

# ***“BLUETOOTH CONTROLLED FLOOR CLEANING ROBOT”***

## **DESIGN PROJECT**

*Submitted by*

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*In partial fulfillment for the award of the degree of*

***Bachelor of Technology***

**in**

***ELECTRONICS***

***AND COMMUNICATION***

**of**

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY  
KERALA**



**GOVERNMENT ENGINEERING COLLEGE IDUKKI**

**PAINAVU 685 603**

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**GOVERNMENT ENGINEERING COLLEGE IDUKKI**  
**PAINAVU 685 603**



**CERTIFICATE**

This is to certify that the project design document entitled "**BLUETOOTH CONTROLLED FLOOR CLEANING ROBOT**" is a bonafied record of the Design Project presented by **ABHIJITH P D (IDK17EC058), SANGEERTHANA RAJ (IDK17EC047), MUHAMMED MUFEED M (IDK17EC032), SALMANUL FARIS P K (IDK17EC045)** in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Electronics and communication of APJ Abdul Kalam Technological University, Kerala.

## **DECLARATION**

I hereby declare that the design of the project titled ***“BLUETOOTH CONTROLLED FLOOR CLEANING ROBOT”*** being submitted in partial fulfillment for the award of B.Tech degree is the original work carried out by us. It has not formed the part of any other thesis submitted for award of any degree or diploma, either in this or any other University.

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## **ABSTRACT**

Robot is an electromechanical machine and used for various purposes in industrial and domestic applications. Robot appliances are entering in the consumer market, since the introduction of iRobots. Many related appliances from various companies have been followed. Initially the main focus was on having a cleaning device. As the time pass on many improvements were made and more efficient appliances were developed. In early, 2010 a new automatic floor cleaner robot “Mint” was developed by Jen Steffen. Detachable clothes were attached for sweeping and mopping purposes. For tracking mint used the GPS-like indoor localization system.

# INTRODUCTION

Robot is an electromechanical machine and used for various purposes in industrial and domestic applications. Robot appliances are entering in the consumer market, since the introduction of iRobots. Many related appliances from various companies have been followed. Initially the main focus was on having a cleaning device. As the time pass on many improvements were made and more efficient appliances were developed.

In early, 2010 a new automatic floor cleaner robot “Mint” was developed by Jen Steffen. Detachable clothes were attached for sweeping and mopping purposes. For tracking mint used the GPS-like indoor localization system.

A floor cleaner robot based on Arduino UNO have been developed. Atachable mop is used for mopping. Unlike other floor cleaner robots this is not a vacuum cleaner robot, it performs sweeping and mopping operation. It works on 12V supply. The cleaning action is controlled by bluetooth module.

In the manual mode, user itself operates the robot. Bluetooth module have been used to transmit and receive the signal for controlling the robot through the phone by the user itself. Therefore user can move the robot in the desired direction.

## MATERIAL REQUIRED

- \* **ARDUINO UNO**
- \* **DOUBLE SHAFT MOTORS**
- \* **MOTOR DRIVER**
- \* **SERVO MOTOR**
- \* **BLUETOOTH MODULE**
- \* **MOTOR SHIELD**

## **1. BLUETOOTH MODULE**

Bluetooth wireless technology is a 2.4GHz ISM-band open industry standard for short range wireless communication, which is capable of voice and data transfer. In this document, the SEMCO-Bluetooth Modules are presented, which consists of RF, base band and link manager protocol together with Host Controller Interface(HCI) / HCI-UART functionality implemented according to the Bluetooth specification version 1.1. SEMCO-Bluetooth Modules are designed for use as an universal Bluetooth module compliant for the Bluetooth specification version 1.1, which can be applied to hand-held phones, PDAs, headsets, PCs and PC peripherals, etcetera for wireless voice and data communication. Bluetooth essentially aims to fix this problem. This is considered a cable-replacement technology.

## **2. SERVO MOTOR**

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 angles or distance, then you use servo motor. It is just made up of simple motor which runs through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages. Due to these features they are being used in many applications like toy car, RC helicopters and planes, Robotics, Machine etc

## **3. MOTOR DRIVER**

Motor drivers are circuits used to run a motor. In other words, they are commonly used for motor interfacing. These drive circuits can be easily interfaced with the motor and their selection depends upon the type of motor being used and their ratings (current, voltage).

