# Circuit Documentation

## Summary

This circuit is designed to control two gear motors and a servo motor using an Arduino Uno. The circuit also includes an ultrasonic sensor for distance measurement. The L298N DC motor driver is used to drive the gear motors, while the Arduino Uno provides control signals to the motor driver and the servo motor. The circuit is powered by a 12V battery.

## Component List

1. **Gear Motor (2 units)**
    - Description: DC gear motors used for driving mechanical components.
    - Pins: +, -
2. **L298N DC Motor Driver**
    - Description: A dual H-bridge motor driver that allows control of two DC motors.
    - Pins: OUT1, OUT2, 12V, GND, 5V, OUT3, OUT4, 5V-ENA-JMP-I, 5V-ENA-JMP-O, +5V-J1, +5V-J2, ENA, IN1, IN2, IN3, IN4, ENB
3. **Battery 12V**
    - Description: Power source for the circuit.
    - Pins: +, -
4. **Arduino Uno**
    - Description: A microcontroller board used for controlling the circuit.
    - Pins: AREF, GND, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, TX->1, 0->RX, A5, A4, A3, A2, A1, A0, Vin, 5V, 3.3V, RESET, IOREF, +, -
5. **Sensor - Ultrasonic HC-SR04**
    - Description: An ultrasonic sensor used for distance measurement.
    - Pins: Trig, Echo, GND, VCC
6. **Servo Motor**
    - Description: A motor used for precise control of angular position.
    - Pins: VCC, GND, SIGNAL

## Wiring Details

### Gear Motor 1

- **+** connected to L298N DC Motor Driver OUT1
- **-** connected to L298N DC Motor Driver OUT2

### Gear Motor 2

- **+** connected to L298N DC Motor Driver OUT3
- **-** connected to L298N DC Motor Driver OUT4

## L298N DC Motor Driver

- **12V** connected to Battery 12V +
- **GND** connected to Battery 12V - and Arduino Uno GND
- **5V** connected to Arduino Uno Vin
- **ENA** connected to Arduino Uno pin 8
- **IN1** connected to Arduino Uno pin 7
- **IN2** connected to Arduino Uno pin 6
- **IN3** connected to Arduino Uno pin 5
- **IN4** connected to Arduino Uno pin 4
- **ENB** connected to Arduino Uno pin 3

## Battery 12V

- **+** connected to L298N DC Motor Driver 12V
- **-** connected to L298N DC Motor Driver GND and Arduino Uno GND

## Arduino Uno

- **Vin** connected to L298N DC Motor Driver 5V
- **GND** connected to Battery 12V - and L298N DC Motor Driver GND
- **Pin 9** connected to Servo Motor SIGNAL
- **Pin 12** connected to Ultrasonic Sensor Trig
- **Pin 11** connected to Ultrasonic Sensor Echo
- **5V** connected to Servo Motor VCC and Ultrasonic Sensor VCC

## Sensor - Ultrasonic HC-SR04

- **Trig** connected to Arduino Uno pin 12
- **Echo** connected to Arduino Uno pin 11
- **GND** connected to Arduino Uno GND and Servo Motor GND
- **VCC** connected to Arduino Uno 5V and Servo Motor VCC

## Servo Motor

- **SIGNAL** connected to Arduino Uno pin 9
- **VCC** connected to Arduino Uno 5V and Ultrasonic Sensor VCC
- **GND** connected to Arduino Uno GND and Ultrasonic Sensor GND