

Human Follower Robot using Arduino

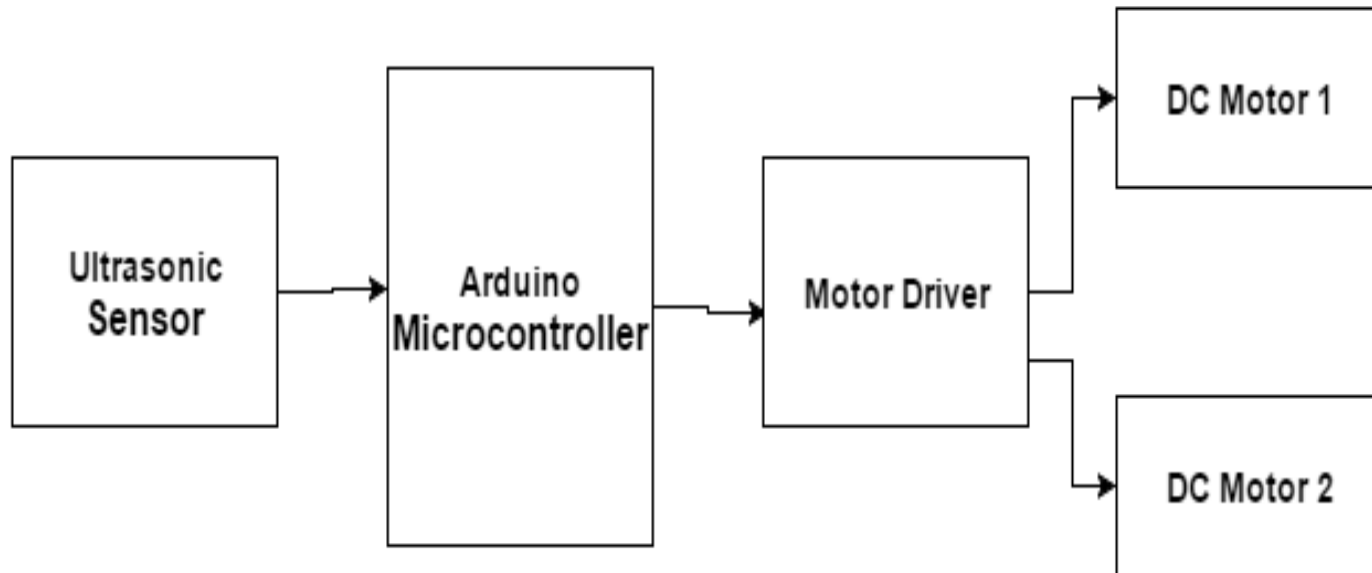
Overview

- Introduction
- Block Diagram
- Hardware requirements
- Software requirements
- Advantages
- Future Work
- Conclusion
- References

Introduction

- Advantages of Robotics – High performance, high accuracy, low labour cost, ability to work in hazardous situations
- Human follower robot in industrial automation

Block Diagram

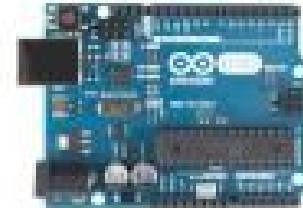


Hardware requirements

- Microcontroller board – Arduino Uno
- Ultrasonic Sensor – HCSR04
- Motor driver IC
- DC Motor
- Power Supply

Arduino Uno Features

- ATmega328P microcontroller
- Input voltage - 7-12V
- 14 Digital I/O Pins (6 PWM outputs)
- 6 Analog Inputs
- 32k Flash Memory
- 16Mhz Clock Speed



ATmega328P

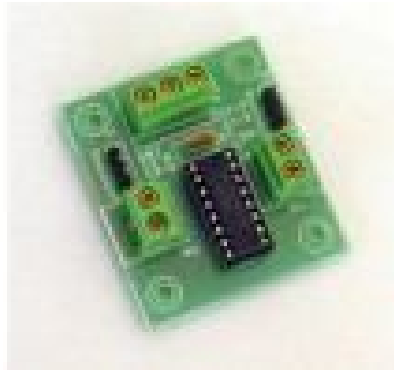
- 8-bit microcontroller
- 8KB ROM
- 256 bytes RAM
- 3 timers
- 32 I/O pins
- 1 serial port
- 8 interrupt sources

Ultrasonic Sensor HCSR04



- Ultrasonic sensor has a transmitter and receiver
- Frequency is 44KHz
- Speed of Sound waves is 340m/s
- Distance can be calculated as $\text{Speed} \times \text{Time} / 2$

