# OMNI DIRECTIONAL VOICE CONTROLLED ROBOT

Overview

- Introduction
- Block Diagram
- Hardware Requirements
- Software used
- Advantages
- Disadvantages
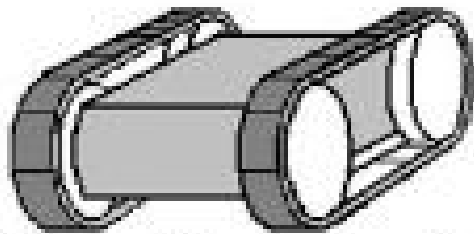- References

Introduction

- It is a vehicle used to move in all directions.

- Our project aims at designing a Omni directional robot equipped with four Omni wheels, mounted at 90 degree apart.

- These wheels are mounted on DC motors which will be driven by L293D motor drivers.
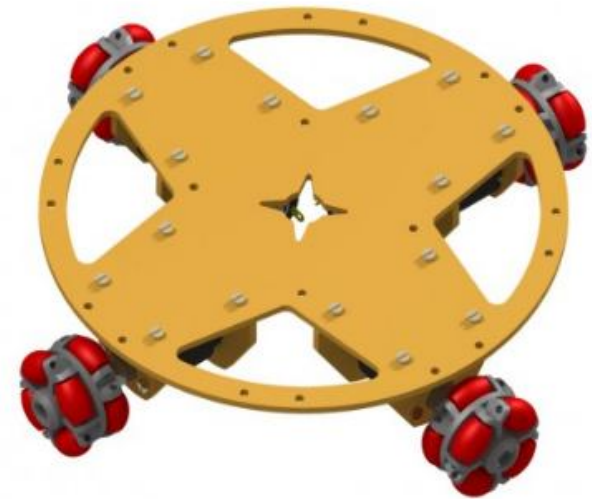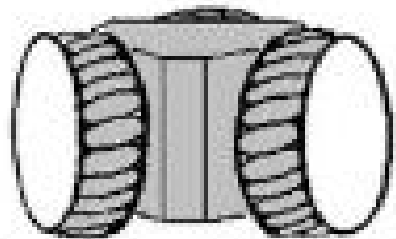
Example
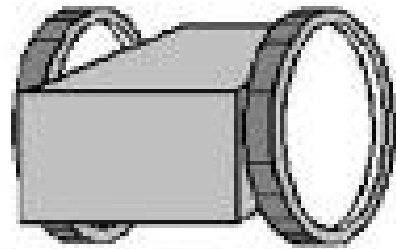
Bi-wheel type robot