## **4. DOUBLE SHAFT MOTOR**

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of rotation of a shaft. Electric motors can be powered by direct current sources, such as from batteries, motor vehicle or rectifiers, or by alternating current (AC) sources, such as power grid, inverters or electrical generators. An electric generator is mechanically identical to an electric motor, but operates in the reverse direction, converting mechanical energy into electrical energy.

## **5. MOTOR SHIELD**

### **L293D Motor Driver Shield**

The Arduino Motor Shield is based on the L293D, which is a Half-bridge driver designed to drive inductive loads such as relays, solenoids, DC and stepping motors. Drive the two DC

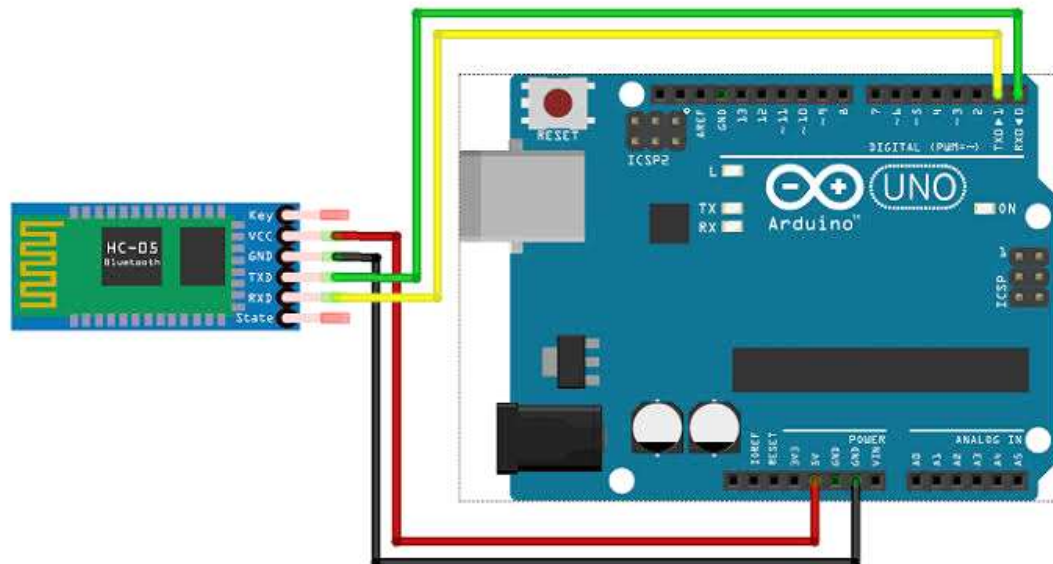


motors with Robomart Arduino board, controlling the speed and direction of each one independently. Also measure the motor current absorption of each motor, among other features.

