

SMART WHEEL CHAIR

EEE 318: CONTROL SYSTEM LABORATORY

Group-5:

1906155 - Shipon Hossain,
1906156 - Shourov Joarder,
1906157 - Tanvir Hasan Shifat,
1906158 - Al Nayem
1906160 - Khondocar Hridul Hassan

AVAILABLE WHEELCHAIR ON MARKET

Manual
Wheelchair



Power
Wheelchair



WHY VOICE CONTROLLED WHEELCHAIRS ARE PREFERABLE

To Aid Disabled Person



Less User Effort Needed



Emergency Help



User Alone Can Run It

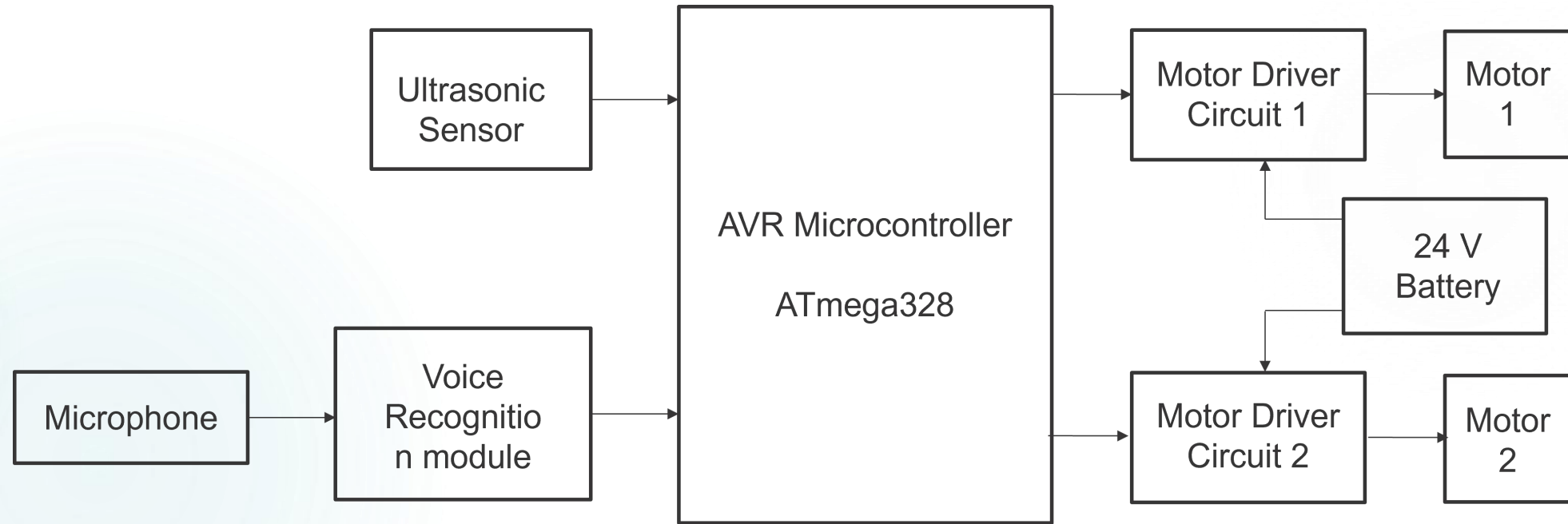
KEY FEATURES

- VOICE-CONTROLLED AUTOMATIC WHEELCHAIR
- SMOOTH SPEED VARIATIONS FOR PATIENT COMFORT
- COLLISION AVOIDANCE
- SOFT START AND STOP
- FACILITY TO COMMAND IN MULTIPLE LANGUAGES
- CONTROLLING THE WHEELCHAIR USING BANGLA LANGUAGE

REFERENCES OF EXISTING WORKS:

[International Journal for Recent Engineering Research and Development
\(ijrerd.com\)](http://ijrerd.com)

