Ultrasonic Sensor

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves.

An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity.

High-frequency sound waves reflect from boundaries to produce distinct echo patterns. I have used two ultrasonic sensors in this project to determine the shape of object. If both the sensors encounter same distance that means the object has plane surface otherwise a curve surface.

Servo Motor

Servo control is a method of controlling many types of RC/hobbyist servos by sending the servo a PWM (pulse-width modulation) signal, a series of repeating pulses of variable width where either the width of the pulse (most common modern hobby servos) or the duty cycle of a pulse train (less common today) determines the position to be achieved by the servo. The PWM signal might come from a radio control receiver to the servo or from common microcontrollers such as the Arduino. I have used it to move ultrasonic sensors in 90,180,0 degrees angle to detect obstacles.
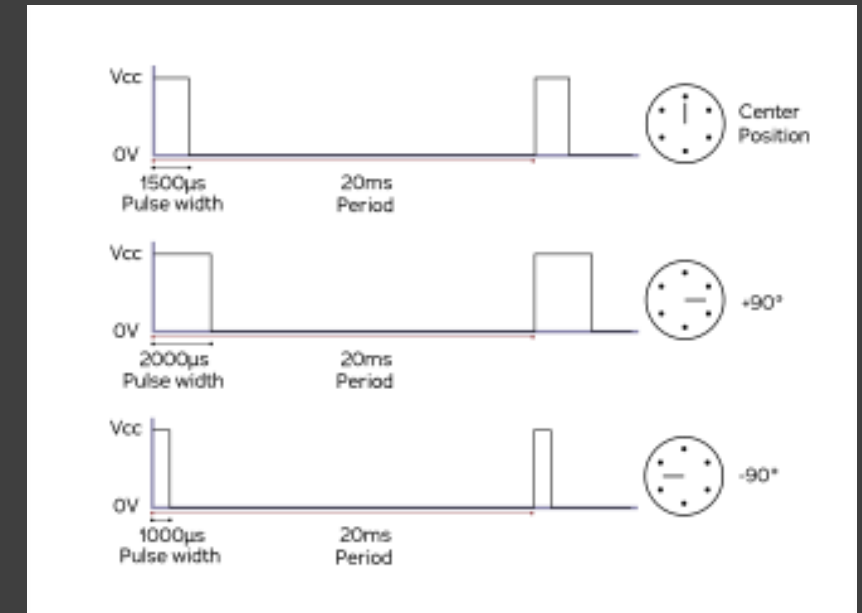
16x2 LCD Display Module

16×2 LCD is a 32 digits display screen for all kinds of CMOS/TTL devices. This word comes from the liquid crystal and 16X2 represents its screen size. In Liquid crystal display 16×2, there are 2 rows and 16 columns. Besides, 5×8 pixel makes a single digit. Any digit from ASCII code is viewable on the module. It supports the custom signs and designs but those require some specific methods and have some limitations. This display module has too much use in most of the commercial projects and there is almost a library in every programming language about it. The premade libraries made it easy to interface with other devices.

I have used it to display no of object detected according to different shapes. Ex: cuboid – 7,sphere -5
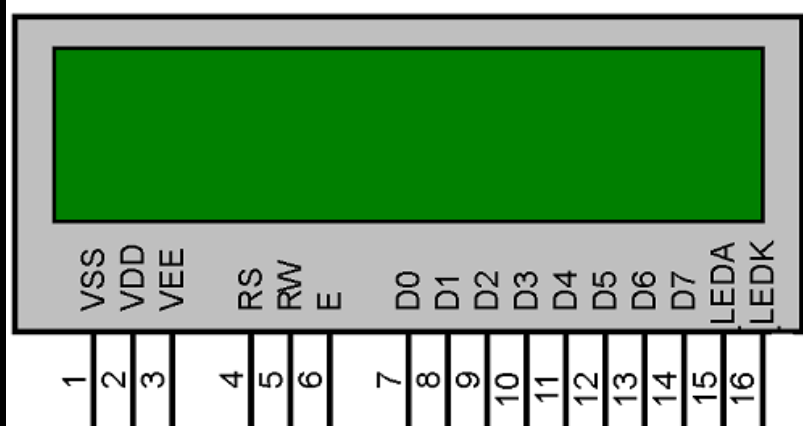

