A

TEC-Project Report

ON

"SparkleBot: The Arduino-Powered Floor Cleaning Genius"

Submitted to

PHYSICS subject

Submitted by:

Mr. Yash Ghadge (68)

Mr. Deepanand Gore(37)

Miss.Amruta Koparkar(03)

Under the Guidance of

Dr. A. S. Tale

Department of Applied Sciences and Humanities.

Shri Sant Gajanan Maharaj College of Engineering,

Shegaon – 444 203 (M.S.)

2023-24

SHRI SANT GAJANAN MAHARAJ COLLEGE OF ENGINEERING,

SHEGAON – 444 203 (M.S.)

DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES

CERTIFICATE

This is to certify that Mr. Yash Ghadge , Mr. Deepanand Gore and Miss. Amruta Koparkar students of First year B.E. in the year 2023-24 of Department of Applied Science And Humanities. Department of this institute has completed the TEC project work entitled “SparkelBot: The Arduino-Powered Floor Cleaning Genius” has submitted a satisfactory account of his work in this report which is recommended for the partial fulfillment of TEC project

.

Dr. A. S. Tale
Head of Department

Acknowledgement

We would like to express my special thanks to our teacher Dr. A. S. Tale sir who gave me and my team the golden opportunity to do this wonderful project on the topic The Arduino Powered Floor Cleaning Robo
which also helped us in gaining a lot of knowledge. We are really thankful to them.

Yash Ghadge(68)
Deepanand Gore(37)
Amruta Koparkar(03)

first year B. E.
Sem-II,EXTC (1U2)

INDEX

Chapter1

1. Introduction

This report explores a floor cleaning robot operated by Arduino using a Bluetooth module, offering efficient and user-friendly cleaning solutions for various environments.

Components Used:

- 100rpm Geared motors X 2
- Wheels X 2
- 60RPM geared motors X 2
- bluetooth module (HC-05)
- Arduino UNO
- L298N motor driver X 2
- servo motor (180 degree rotation)
- Sealed leadacid rechargeable battery
- 12V Water pump
- Old CDs
- Wiping cloth
- Silicon tubing
- Rainbow wire
- jumper wires
- Male/female headers
- Nuts and Screw
- A 1000ml plastic bottle

Tools:

- Soldering iron
- glue sticks
- Drill
- Pliers
- stripper
- Paper cutter
- Tape

Chapter2

2. Material

2.1 Components required

2.1.1 Arduino(UNO) Microcontroller

The Arduino is a popular and versatile microcontroller platform widely used in various electronic projects and applications. It is known for its simplicity, flexibility, and extensive community support. Here are some key points about Arduino:

Versatile Platform: Arduino boards are available in various models, each catering to different project requirements. Common models include the **Arduino Uno**, Arduino Mega, Arduino Nano, and more. You can choose the one that suits your project best.

Open-Source: Arduino is an open-source platform, which means that the hardware and software designs are freely available for anyone to use and modify. This openness has led to a vast ecosystem of compatible hardware and software.

Programming: Arduino is programmed using the Arduino Integrated Development Environment (IDE), which is based on the C and C++ programming languages. The IDE is user-friendly and offers a vast library of functions to simplify programming tasks.

I/O Pins: Arduino boards come with digital and analog input/output pins that allow you to connect sensors, displays, actuators, and other components to interact with the physical world. These pins can be easily controlled and monitored through the Arduino code.

Applications: Arduino is used in a wide range of applications, from simple blinking LED projects for beginners to complex robotics, home automation, and IoT projects. It's suitable for both hobbyists and professionals.

Prototyping: Arduino boards are often used for prototyping and proof-of-concept development before transitioning to custom-built circuits. They allow for quick and easy testing of ideas.

Interfacing: Arduino can interface with a variety of sensors (temperature, humidity, motion, etc.), actuators (motors, servos, relays), displays (LEDs, LCDs, OLEDs), communication modules (Bluetooth, WiFi, RFID), and more, making it suitable for a wide range of projects.

In summary, Arduino is a versatile microcontroller platform that's accessible to beginners and professionals alike. Its open-source nature, vast community support, and wide range of compatible components make it a popular choice for various electronic projects, from basic LED blinking to complex automation and robotics.

Figure 2.1.1-Arduino Microcontroller

2.1.2 L298N Motor Driver

The L298N is a versatile motor driver integrated circuit commonly used in a variety of projects and applications. It's known for its ability to control DC motors and stepper motors efficiently. Here are some key points about the L298N motor driver:

Dual H-Bridge Design: The L298N is designed as a dual H-bridge motor driver, allowing it to control the speed and direction of two DC motors or one stepper motor simultaneously. This makes it ideal for applications where precise

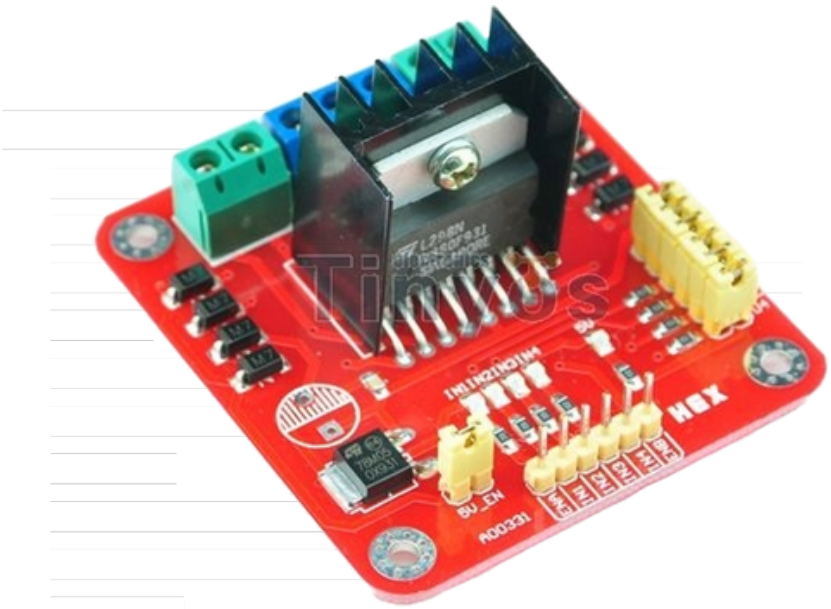
motor
control is required.

