



# A REAL TIME DEVELOPMENT ON WHEEL CHAIR (VOICE CONTROLLED)

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**Abstract**— This project is related to the voice controlled wheelchair system by using speech recognition module (HM 2007 voice kit). The system is designed to control a wheelchair using the voice of disabled person. The programming of the wheel chair is done by using Embedded C language. The objective of this project is to facilitate the movement of people who are disabled or handicapped through speech recognition technology. The result of this design will allow this people with less dependence on others. Speech recognition technology is new way of human machine interaction. Thus the problem faced can be solved by using speech technology to the wheel chair. This project uses ATMega16 microcontroller circuit and Direct current motor to create the movement of wheelchair The result of this project can be used for future research work and to design excellence innovation that meets need of disabled person.

**Keywords**— *wheel chair, HM 2007 voice kit., man machine ineration, voice recognition technology, embedded C language, .*

## I. INTRODUCTION

The goal of this smart wheelchair project is to enhance an ordinary powered wheelchair using sensors to perceive the wheelchair's surroundings, a speech interface to interpret commands. Intelligent wheelchair will play an important role in the future welfare society. The use of intelligent wheelchair encourages the view of the machine as a partner rather than as a tool. The population of people with disabilities has risen markedly during the past century. As the data come from the

National Health Interview Survey (NHIS), two distinct trends have contributed to the increasing overall prevalence of disability: a gradual rise, due largely to demographic shifts associated with an aging population, as well as a rapid increase that is due to health impairments and accidents. Many individuals have problems to use a conventional wheelchair. A recent clinical survey indicated that 9%-10% of patients who received power wheelchair training found it extremely difficult or impossible to use it for their activities of daily living, and 40% of patients found the steering and maneuvering tasks difficult or impossible. These people, suffering from motor deficits, disorientation, amnesia, or cognitive deficits, are dependent upon others to push them, so often feel powerless and out of control. Intelligent wheelchair has the potential to provide these people with effective ways to alleviate the impact of their limitations, by compensating for their specific impairments.

## II. LITREATURE REVIEW

Literature review is an assignment of previous task done by some authors and collections of information or data from research papers published in journals to progress our task.

1. R. Puviarasi, Mritha Ramalingam, Elanchezhian Chinnavan (Lecturer, School of Engineering, AIMST University, Malaysia ) published paper in ,

This proposed system will provide an alternative to the physically challenged people with quadriplegics who is permanently unable to move their limbs (but who is able to speak and hear) and elderly people in controlling the motion of the wheelchair and home appliances using their voices to lead an independent, confident and enjoyable life.

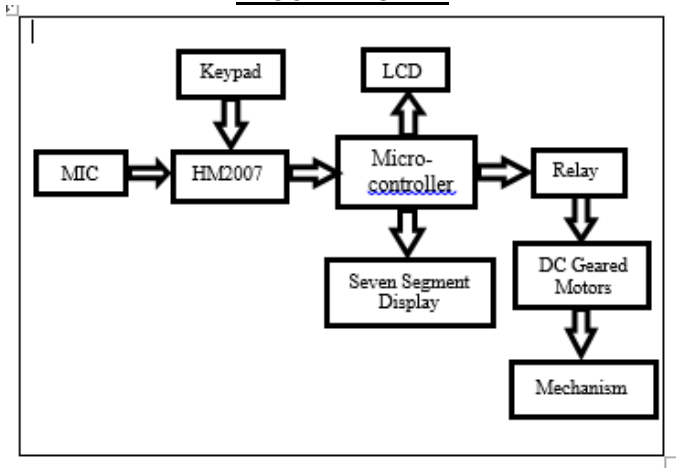
2. **Anoop.K.J, Inbaezhilan, Sathish raj, Ramaseenivasan, CholaPandian** (Associate Professor, Saveetha School of Engineering, Saveetha University, Chennai, Tamilnadu, India) published paper in,

- International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (Vol. 3, Special Issue: 2, April 2014)

This project describes the design of a voice controlled wheelchair and home appliances using embedded system. Proposed design supports voice activation system for severely disabled persons incorporating manual operation with switch. PIC Microcontroller (16F877A) and voice recognize processors(HM2007) were used to support the wheel chair and home automation. This is a unique system incorporating both wheel chair control through voice and the home automation which provides reliability, safety and comfort.

### III. RESEARCH METHODOLOGY

#### BLOCK DIAGRAM



According to the block diagram MIC is considered as an input device which will give the analog signal to the HM2007 IC and store the trained voice, which will be displayed in the form of Display system and generate the digital command from their pins. Now the output will be connected to the microcontroller ATmega16 for decision and control. The LCD attached with the microcontroller will display the status of the wheel chair movement. The Single pole relay is used to send the voltage to the Motor for operation and control of the mechanism.