- Smooth motion
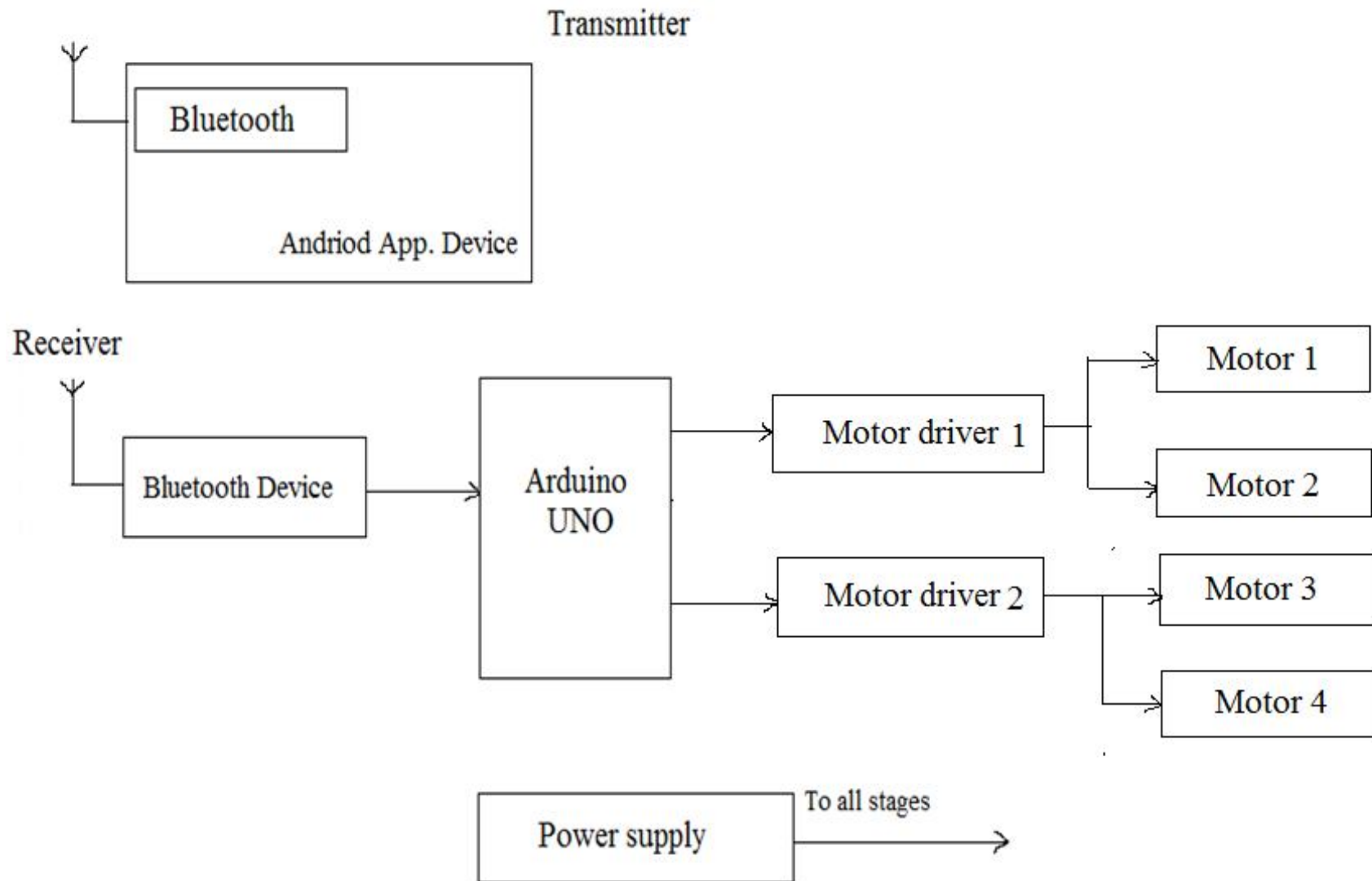- Risk of slipping
- Some times use roller-ball to make balance