Sr. No	Pin No.	Pin Name	Pin Type	Pin Description	Pin Connection
1	Pin 1	Ground	Source Pin	This is a ground pin of LCD	Connected to the ground of the MCU/ Power source
2	Pin 2	VCC	Source Pin	This is the supply voltage pin of LCD	Connected to the supply pin of Power source
3	Pin 3	V0/VEE	Control Pin	Adjusts the contrast of the LCD.	Connected to a variable POT that can source 0-5V
4	Pin 4	Register Select	Control Pin	Toggles between Command/Data Register	Connected to a MCU pin and gets either 0 or 1. 0 -> Command Mode 1-> Data Mode

5	Pin 5	Read/Write	Control Pin	Toggles the LCD between Read/Write Operation	Connected to a MCU pin and gets either 0 or 1. 0 -> Write Operation 1-> Read Operation
6	Pin 6	Enable	Control Pin	Must be held high to perform Read/Write Operation	Connected to MCU and always held high.
7	Pin 7-14	Data Bits (0-7)	Data/Command Pin	Pins used to send Command or data to the LCD.	In 4-Wire Mode Only 4 pins (0-3) is connected to MCU In 8-Wire Mode All 8 pins(0-7) are connected to MCU
8	Pin 15	LED Positive	LED Pin	Normal LED like operation to illuminate the LCD	Connected to +5V
9	Pin 16	LED Negative	LED Pin	Normal LED like operation to illuminate the LCD connected with GND.	Connected to ground

L298N Motor Driver

This L298N Motor Driver Module is a high-power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. L298N Module can control up to 4 DC motors, or 2 DC motors with directional and speed control. I have used it for controlling the wheel motors.
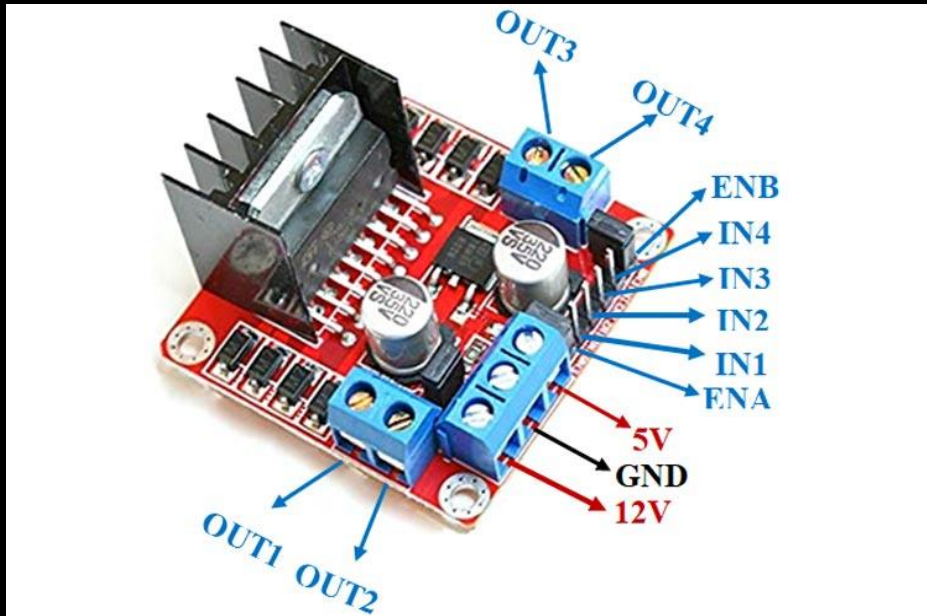
Pin Name	Description
IN1 & IN2	Motor A input pins. Used to control the spinning direction of Motor A
IN3 & IN4	Motor B input pins. Used to control the spinning direction of Motor B
ENA	Enables PWM signal for Motor A
ENB	Enables PWM signal for Motor B
OUT1 & OUT2	Output pins of Motor A
OUT3 & OUT4	Output pins of Motor B
12V	12V input from DC power Source
5V	Supplies power for the switching logic circuitry inside L298N IC
GND	Ground pin

BO MOTORS

Bo motor (Battery Operated) lightweight DC geared motor which gives good torque and rpm at lower voltages. Here you can get BO motor with varying rated speed. This motor can run at approximately 200 rpm when driven by a single Li-Ion cell. Great for battery operated lightweight robots. The motor has ability to operate with minimum or no lubrication, due to inherent lubricity. The motor is ideal for DIY enthusiasts. This motor set is inexpensive, small, easy to install, and ideally suited for use in a mobile robot car. They are commonly used in our 2WD platforms.

Wheels