BLOCK DIAGRAM



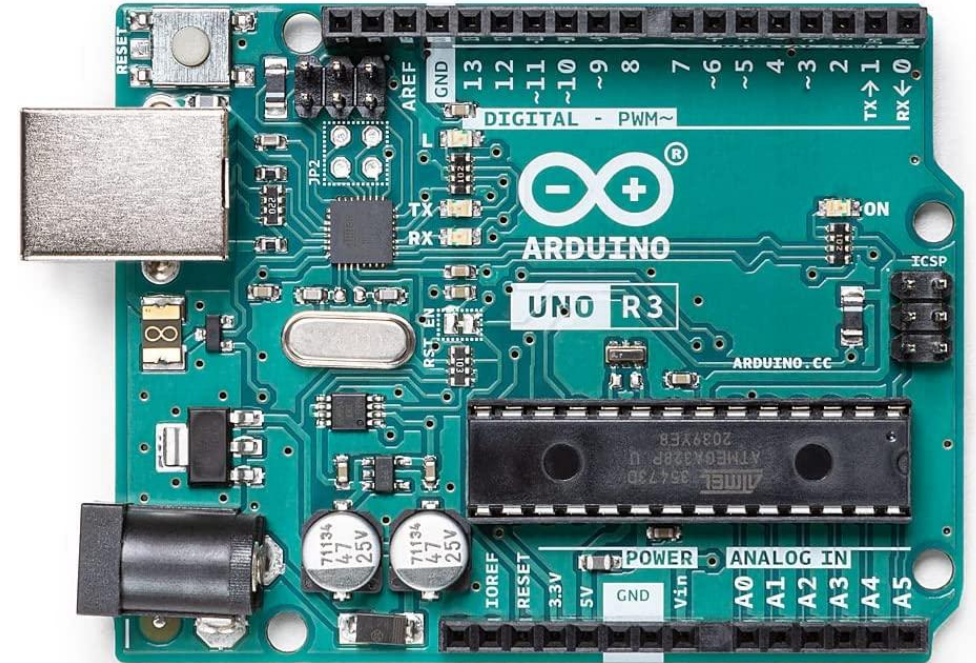
MICROCONTROLLER MODULE

- **Arduino Uno**

Function :

- Takes Input signal from the V3 module when any command is recognized
- Takes input from the Ultrasonic UV sensor
- Gives output to signals to control the motors according to the program coded

Cost: 1000



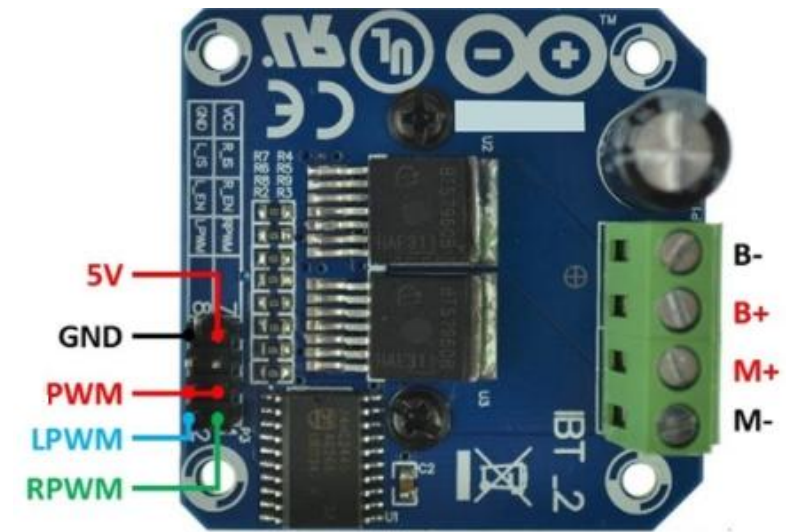
MOTRO DRIVER

BTS7960 H bridge Motor Driver

Features and Functions :

- It is suitable for driving DC motors with a voltage range of 5V to 27V.
- It can handle a continuous current of up to 43A and peak currents of up to 46A.
- It uses H-bridge technology to control the motor's direction and speed.
- The Motor driver will take PWM signals generated from the Arduino and will control the motors accordingly

