SMART FLOOR CLEANER

Prof. Vijaykumar Bhanuse
Professor, Instrumentation engineering department Vishwakarma Institute of Technology Pune,India

Kaushik Najare **Deep Gadappa** **Sachin Chaware**

Muhib Momin **Anway Deshpande**

Students, Instrumentation engineering department Vishwakarma Institute of Technology Pune,India

***Abstract* —**

The primary goal of this project is to automate a labor-intensive task because cleaning is time-consuming and requires a lot of patience and skill. Cleaning may also be harmful to one's health. We created a robot to make the job easier, and it is built in such a way that it can clean homes, offices, apartments, cellars, and even streets. The person watching the robot from a distance away from the cleaning area. DC motors, servo motor brushes, a bathtub, a scrub brush, an LED light, a battery, a water pump, an Arduino, Bluetooth for wireless communication, and a cell phone are all included in this design.

I. INTRODUCTION

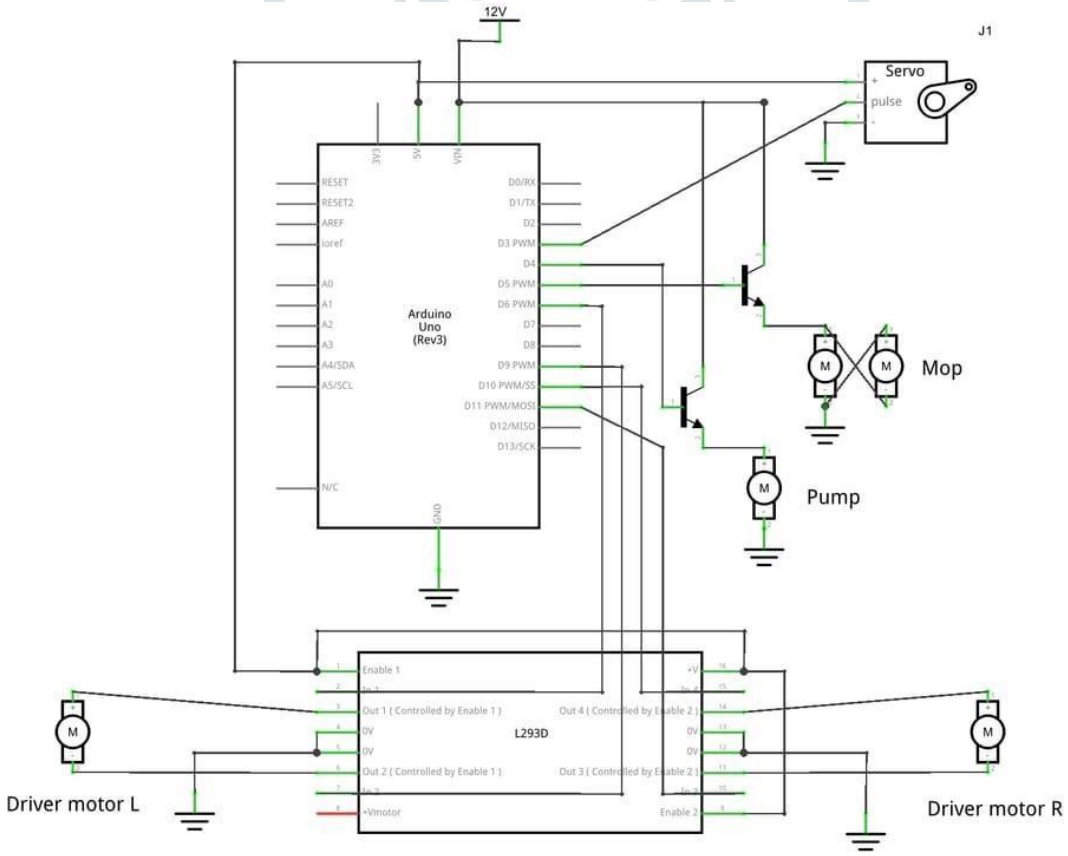
The project's primary objective is to develop a robot that reduces human effort required for sweeping and scrubbing, as well as to find a way to get beyond the shortcomings of prior cleaning methods. Humans were employed as sweepers in manual processes to clean the streets and floors. People will take a long time to finish their task during this cleaning procedure, and various health issues, such as back discomfort and shoulder pain, may also arise. "Vacuum Cleaner" was created by scientists to solve the concerns mentioned above. It has cleaning capabilities as well. People who use this cleaner occasionally run into issues with it being difficult to move around the house and being heavy to lift. It's also nearly impossible to move a hoover up and down stairs. Large-sized hoover cleaners were made. Our electricity bill will rise depending on the type of hoover cleaner we use, from a few hundred to thousands of rupees. To address these issues, a cleaning robot that is quick and can go places that people can't is being developed. This robot can be used both indoors and outdoors. By using this robot, less power is used. This robot's design makes it suitable for usage in homes, offices, flats, cellars, and even on public roadways. We can effortlessly mop with the help of this robot. It is controlled by Bluetooth on a mobile device. This robot costs a lot less than other cleaning methods. Physically disabled people who are unable to move from one location to another are mostly helped by it. The robot's operator will avoid the cleaning area while cleaning, protecting their health. Additionally, the robot that cleans the floors of your home using spinning mops and a servo motor is less expensive. Additionally, there is a water pump and water reservoir that may be turned on as needed to spray water on the floor and moisten the mops for thorough cleaning. The robot wheel is attached to the DC motor, and when the switch is turned on, the wheel rotates and the robot moves ahead. Brushes and scrubbers are rotated by a servo motor, and an Arduino Uno microcontroller receives instructions from a smartphone.