### IV. HARDWARE USED

- 1) DC Geared Motor
- 2) Wheel chair
- 3) Microcontroller (ATmega16)
- 4) Single Pole Relay
- 5) LCD
- 6) HM2007 Voice Kit
- 7) 12V DC Battery
- 8) Microphone

#### 1. DC GEARED MOTOR

A DC motor is any of a class of rotary electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. In this project the dc motor is used for giving moment to wheelchair wheel in specified directions.

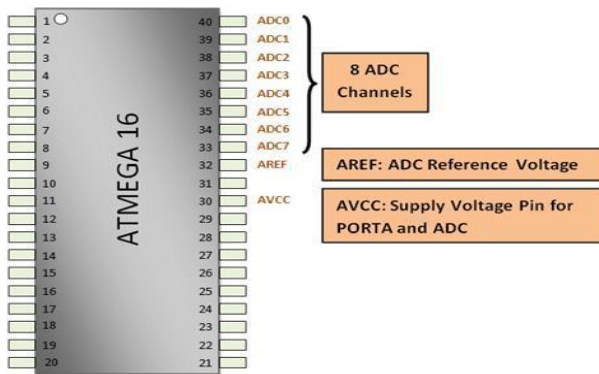
#### 2. WHEELCHAIR

Wheelchair has four wheels, two rear wheels and two castor wheels, the two castor wheels fixed in wheelchair base in front all wheels have the same diameter. The drive wheels are in rear on either side of the base, allowing the chair to turn according to voice command, wheels engage directly to a gear train that transmit torque from motor to wheels by two grooves in each wheel and nut.



#### 3. MICROCONTROLLER

ATmega16 is a 40 pin microcontroller. ATmega16 is an 8 bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. ATmega16 is based on enhanced RISC architecture with 131 powerful instructions. Most of the instructions execute in one machine cycle. ATmega16 can work on a maximum frequency of 16MHz. ATmega16 has 16KB programmable flash memory, static RAM of 1KB and EEPROM of 512 Bytes.



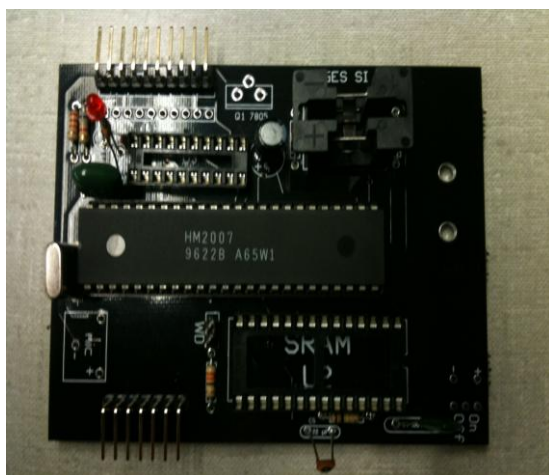
#### 4. SINGLE POLE RELAY

It is ambiguous whether the pole is normally open or normally closed. The terminology "SPNO" and "SPNC" is sometimes used to resolve the ambiguity. SPDT – Single Pole Double Throw. A common terminal connects to either of two others. Including two for the coil, such a relay has five terminals in total.



#### 5. HM2007 VOICE KIT

The speech recognition system is a completely assembled and easy to use programmable speech recognition circuit. Programmable, in the same that you train the words you want the circuit to recognize. This board allows you to experiment with many facets of speech recognize technology. it has 8 bit data out which can be interfacing applications which can be made are controlling home appliances, robotics movements, speech assisted technologies, speech to text translation , and many more.



#### 6. 12V DC BATTERY

A DC motor is any of a class of rotary electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor .DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances.



#### IV. SOFTWARE USED

1. Embedded C Language
2. PCB Artist

#### V. CONCLUSION

This proposed system contributes to the self dependency of physically challenged and older people. It reduces the manual effort for acquiring and distinguishing the command for controlling the motion of a wheelchair & home appliances. The speed and direction of the wheelchair now can be selected using the specified commands. Thus the only thing needed to ride the wheelchair is to have a trained voice. Besides that, the development of this project is done with less cost and affordable. However this system requires some improvements to make it more reliable. This design could be improved by implementing wireless communication in the wheelchair. By improving this system, we directly enhance the life style of the disabled people in the community. Lastly, we hope that this kind of system could contribute to the evolution of the wheelchair technology.

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