1)
    {
        if((portB.f0==1)&&(portB.f0==1))
            { Lcd_Cmd(LCD_CLEAR);

                Lcd_Out(1, 1, "NO obstacle ");
            }
    }
    while(L==0) //
    {
        if(portB==0xEF)    {portA=0x0a,    delay_ms(100),
        portA=0x00;} // ff

        if(portB.f5==0) {portA=0x05, delay_ms(100), portA=0x00;
        // rev

            if((portB.f0==1)&&(portB.f0==1))
            { Lcd_Cmd(LCD_CLEAR);

                Lcd_Out(1, 1, "NO obstacle ");
            }
    }

    if(portB.f6==0)    {portA=0x09,    delay_ms(100),
    portA=0x00;} // turn ??
    
```

```

if(portB.f7==0)      {portA=0x06,      delay_ms(100),
portA=0x00;} //turn ??

if(portB.f0==0) {Lcd_Out(1, 1, "object on LEFT"),
delay_ms(200);} //obstacle

if(portB.f1==0)
{
Lcd_Cmd(LCD_CLEAR);
Lcd_Out(2, 1, "object on RIGHT"),
delay_ms(200);
} //obstacle
}
}}

```

PCB layout:

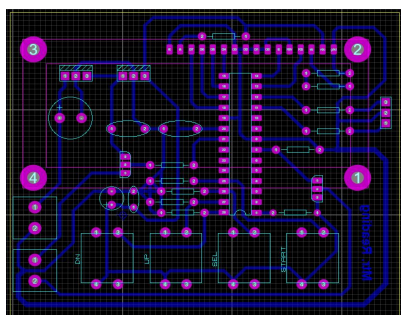


Fig. PCB layout of controller

VI. CONCLUSION

In This paper, Remote controlled floor cleaning Robot with low-cost sensors is presented for efficient cleaning purpose. However, the result for this particular realization shows the good accuracy of the designed IR sensor driver that has been tested and used for lateral positioning error correction. A prototype of the rotating brush device is made manually to ensure the cleaning effect of the proposed system.

VII. ACKNOWLEDGEMENT

We are pleased to present this project paper entitled “Remote Controlled Floor Cleaning Robot” to my college as a part of academic activity. We would like to express my deep sense of gratitude to my guide Mr.P.G.Kamble for his valuable guidance, encouragement and kind co-operation throughout the project work. We feel proud presenting this project under his guidance. We are also thankful to all the teaching staff and non-teaching staff for their co-operation to complete my project work. Last but not the list We are thankful to all my friends, parents and those who helped us directly or indirectly throughout this work.

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