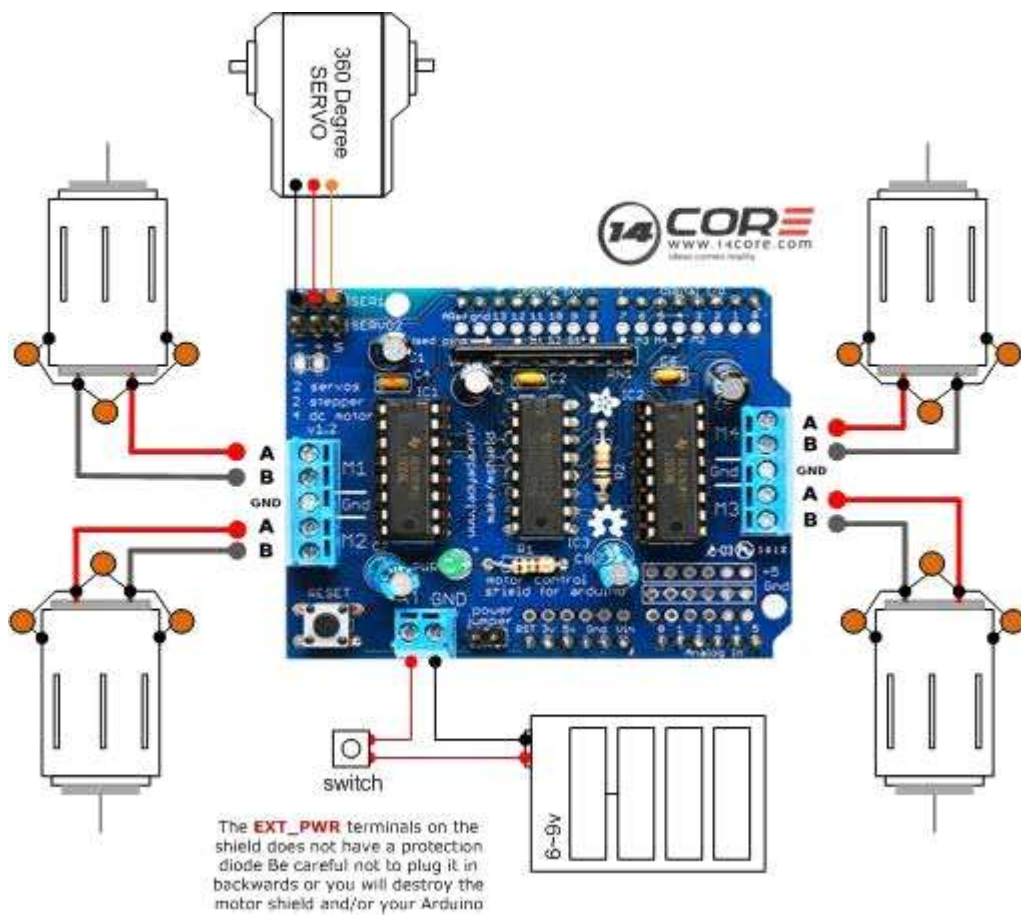
**Specification of L293D Motor Driver Shield:**

- Operating Voltage :5V to 12V.
- Motor controller: L293D, Drives 2 DC motors or 1 stepper motor.
- Max current: 600mA per channel.
- Peak Output Current :1.2 Amp.

## CIRCUT DIAGRAM:



fritzing



## CODE SECTION:

```
#include <AFMotor.h>
#include <Servo.h>

Servo myservo;
int pos=0;
int pump=A0;
AF_DCMotor motor1(1);
AF_DCMotor motor2(2);
AF_DCMotor motor3(3);
char bt='S';
void setup()
{
    Serial.begin(38400);
    my servo.attach(9);
    pinMode(Pump,OUTPUT);
    motor1.setSpeed(255);
    motor2.setSpeed(255);
    motor3.setSpeed(255);
    Stop();
}
void loop() {
    bt=Serial.read();
    if(bt=='F')
    {
        forward();
    }
    if(bt=='B')
    {
        backward();
    }
    if(bt=='L')
    {
```

```
    left();  
}  
if(bt=='R')  
{  
    right();  
}  
if(bt=='S')  
{  
    Stop();  
}  
if(bt=='W')  
{  
    UP();  
}  
if(bt=='D')  
{  
    Down();  
}  
if(bt=='M')  
{  
    Sweep();  
}  
if(bt=='F')  
{  
    Water();  
}  
void forward()  
{  
    motor1.run(FORWARD);  
    motor2.run(FORWARD);  
}  
void backward()  
{  
    motor1.run(BACKWARD);
```

```

    motor2.run(BACKWARD);
}
void left()
{
    motor1.run(FORWARD);
    motor2.run(BACKWARD);
}
void right()
{
    motor1.run(BACKWARD);
    motor2.run(FORWARD);
}
void Stop()
{
    motor1.run(RELEASE);
    motor2.run(RELEASE);
    motor3.run(RELEASE);
    digitalWrite(Pump,LOW);
}
void seep()
{
    motor3.run(FORWARD);
}
void UP()
{
    for (pos=180;pos>=0;pos+=1)
    {
        myservo.write(pos);
    }
}
void Down()
{
    for (pos=180;pos>=0;pos+=1)
    {
        myservo.write(pos);
    }
}

```

```
}}  
{  
void water()  
{  
digitalwrite(pump,HIGH);  
}
```

## **CONCLUSION:**

A cheaper and user friendly floor Cleaner robot can be developed by controlling manually using an Arduino Board with more electronics functionality. Households of today are becoming smarter and more automated. Home automation delivers convenience and creates more time for people. Several robotic vacuum cleaners are available on the market but only few ones implement wet cleaning of floors.