Caterpillar type robot

- Exact straight motion
- Robust to slipping
- Inexact modeling of turning

Omnidirectional robot

- Free motion
- Complex structure
- Weakness of the frame

Block Diagram

Transmitter

Bluetooth

Andriod App. Device

Receiver

Bluetooth Device

Arduino UNO

Motor driver 1

Motor 1

Motor 2

Motor driver 2

Motor 3

Motor 4

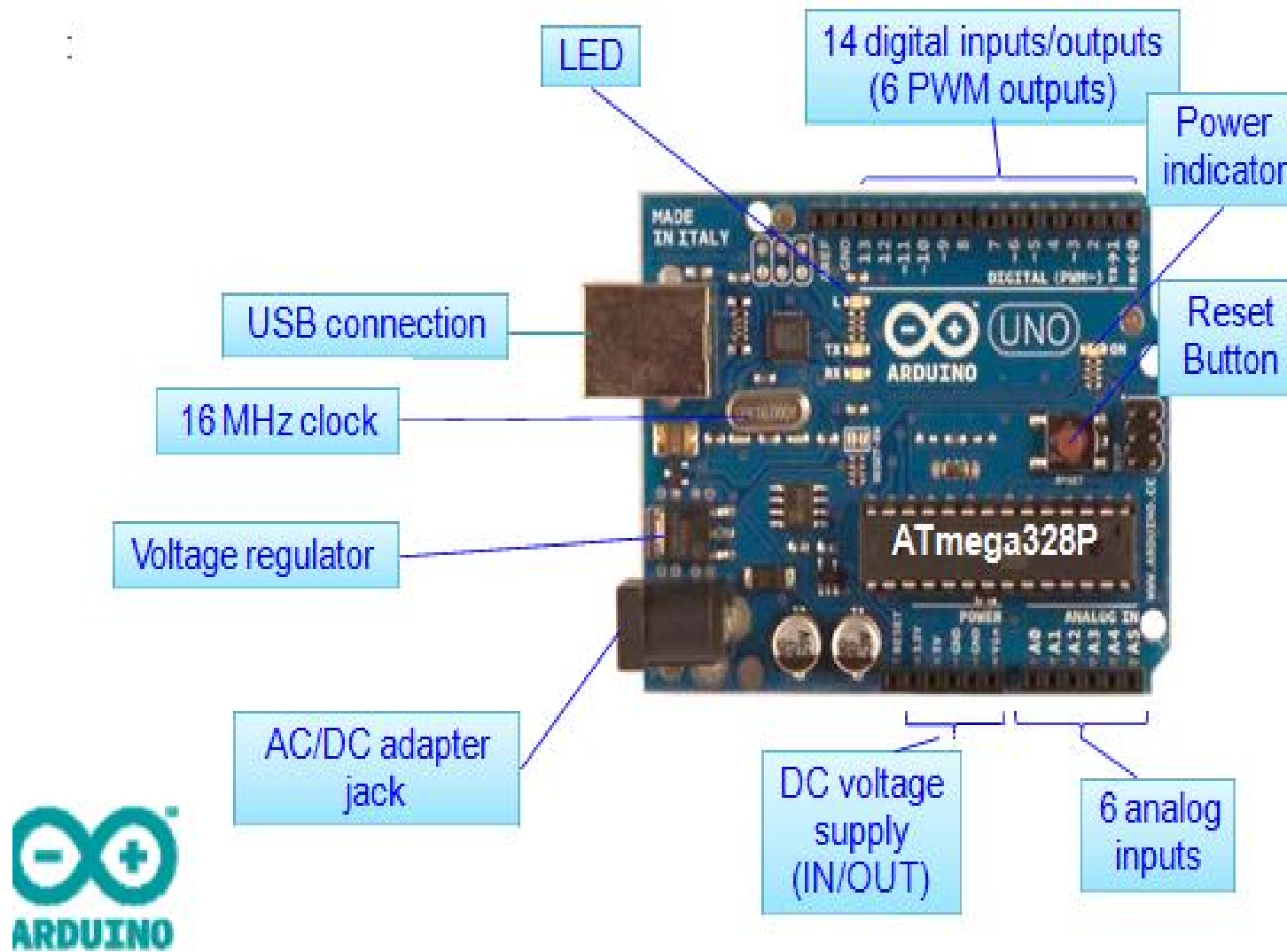Power supply

To all stages

Hardware requirements

- Arduino Uno
- Bluetooth Module HC-05
- DC Motor Driver L293D
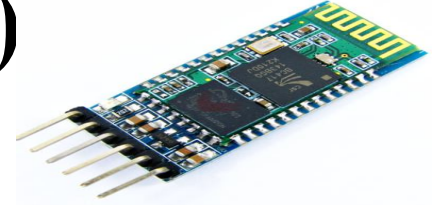- DC Motor
- Omni Wheels
- Power Supply

Arduino UNO

- Microcontroller board based on the ATmega328P.
- 14 digital input/output pins (of which 6 can be used as PWM outputs)
- 6 analog inputs.
- 16 MHz quartz crystal
- A power jack
- Connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The board...

LED

14 digital inputs/outputs
(6 PWM outputs)

Power
indicator

USB connection

Reset
Button

16 MHz clock

Voltage regulator

ATmega328P

AC/DC adapter
jack

DC voltage
supply
(IN/OUT)