Voltage and Current Ratings: The L298N can handle a wide range of input voltages, typically from 7V to 35V. It's suitable for various motor types and voltage levels. The driver can handle a current of up to 2A per channel, making it suitable for driving small to medium-sized motors.

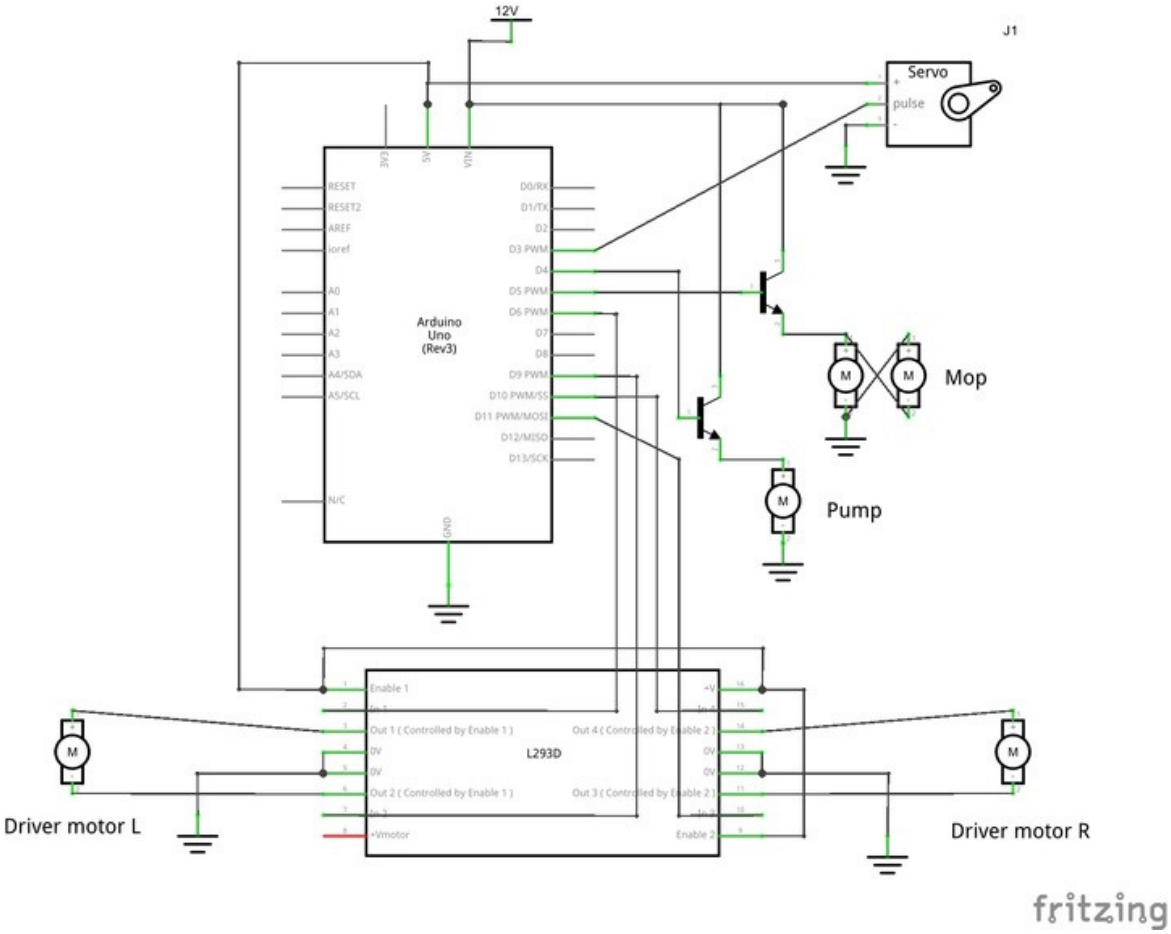
Speed and Direction Control: The L298N provides a simple interface for controlling the speed and direction of motors. By applying PWM (Pulse Width Modulation) signals to the control pins, you can precisely adjust the motor speed. Reversing the polarity of the control pins changes the motor's direction.

Applications: The L298N is used in a wide range of applications, including robotics, RC vehicles, home automation, CNC machines, and more. It's a fundamental component for any project involving motor control.

In summary, the L298N motor driver is a versatile and widely used integrated circuit that provides efficient control of DC motors and stepper motors. Its ability to handle various voltage levels and current requirements, along with built-in protection features, makes it a crucial component in a wide range of projects involving motor control.



2.1 Circuit Diagram



Chapter3

3.1 Conclusion

In conclusion, the development and exploration of a floor cleaning robot operated by Arduino and Bluetooth technology represent a significant advancement in the field of robotics and automation. Through the integration of Arduino as the central control system and Bluetooth for remote communication, the robot offers an efficient and user-friendly solution for automating floor cleaning tasks. This report has highlighted the successful implementation of these technologies, addressing challenges and presenting potential applications in both residential and commercial environments. Moving forward, continued research and innovation in this area hold promise for further enhancing efficiency and convenience in cleaning processes.