Voice Controlled Wheelchair

The Project aims at controlling a wheelchair by means of human voice. PIC16F877 microcontroller is the brain of the control circuit. The voice recognition is done by HM2007 voice recognition IC. The bellow figure shows the block diagram of the control circuit.

**Fig:1 BLOCK DIAGRAM OF VOICE CONTROLLED WHEELCHAIR**

**Working**

The voice recognition IC HM2007 is capable of operating in speaker indepident speech recognition mode. In this mode, at first, the voice is recorded to the external SRAM attached to the the IC with the help of a directly connected microphone at the analog input terminal of HM2007 keeping the mode selection key in the record mode. In this way 40 words of maximum 1.92sec. duration can be recorded in the memory. After training the voice recognition IC like above the mode selection key is switched to voice input mode. Here the speech through the microphone at a particular instant is compared with the recorded sound and according to that digital output is generated.

The output of voice recognition IC is then fed to the digital input ports of the PIC16F877 microcontroller. On receiving the Signal the microcontroller directs the motors through the control circuit. The speed and direction controls are done in this way. The direction control is achieved by changing the direction of current flow through the motor and speed control is achieved by varying the current through the motor.
**Mechanism**

Differential drive mechanism is used for controlling the wheelchair. In this, two DC brushless motors are used for controlling the two wheels of the chair independently. The coupling of the motor to the wheels are done either by direct coupling using couplers or timing belts (if space constraints arise then only this option is applicable). Using couplers, the wheel rotate in the same rpm as that of the motor. Hence brushless motor with reduction gears are used in this case. The below figure shows the coupling of motors with the wheel.

![Coupling-View from behind the wheelchair](image)

The different direction of motions possible are:
- Forward: Both the motors in forward direction
- Reverse: Both the motors in the reverse direction
- Left: Left motor stopped/Right motor in the forward direction
- Right: Right motor stopped/Left motor in the forward direction
- Inturn: The motors are in the opposite direction
SPECIFICATION

MICROCONTROLLER       PIC 16F877
VOICE RECOGNITION IC   HM2007
MOTOR                  DC BRUSHLESS MOTOR(2)
BATTERY                LED-ACID
WORK DIVISION

**NISHA:** MECHANICAL PART, INTERFACING, MOTOR CONTROL, PROGRAMMING, PCB, AVAILABILITY OF COMPONENTS.

**SAPNA:** VOICE RECOGNITION, PCB, AVAILABILITY OF COMPONENTS.

**TINTU:** BATTERY CHARGER, REPORT, PCB, AVAILABILITY OF COMPONENTS.

**SENTHIL:** PROGRAMMING, MECHANICAL PART, PCB, AVAILABILITY OF COMPONENTS.

**PRIYA:** PROGRAMMING, REPORT, PCB, AVAILABILITY OF COMPONENTS.