6 analog
inputs

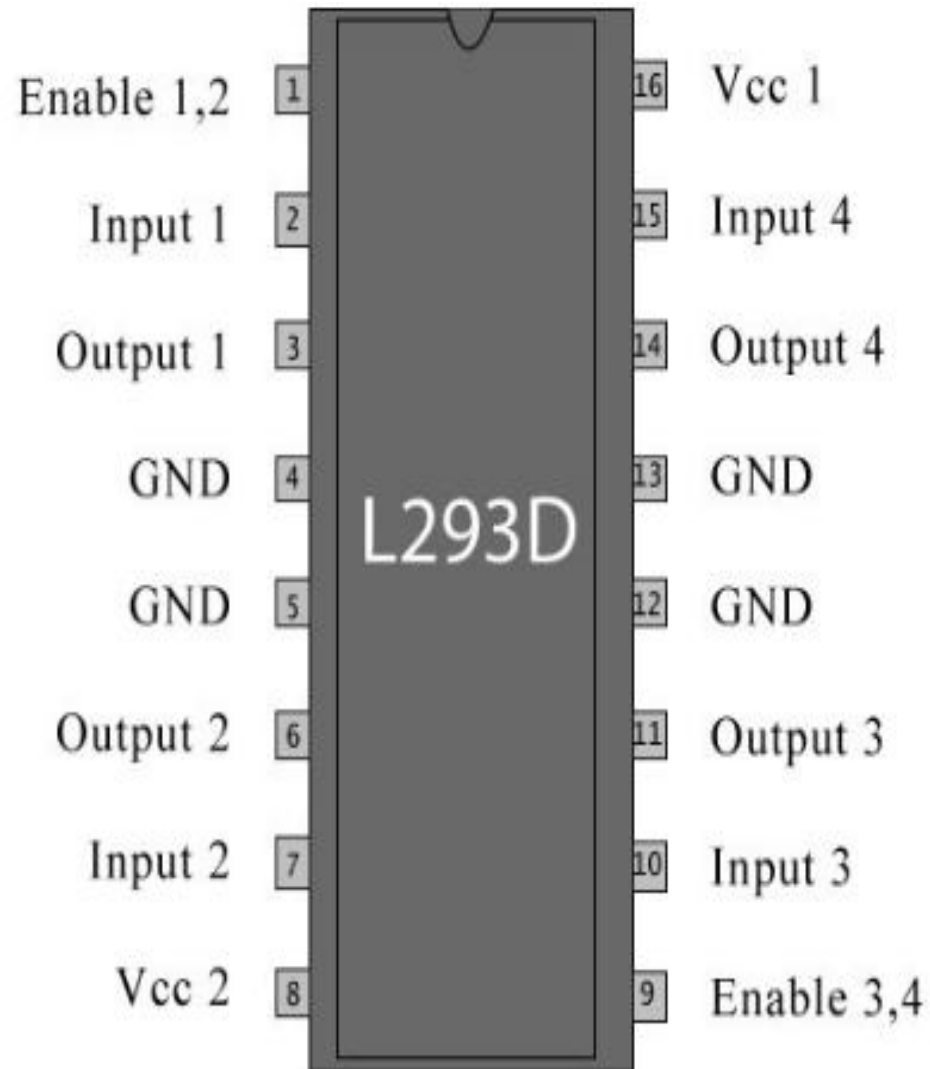ARDUINO

Bluetooth Module (HC-05)

- For the communication between mobile phone and microcontroller Bluetooth module(HC-05) is used

- Low Power 1.8V Operation ,1.8 to 3.6V I/O .

- Serial port Bluetooth module have a Bluetooth 2.0+EDR (enhanced data rate), 3Mbps modulation with complete 2.4GHZ radio transceiver and baseband.

