HARDWARE LISTS

1. NODE MCU (ESP8266)

NodeMCU and Arduino are both popular platforms for building IoT projects, but they have different approaches and strengths.

NodeMCU is based on the ESP8266 chip, which has built-in networking capabilities and a modern operating system. This makes it an excellent choice for projects that require WiFi connectivity and easy access to the chip's features. However, working with the ESP8266 directly can be challenging, especially for beginners.

NodeMCU simplifies the development process by providing a convenient form factor, pre-soldered pins, and a software development environment that makes it easier to program the ESP8266. NodeMCU also offers a range of libraries and modules that make it easy to interact with sensors, displays, and other components.

Arduino, on the other hand, is a more flexible platform that supports a wide range of microcontrollers and programming environments. Arduino boards can be used for a variety of projects, from simple LED blinkers to complex robots and automation systems.

Arduino's strength lies in its flexibility and versatility. It can be used with a wide range of sensors, actuators, and other components, and there is a vast community of developers and users who have created libraries, examples, and tutorials to help you get started.

In summary, NodeMCU is a great choice for projects that require WiFi connectivity and easy access to the ESP8266's features, while Arduino is a more flexible platform that can be used for a wide range of projects and supports a variety of microcontrollers and programming environments.

Node MCU ESP8266 Specifications
Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
Operating Voltage: 3.3V
Input Voltage: 7-12V
Digital I/O Pins (DIO): 16
Analog Input Pins (ADC): 1
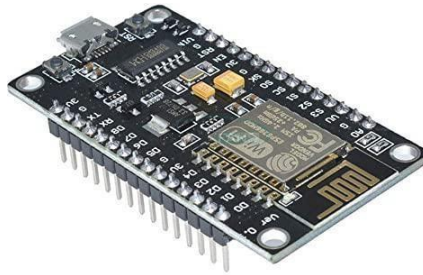UARTs: 1
SPIs: 1
I2Cs: 1
Flash Memory: 4 MB
SRAM: 64 KB
Clock Speed: 80 MHz
USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
PCB Antenna
Small Sized module to fit smartly inside your IoT projects.

2. MOTOR SHEILD (L298n)

A Motor Shield is an add-on board for an Arduino or similar microcontroller that allows you to control one or more motors. One popular motor shield is the L298N, which is designed to control up to two DC motors or a single stepper motor.

The L298N Motor Shield consists of an L298N motor driver IC, which is capable of delivering up to 2 amps of current to each motor. The shield also includes screw terminals for connecting the motors, as well as headers for connecting to the Arduino.

To use the L298N Motor Shield, you would first connect the shield to your Arduino, making sure to match the pins correctly. You would then connect your motors to the screw terminals on the shield. Finally, you would use the Arduino's digital output pins to control the direction and speed of the motors.

The L298N Motor Shield provides several useful features, such as over-current protection and the ability to control the speed and direction of the motors using pulse-width modulation (PWM). It is a popular choice for robotics and other projects that require motor control, and there are many resources available online to help you get started with using it.

Motor Shield (L29n) Features and Specifications:
Driver Model: L298n 2A
Driver Chip: Double H Bridge L298n
Motor Supply Voltage (Maximum): 46V
Motor Supply Current (Maximum): 2A
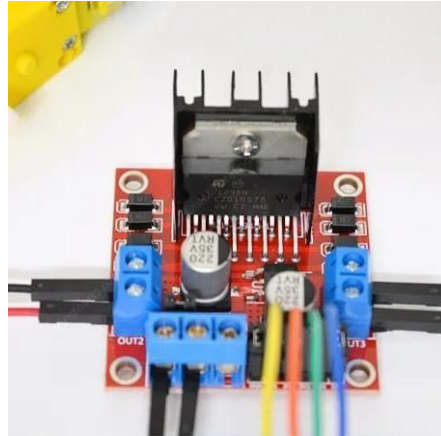Logic Voltage: 5V
Driver Voltage: 5-35V
Driver Current: 2A
Logical Current:0-36mA
Maximum Power (W): 25W
Current Sense for each motor
Heat-sink for better performance
Power-On LED indicator

3. Ultrasonic Sensor (HERS-04)

HERS-04 is a commonly used ultrasonic sensor that can be used for distance measurement and obstacle detection. The sensor emits ultrasonic waves and measures the time it takes for the waves to bounce off an object and return to the sensor. Based on this time measurement, the distance between the sensor and the object can be calculated using the speed of sound in air.

The HERS-04 ultrasonic sensor typically has a detection range of 2-450 cm and can operate at frequencies of 40 kHz. It is commonly used in robotics, automation, and security systems.