Cost: 500 x 2



MOTOR

DC Wiper Motor

Features and Functions :

- 12 volt & 7Amp
- Will eventually rotate the wheels of the WheelChair
- Will need 2 such motors
- Each wheel will be controlled by one motor
- Each motor driver will control one motor

Cost: 2500 x 2



WHEEL CHAIR

Front Wheel



Back Wheel



Rexing Seat



Cost: 3000

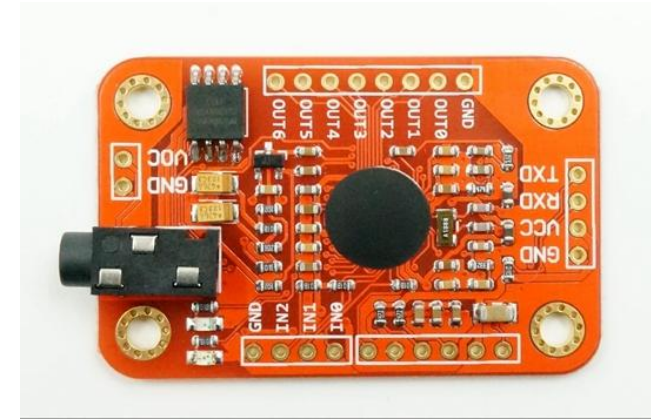
VOICE RECOGNITION MODULE

- **Elechouse Voice Recognition Module V3**

Features :

- Support maximum 80 voice commands, with each voice 1500ms (one or two words speaking)
- Maximum 7 voice commands effective at same time
- Arduino library is supplied
- Easy Control: UART/GPIO

Cost: 2500



Function :

It basically recognizes voice command from the user and the user only using MFCC features of the user's voice

Training of the V3 :

```
sigtrain 0 On Send
Elechouse Voice Recognition V2 Module "train" sample.
-----
settings
-----
Baud rate: 9600
Output IO Mode: Pulse
Pulse Width: 10ms
Auto Load: disable
Group control by external IO: disabled
-----
sigtrain 0 On
-----
Record: 0      Speak now
Record: 0      Speak again
Record: 0      Cann't matched
Record: 0      Speak now
Record: 0      Speak again
Record: 0      Success
Success: 1 ←
Record 0      Trained ←
SIG: On ←
```