II. WORKING

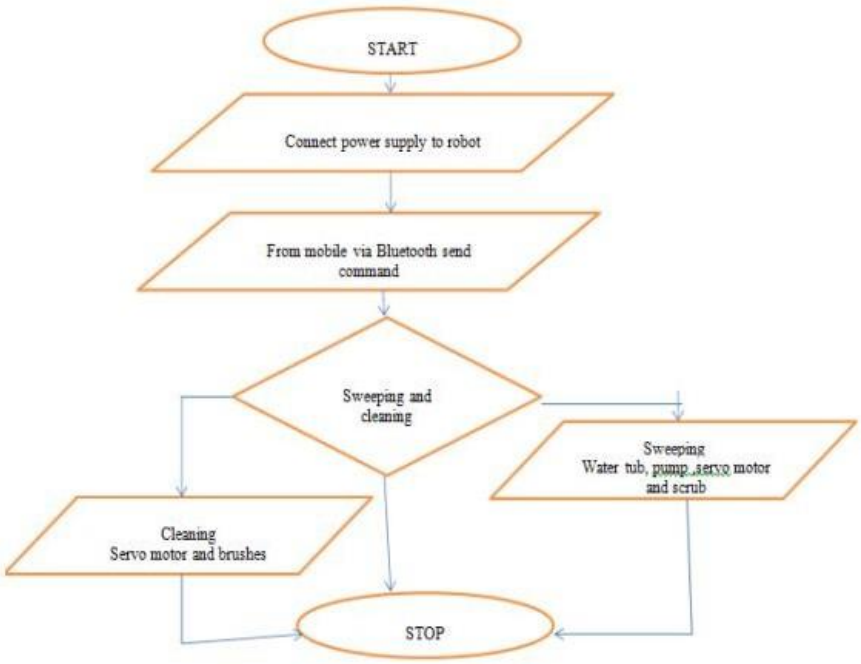
In this study, Bluetooth is used at both the transmitter side and receiver side to operate the robot. By transmitting orders from a mobile device while maintaining the minimum Bluetooth committee-recommended distance for data transfer. Robot will begin functioning in accordance with the instructions.

A microcontroller board called the Arduino is based on the ATmega328. It contains a 16 MHz ceramic resonator, 6 analogue inputs, 14 digital input/output pins (of which 6 can be used as PWM outputs), a USB port, a power jack, an ICSP header, and a reset button. Seven analogue input pins, numbered 3, 5, 6, 9, 10, 11, are used in this robot.

The positive terminal of a DC motor is linked to Arduino pin 10 and the negative terminal is attached to pin 11. The positive terminal of the DC motor-2 is linked to Arduino pin-9, while the negative terminal is connected to pin-6. It uses two servo motors. One to execute the sweeping task and another to complete the cleaning task. Through Bluetooth, a mobile phone can control it. When the Arduino's pin-5, which is where the servo motor-1 is connected, is turned ON, the servo motor-1 and its associated brushes begin to move. Sweeping the floor requires the use of brushes. so that sweeping can be done. It is movable in all directions, including forward, backward, and sideways. when the sweeping process is finished.



III. FLOW CHART



General pin functions

LED: Built-in LED powered by digital pin 13 is present. When the pin's value is high, the LED is on, and when it is low, it is off.

VIN: The Arduino/Genuino board's input voltage when it is powered by an external source (as opposed to the 5 volts provided by the USB connection or another regulated power source). This pin can be used to feed voltage to or access voltage that has been supplied by the power jack.

5V: This pin provides a regulated 5V output from the board's regulator. The board can receive power from the USB connector (5V), the DC power port (7–20V), or the board's VIN pin (7–20V). Bypassing the regulator by supplying power through the 5V or 3.3V pins risks damaging the circuit board.

3V3: An internal regulator-generated 3.3-volt supply a 50 mA maximum current consumption is allowed 50 mA is drawn.

GND: Ground pins.

IOREF: The microcontroller uses this pin on the Arduino/Genuino board as its voltage reference. The IOREF pin voltage can be read by a properly constructed shield, which can then choose the proper power supply or enable voltage translators on the outputs to operate with 5V or 3.3V.

Reset: With this function, shields that block the board's reset button are regularly implemented.