- Using Bluetooth profile and android platform architecture different type of Bluetooth applications can be developed.
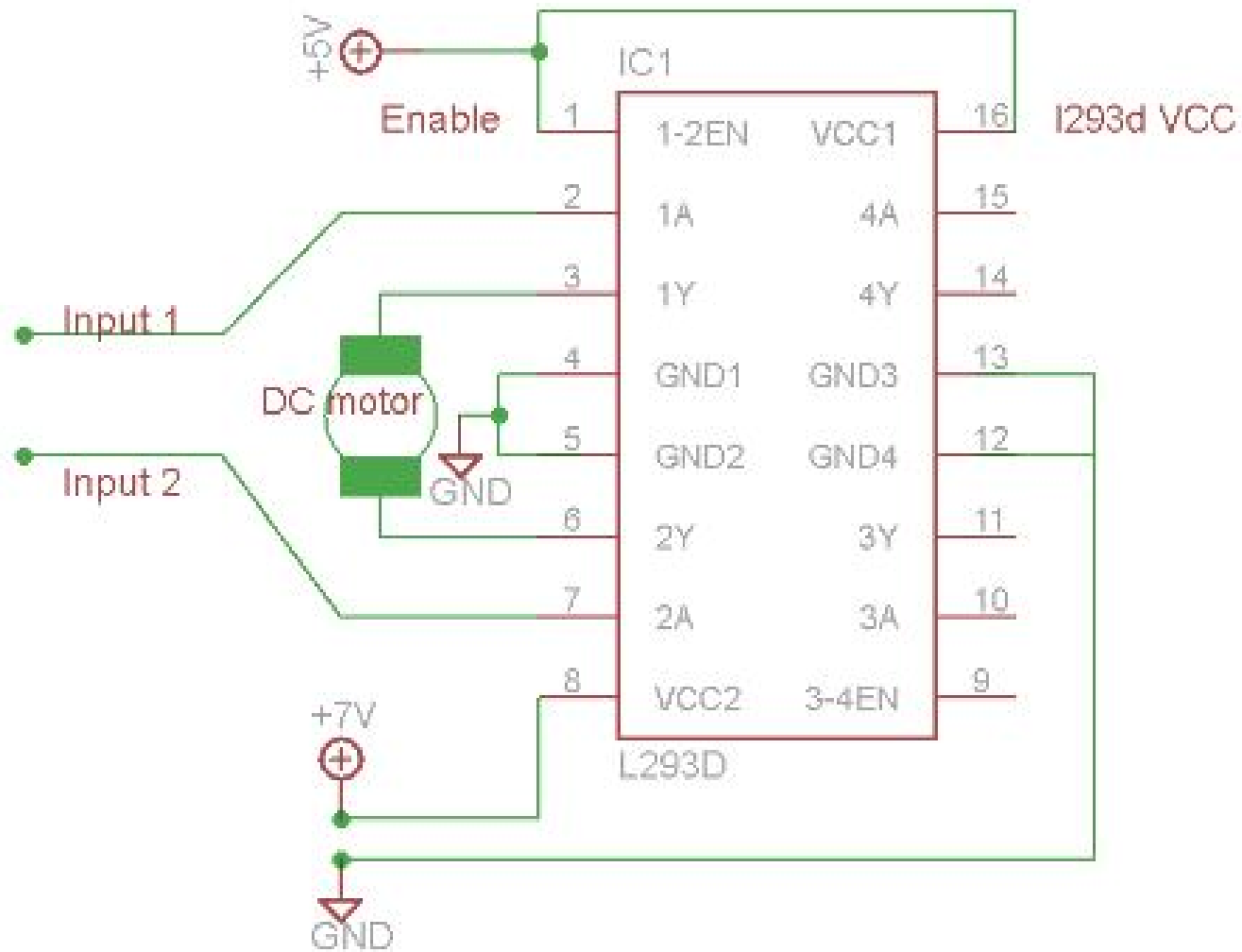
DC Motor Driver(L293D)

- L293D has quadruple high current half-H drivers.
- Wide Supply-Voltage Range: 4.5 V to 36 V
- High-Noise-Immunity Inputs
- Output Current 600mA Per Channel
- Peak Output Current 1.2A Per Channel.