OTHER COMPONENTS

Ultrasonic Sensor

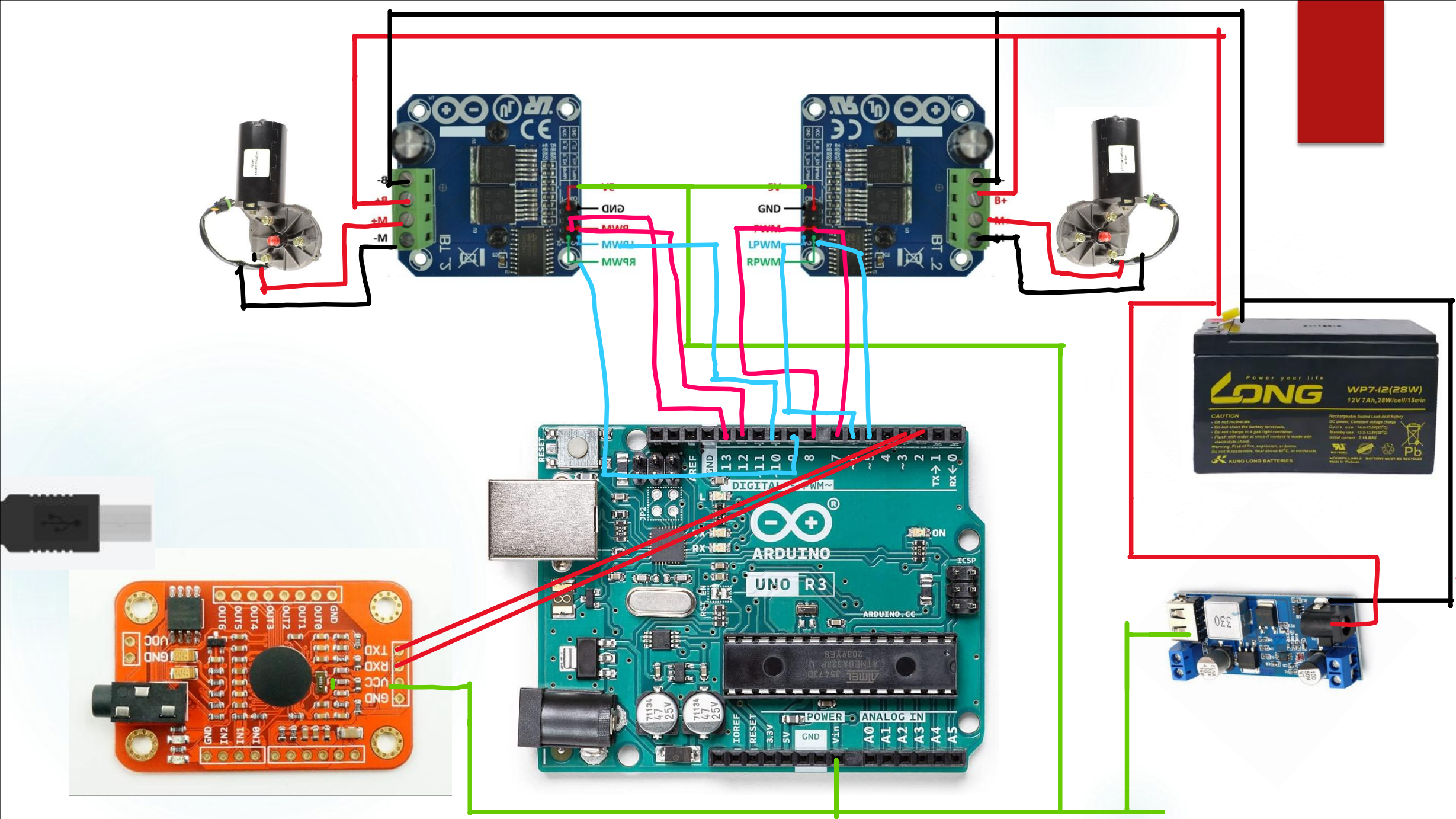


Cost: 80 x 2

Power source (12 volt 7 Amp)



Cost: 3000



COSTING

Components/Modules	Module Name	Quantity	Approximate (BDT)
Speech Recognition Module		1	2500
Microcontroller	Arduino Uno	1	1000
Wheelchair		1	3000
DC motors	12 volt wiper motor	2	5000
Motor Drivers	BTS7960	2	1000
Battery	Long 12v-7ah Smf Battery	1	3000
Hardware Implementation Cost		1	5000
Ultrasonic Sensor		1	100
Total Approximate Cost			20500

Task Distribution

Software Part:

1906156- Shourav Joarder
1606160- Khondocar Hridul Hasaan

Hardware Part:

1906155 – Shipon Hossain,
1906157 – Tanvir Hasan Shifat,
1906158 – Al Nayem

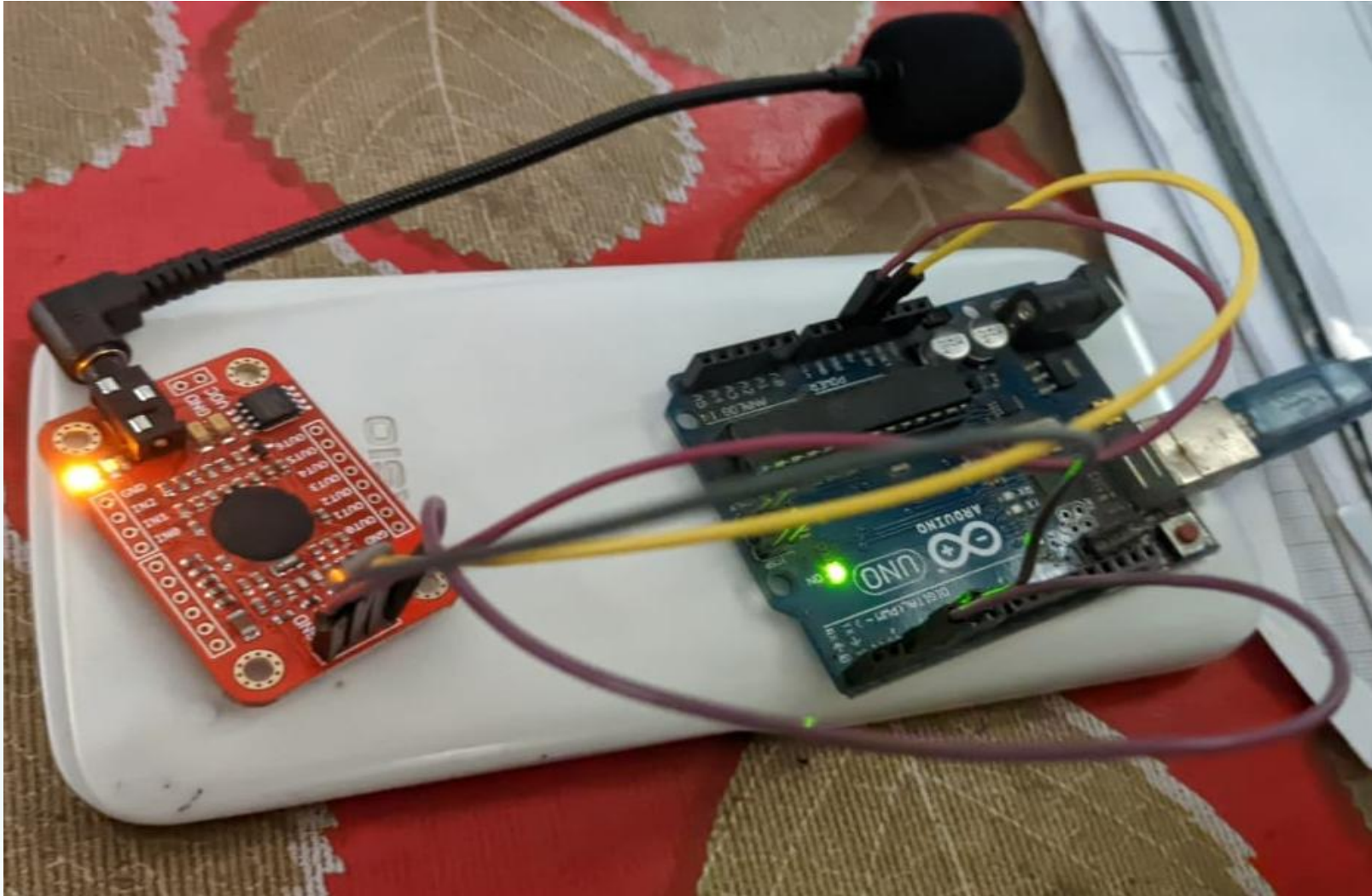
Initial Weekly Plan

Week 4	Training Voice Recognition Module.	Week 7	Testing drive and fix all the problems.
Week 5	Purchasing Motor, Motor Driver, Arduino, Battery, etc. And test all those parts.	Week 8	Trial with a human.
Week 6	Implementing all the parts in the wheelchair.	Week 9	Reserved week.