Special pin functionalities

Under software control (using the pin Mode(), digital Write(), and digital Read() functions), each of the Uno's 14 digital pins and 6 analogue pins can be used as an input or output. They use 5 volts to work. The suggested operating condition for each pin is 20 mA, and each pin also has a 20–50K ohm internal pull-up resistor that is unplugged by default. To prevent the microcontroller from becoming permanently damaged, no I/O pin should draw

more current than 40mA at a time. The Uno features six analogue inputs, denoted by the letters A0 through A5, each of which has a resolution of 10 bits (1024 different values). They measure from ground to 5 volts by default, but the upper end of the range can be changed by using the AREF pin and the analogue Reference() function.

Additionally, several pins perform specific tasks:

Pins 0 (RX) and 1 (TX) for serial / UART. used to transmit and receive TTL serial data (RX and TX). The ATmega8U2 USB-to-TTL serial chip's matching pins are connected to these pins.

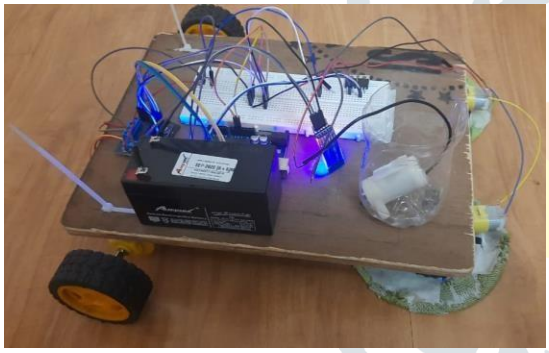
External interrupts: These pins can be set up to initiate an interrupt in response to low values, rising or falling edges, or value changes.

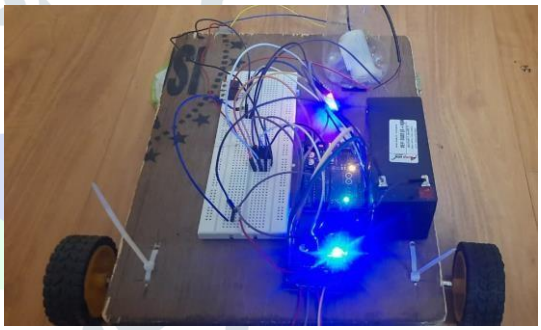
Pulse-width modulation (PWM) is carried out using pins 3, 5, 6, 9, and 11. has an analogue Write () function that can provide 8-bit PWM output.

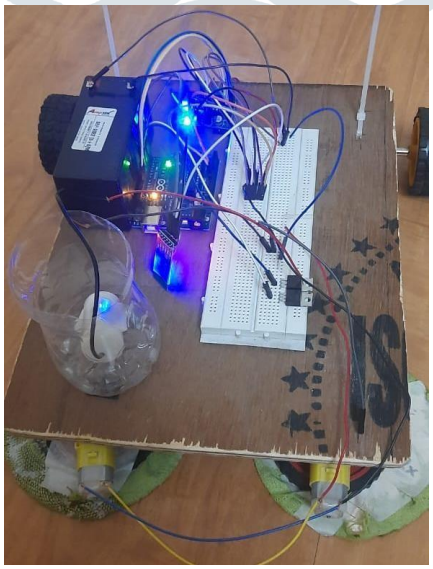
SPI (Serial Peripheral Interface) pins 10, 11, 12, and 13 (SS, MOSI, MISO, and SCK, respectively). On these pins, the SPI library provides SPI communication.

Pins SDA (A4) and SCL (A5) of the TWI (two-wire interface)/I2C are used. Utilise the Wire library to support TWI communication.

FINAL MODEL







IV. CONCLUSION

Effective floor cleaning is made possible by this project through sweeping and mopping procedures. It provides effective cleaning while also lowering labor costs and saving time. Bluetooth module and android application can be used to control the robot.

V. FUTURE SCOPE

In place Bluetooth technology GSM MODEM will be use and obstacles detection will be added.

VI. REFERECES

1. *Jens-Steffen Gutmann, Kristen Culp, Mario E. Munich and Paolo Pirjanian. The Social Impact of a Systematic Floor Cleaner. In IEEE international workshop on advance robotics and its social impacts, Technische University munchen, Germany May 21-23,2012.*
2. *J Frolizzi C.Disalvo. Service robots in the domestic environment: A study of Roomba vacuum in the home". In int. conference on human robot interaction HRI, PAGE 258-265 March 2006.*
3. *H.Asada and J.-J E. Slotin, robot analysis and control, a wiley-interscience publication, 1986, pp. 29-49.*
4. *Karthick. T. Ravi Kumar. A, Selvakumar. L, Viknesh. T "Simple Autonomous Cleaner Robot" International journal of Science, Engineering & Technology Research (IJSER), Vol.4. Issue 5 May 2015.*
5. *Uman Khalid, Haseeb Haider, Tahseen Amin Khan Qasuria "Smart Floor Cleaning Robot (CLEAR)" in IEEE standard 2015.*
6. *Naman Aggrawal, Piyusha Chaudhari, Akshay Mahalkar "Review Paper Based on Cleaning Robot", vol.3 No.5 May 2016.*