Pin Diagram

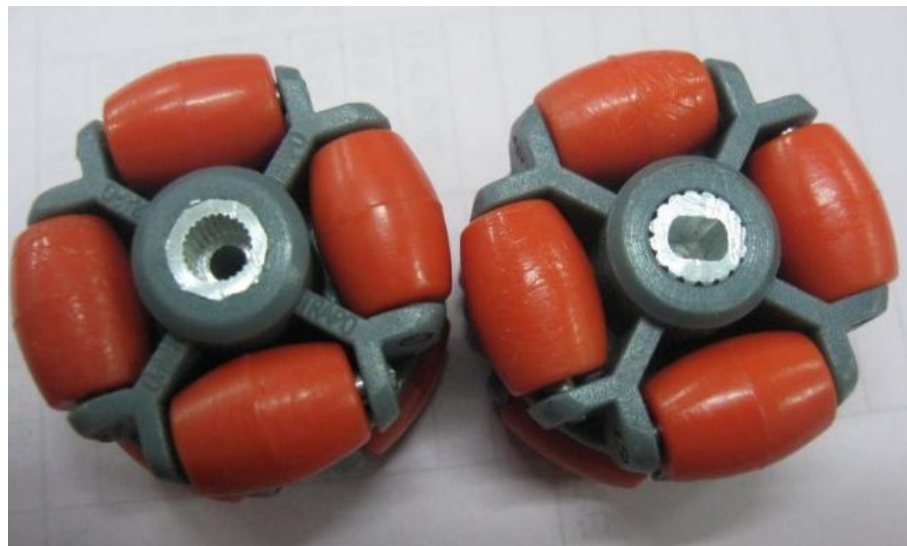|		L293D		
Enable 1,2	1		16	Vcc 1
Input 1	2		15	Input 4
Output 1	3		14	Output 4
GND	4		13	GND
GND	5		12	GND
Output 2	6		11	Output 3
Input 2	7		10	Input 3
Vcc 2	8		9	Enable 3,4

Circuit Diagram

DC Motor

- 12 V, 78 RPM side shaft DC Motor
- No- Load Current - 20mA
- Full Load Current - 800mA
- Full (Stall) Load Torque - 20 kgcm

Omni Wheels

- Similar to Meccanum wheels, are wheels with small discs around the circumferences which are perpendicular to the turning direction.

- The effect is that the wheel can be driven with full force but will also slide laterally with great ease.

- These wheels roll forward like normal wheels, but slide sideways with almost no friction (no skidding during turns)
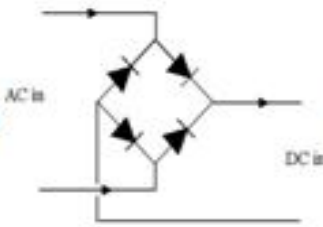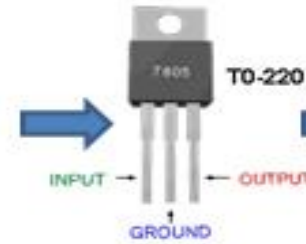
Power Supply

230 V AC
50 Hz
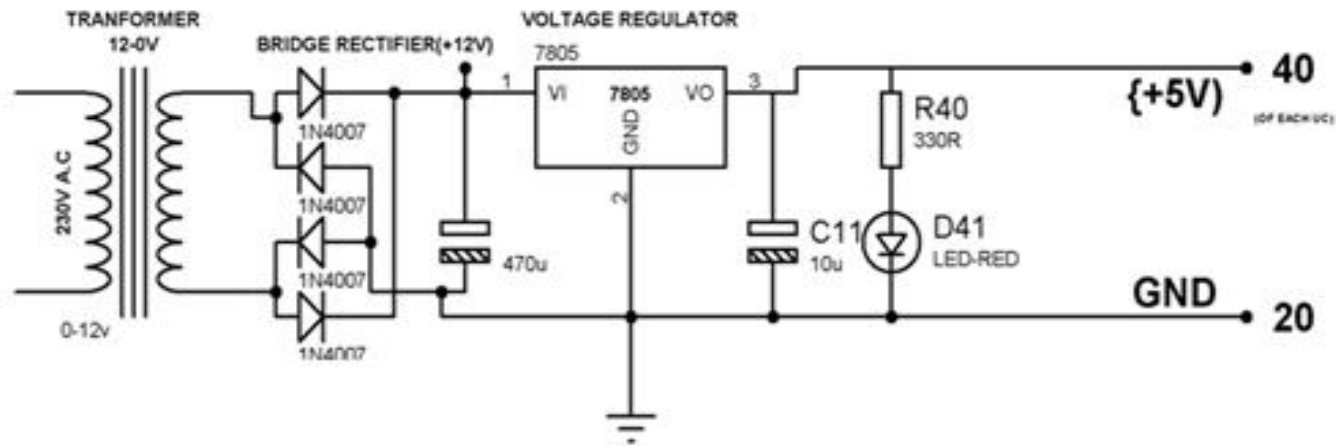
12V step down transformer

Bridge rectifier

AC in

DC in

Filter(470μf)