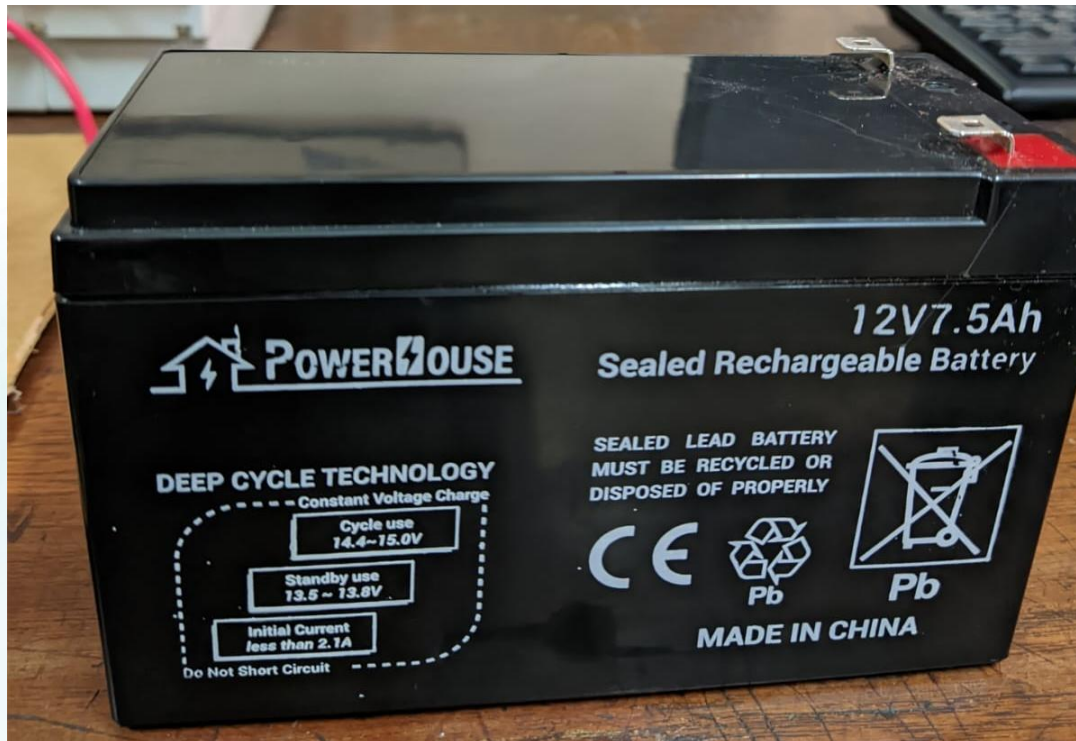
A group of people are gathered outdoors on a concrete surface, working on a project. One person is using a heat gun to heat a metal plate. Another person is holding the plate. A third person is pointing at the plate. A fourth person is holding a small object. A red bag is visible in the bottom left corner. The word "Progress" is overlaid on the image.

Progress

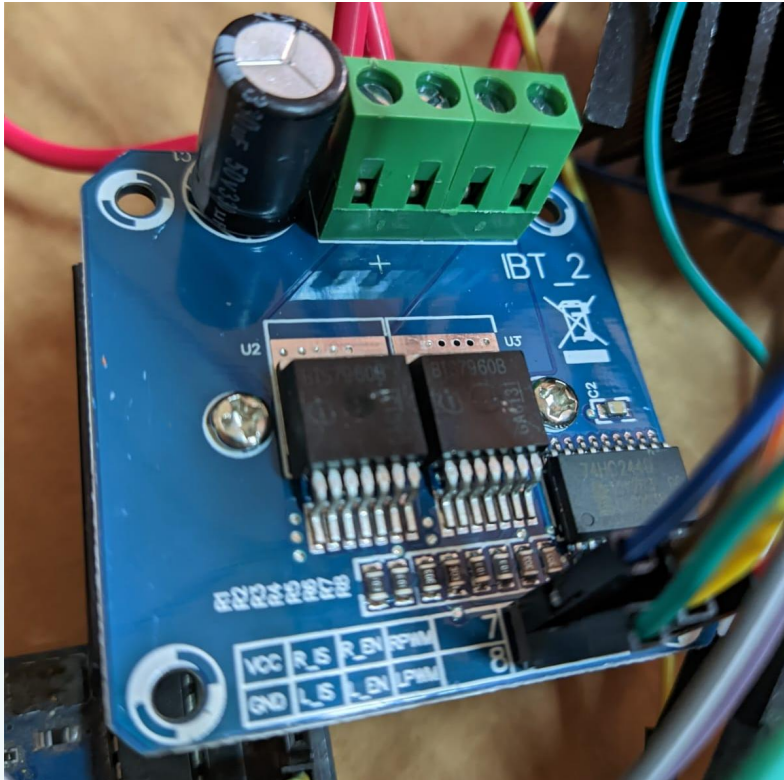
Week 4: Trained Voice Recognition Module