Ultrasonic Sensor Features and Specifications:
Power Supply: DC 5V.
Working Current: 15mA.
Working Frequency: 40Hz.
Ranging Distance: 2cm – 400cm/4m.
Resolution: 0.3 cm.
Measuring Angle: 15 degrees.
Trigger Input Pulse width: 10uS.
Dimension: 45mm x 20mm x 15mm.

4. Tower Pro Micro Servo Motor (SG90 9g)

The Tower Pro SG90 9g micro servo motor is a small motor that is commonly used in hobbyist and DIY projects such as robotics, RC cars, and airplanes. It is a low-cost motor that offers good performance and precision for its size and weight.

The SG90 servo motor is a 3-wire motor that operates at a voltage of 4.8V to 6V and has a torque of approximately 1.8kg/cm. It can rotate continuously in a 360-degree range, making it useful for applications that require continuous rotation. It also has a feedback mechanism that allows for precise positioning of the motor.

Overall, the SG90 servo motor is a popular choice for small projects due to its affordability, reliability, and versatility.

Tower Pro 9G Micro Servo Motor Features:
Required Pulse: 3-5 Volt Peak to Peak Square Wave
Operating Voltage: 4.8-6.0 Volts
Operating Temperature Range: -10 to +60 Degree C
Operating Speed (4.8V): 0.12sec/60 degrees at no load
Operating Speed (6.0V): 0.10sec/60 degrees at no load
Stall Torque (4.8V): 1.8kg/cm
Stall Torque (6.0V): 2.4kg/cm
360 Modifiable: Yes
Bearing Type: Ball Bearing
Gear Type: Nylon Gears
Connector Wire Length: 12"
Dimensions: 22x11.5x27mm
Weight: 11g

5. 4WD Car Kit

A 4WD car kit is a set of components that allow you to build a four-wheel-drive (4WD) car. These kits typically include a chassis, four wheels, motors, a battery pack, and a controller. Some kits may also include additional components such as suspension systems, gearboxes, and steering systems.

Building a 4WD car from a kit can be a fun and rewarding project for hobbyists and DIY enthusiasts. It allows you to customize your car's design and performance to your liking and learn about the mechanics of cars in the process.

There are many different types of 4WD car kits available, ranging from beginner-level kits that are easy to assemble, to advanced-level kits that require more technical Skill and expertise.

Specifications of 4WD Car Kit
Operating Voltage (VDC) - 3-6V
Gear Ratio - 1:48
No-load speed (5V) - about 200 RPM
Rated Torque - 0.8 Kg.cm @ 5V
Load current - 170mA (when it is 4.5V)
Shaft Length - 10 mm
Shaft Type - 6 mm, Double-D
Size - 70 x 23 x 18 mm
Weight - 28g
Product Name - BO Wheel
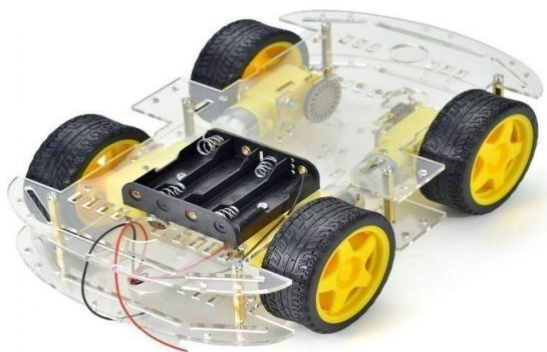Loading Capacity-Max - 2.5Kg
Double D hole For BO Motor - 6 mm
Wheel Diameter - 65 mm
Wheel Width - 27 mm
Grip Material - Rubber
Weight - 34g

Lists of Actions

1) Moving

    a) Forward
    b) Backward
    c) Left
    d) Right

2) Picking up and moving objects.

REPORTS

- This project presents the development of a voice-controlled home assistant robot that processes voice commands in real-time using an offline server. The speech signal commandsare transmitted to the server over a wired network.

- There are several areas that could be further explored to improve the robot's performance,including the effect of the distance between the speaker's mouth and the microphone, the impact of noise on the **speech-to-text conversion process**, and the use of **renewable energysources such as solar cells to power the robot**. However, the robot is not affected by the accent of the speaker as the voice commands are processed using a cloud server that functions regardless of the speaker's accent.

- The developed robot has potential applications in a range of industries, from **chemical industries** to **home automation**. The report also discusses possible improvements for futureresearch towards potential applications in **hospitals, car systems, and industries**. Overall, the voice-controlled home assistant robot provides a promising development in the field of robotics and can potentially offer efficient and comfortable solutions for daily tasks.

- The voice which we will give through Voice assistant to robot will first store in our database then it will forward the commands to **Node MCU(ESP8266)** according towhich robot will perform the instructions.

- It can be used in various industries for **picking various objects** where human intervention is not desired.

- On a large scale, it can be used to develop robots with **Military**. It can be used to target enemy without any human being crossing the territory.