Abstract:

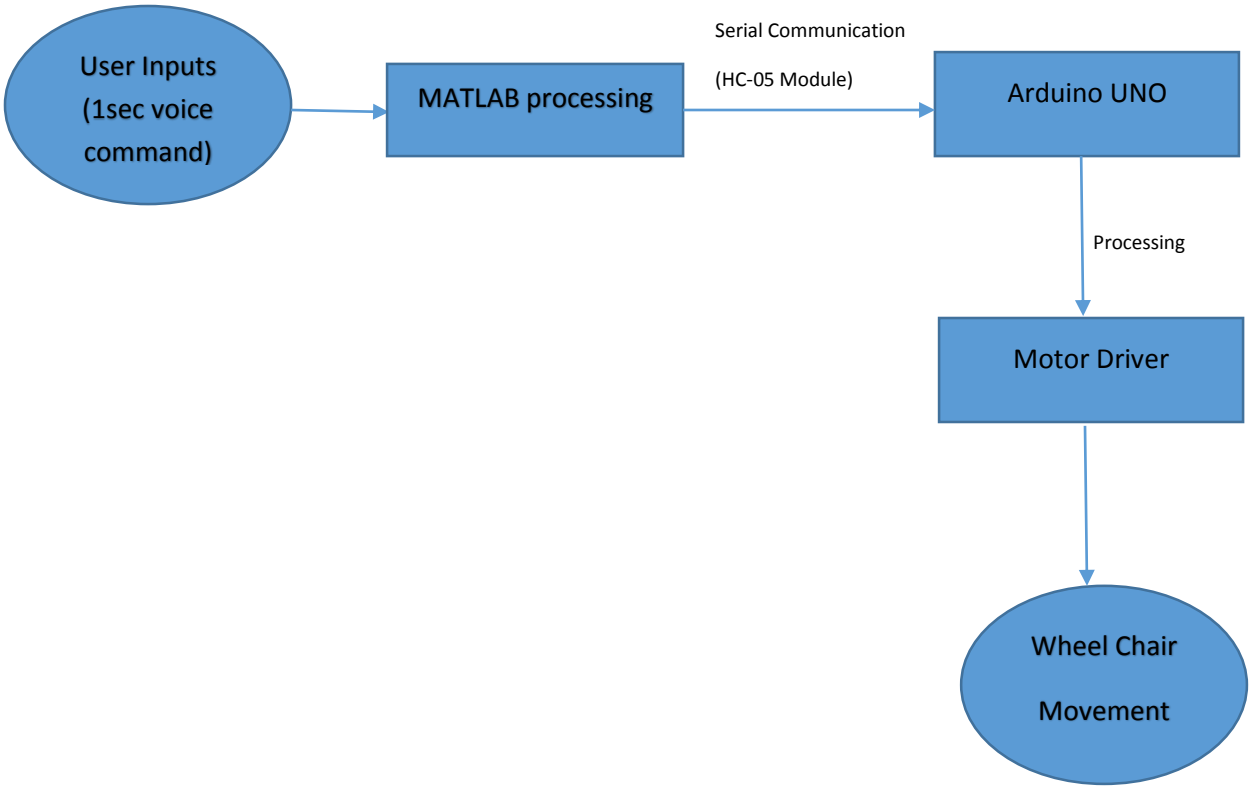
In this project, we would like to transmit voice command to control the movement of a wheel chair by processing the voice commands in MATLAB and maintaining MATLAB-ARDUINO communication via Bluetooth module.

Components:

- Arduino
- Bluetooth module
- MATLAB
- Car Chassis
- Motor Driver Circuit(L298N)
- Power Supply(Li-Po Battery)

Working Principle:

The main working procedures are described below:



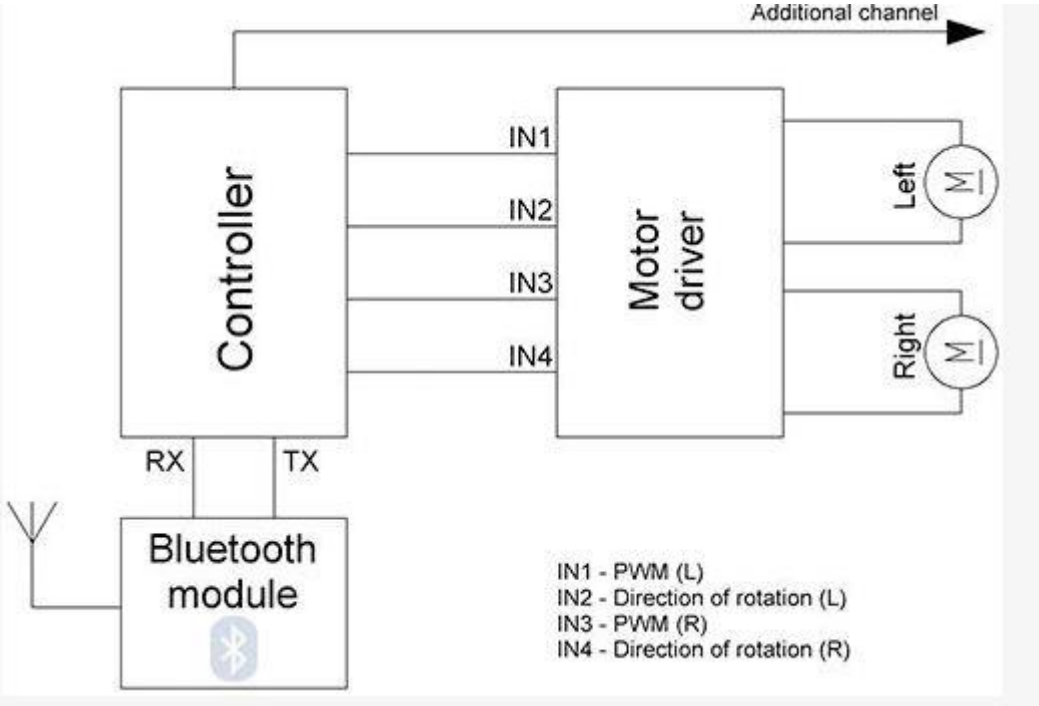


Figure: Schematic Diagram of Arduino controller

- We have used four voice commands(FORWARD,RIGHT,LEFT,STOP) to control the wheel chair
- First, the voice commands are saved as .MAT file in MATLAB from a specific user to use as reference
- Then voice commands from user are taken and processed by matlab to produce corresponding command codes

Voice Commands	Corresponding Command Codes
FORWARD	1
RIGHT	2
LEFT	3
STOP	4

- For serial communication , we have used HC-05 Bluetooth Module which is paired with matlab using the Bluetooth of PC
- Corresponding Command codes are sent to ARDUINO through the Bluetooth module
- Then arduino processed the received code to generate the required logic for the motor driver to control the wheel chair according to user's intended direction

Difficulties we have faced:

- Motor Driver IC was not perfectly balanced. The output voltage of the two motors are different. So when the forward instruction was given, there was a tendency of moving the Wheelchair slightly right direction
- Sometimes Bluetooth module can not maintain continuous connection with MATLAB

- Voice commands could not be processed continuously in MATLAB
- Noise was interfering with the original voice commands. So the accuracy of detected voice commands was not perfect
- We could not fully control the speed of motors. So the movement was a bit faster than our expectation

Recommendation:

- When the serial communication was interrupted, the wheelchair should automatically stop
- Voice detection should be user specific meaning the wheelchair will only move according to the command of the specific user
- Speed control of the motors could be implemented using Pulse width Modulation