Week 5: Purchased Motor and other components



Week 6: Run the Motor



The Motor Was
Rotating According To
Our Given Command

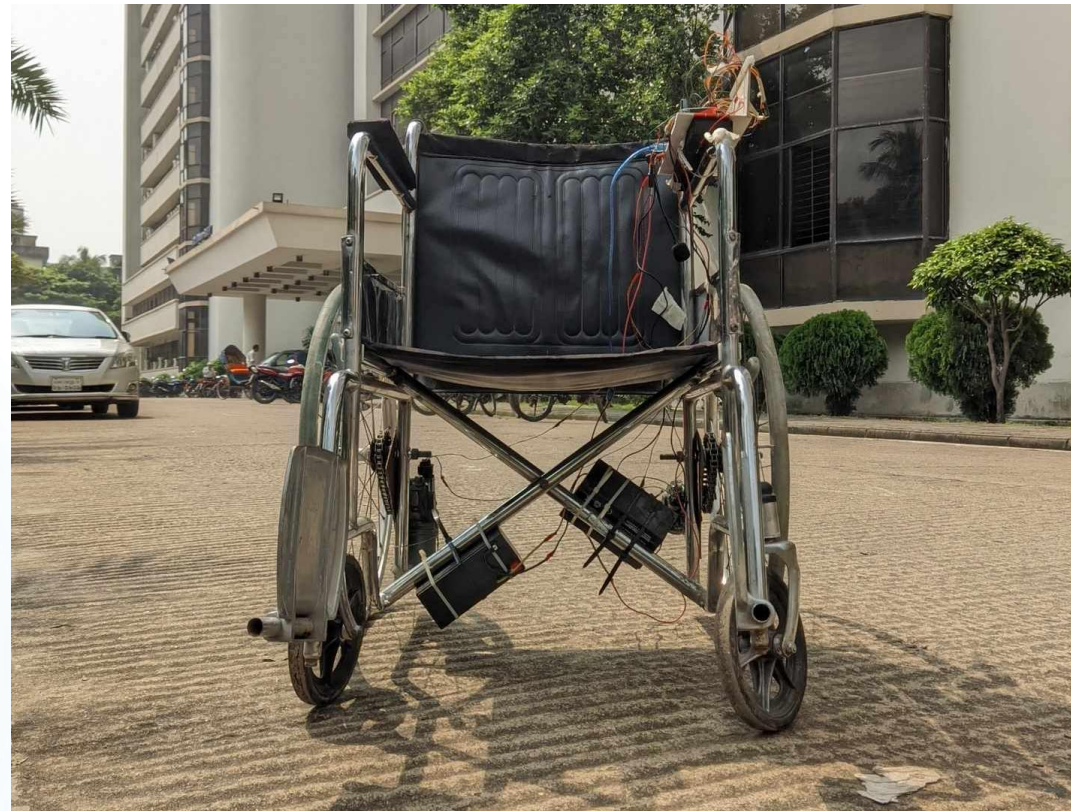
Week 7: Purchased Wheelchair



Week 8: Hardware Implementation



Week 9: Implemented The Smart Wheelchair And Test Run



The background features several large, faint, concentric circles in shades of light blue and green, centered on the left and right sides. A solid red rectangle is positioned in the top right corner.

Thank You