5v Regulator

7805

TO-220

INPUT → ← OUTPUT

GROUND

5V
DC

TRANFORMER
12-0V

230V A.C

0-12v

BRIDGE RECTIFIER(+12V)

1N4007

1N4007

1N4007

1N4007

470u

VOLTAGE REGULATOR
7805

VI   7805   VO

GND

1

2

3

C11
10u

R40
330R

D41
LED-RED

{+5V}

40

(OF EACH UC)

GND

20

Android

- Android is an open-source operating system which means that any manufacturer can use it in their phones free of charge.

- It was built to be truly open.

- Android is built on the open Linux Kernel. Furthermore, it utilizes a custom JAVA virtual machine

Android Application on Mobile Phones

- An android app is meant for phones with an android based operating systems. They can be downloaded from the android app Market which is pre-loaded on every android phone.

- Blue control APP and Bluetooth Spp APP are some examples.

Android Application Operated Bluetooth

- The Android platform includes support for the Bluetooth network stack, which allows a device to wirelessly exchange data with other Bluetooth devices.

- The application framework provides access to the Bluetooth functionality through the Android Bluetooth APIs.
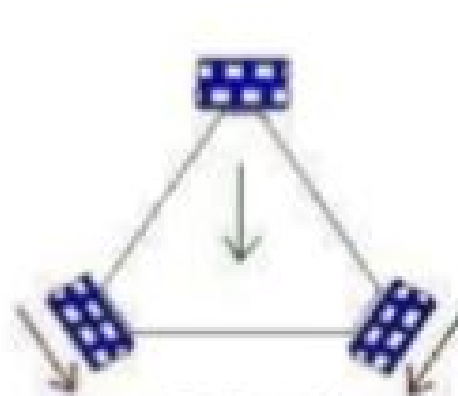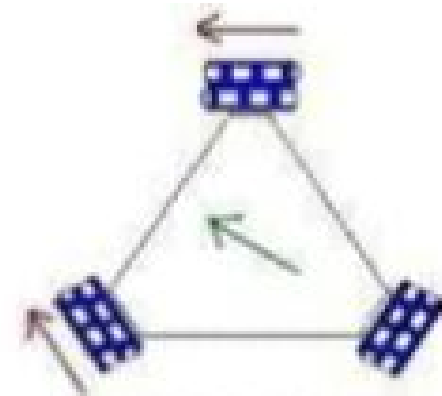
Android Application
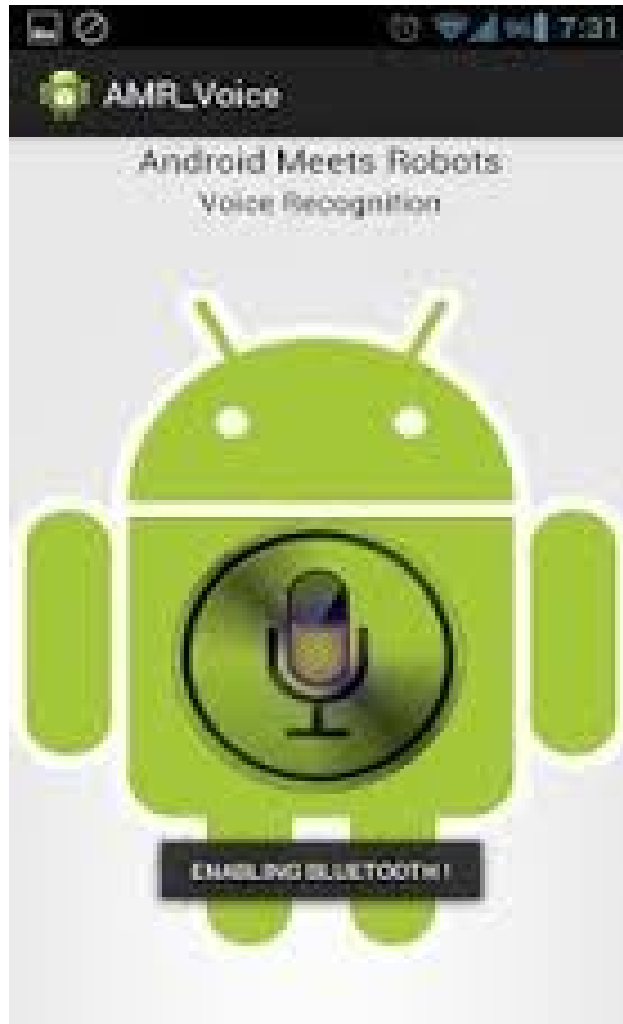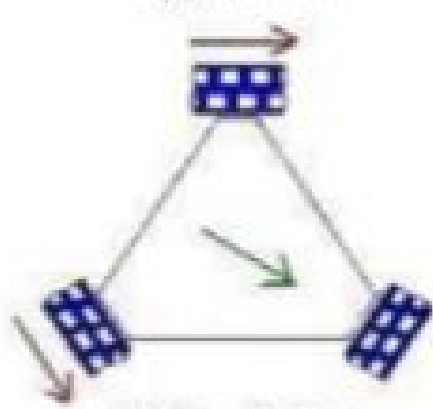
Directions of Omni directional robot
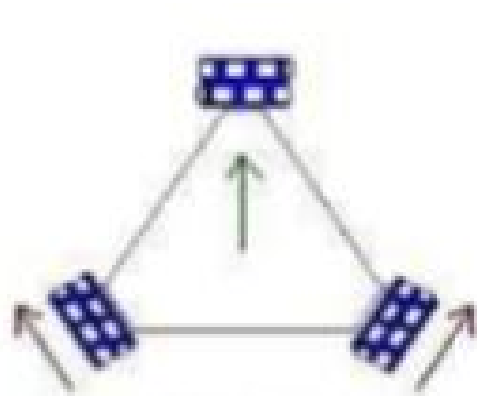
(a) North
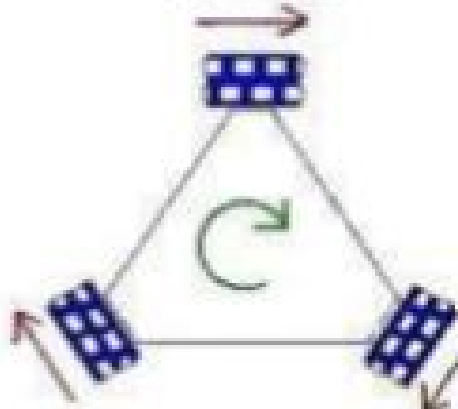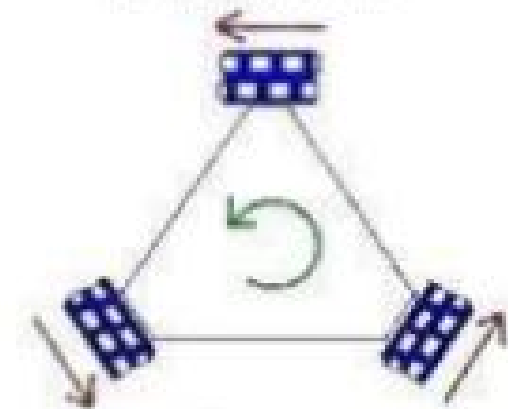
(b) South

(c) North West

(d) South East

(e) CW

(f) CCW

Software Used..

- Arduino IDE
- Eclipse Android SDK(Software Development Kit)

Programming Languages Used..

- Embedded C/C++
- Java & XML

Advantages

- It can move in all 8 directions i.e., in 360 degrees.
- Robots can work in factories and do the same thing over and over again and not do it any differently.
- This robot is serve food or products, to carry material from one place to another, to send medicines to the patients kept in the isolated environments etc.

Disadvantages

- Results from humanoid robots will be that many people are going to lose their jobs.

References

- www.arduino.org

- www.beyondlogic.org

- www.wikipedia.org

- www.elementzonline.com

- www.elementztechblog.wordpress.com

Questions????

THANK YOU