Motor Driver IC



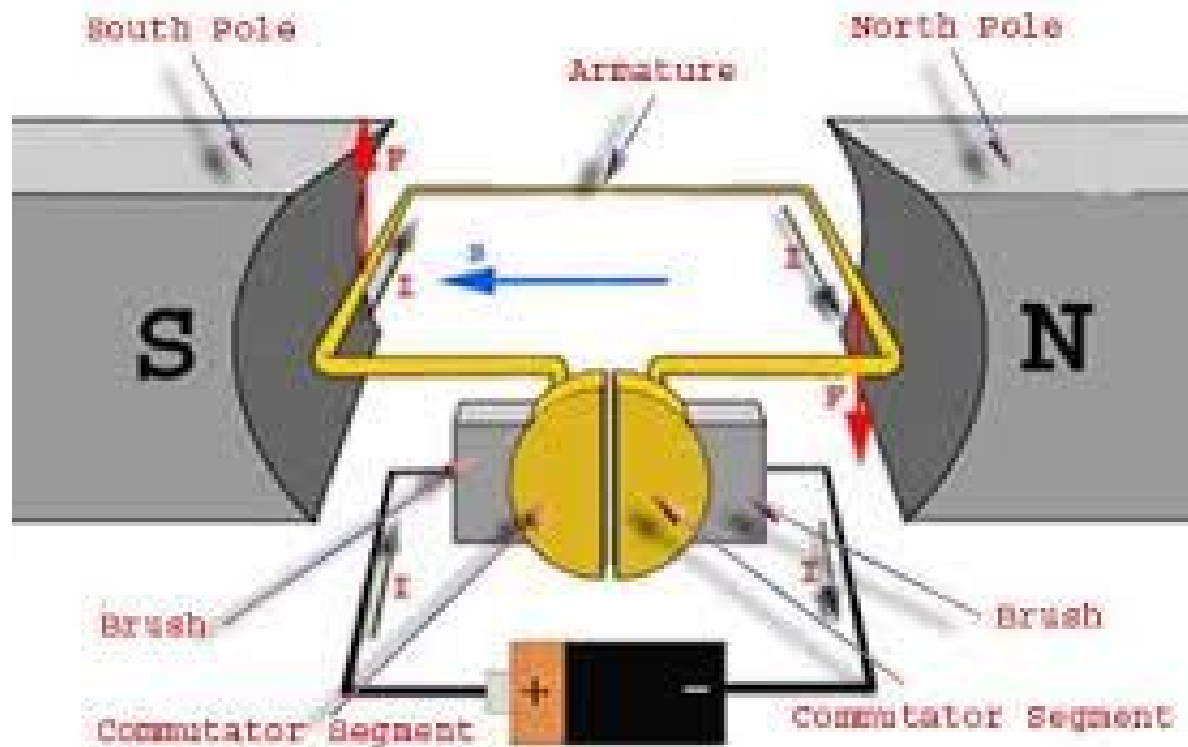
- This Motor Driver Board is designed to Work with L293D IC.
- This can control 2 DC Motors, their direction using control lines and their speed using PWM.

DC Motor

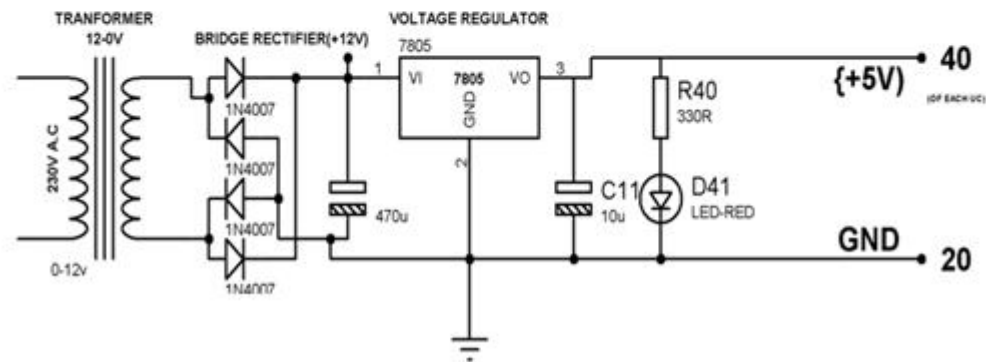
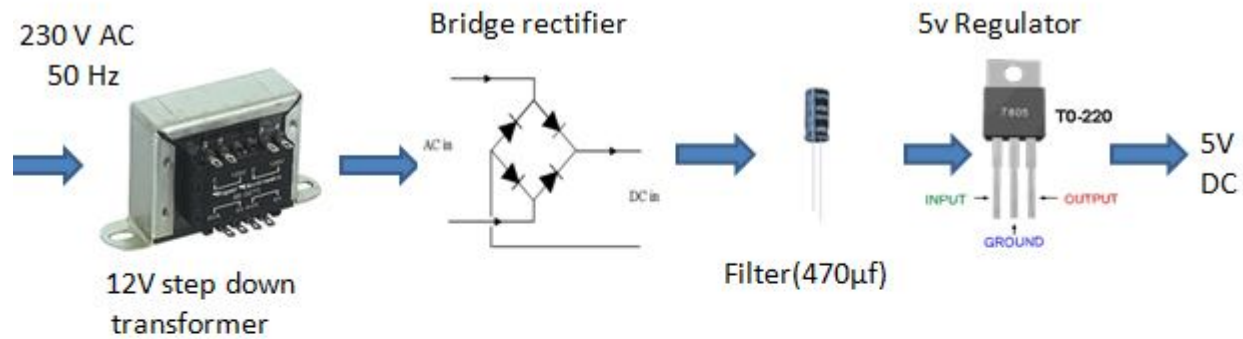


- Converts direct current electrical power into mechanical power
- The very basic construction of a dc motor contains a current carrying armature which is connected to the supply end through commutator segments and brushes are placed within the north south poles of a permanent or an electro-magnet

DC Motor - Construction



Power Supply



Software requirements

- Tool
 Arduino IDE

- Programming languages used
 Embedded C/C++

Advantages

- Code compatibility and expandability across different Arduino boards
- Cost is less as Arduino is open source
- The schematic of Arduino is open source. So for future enhancement of the project the board can be extended to add more hardware features
- Ultrasonic sensor has large range and can be used in any lighting conditions

Future Work

- Hardware can be enhanced
- This will allow the use of advanced sensors like Kinect sensors
- Image processing algorithms can be added

Conclusion

- Designed human follower robot using Arduino microcontroller
- It can follow a human whenever he moves in a straight line

References

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