Implementation of Voice Controlled Wheel Chair

Akshay R.V [1], Bharath E [2] and Praphul M N [3]

[1-2] Department of Electronics and Communication Engineering, MVJ college of Engineering, Near ITPL,
Channasandra, Whitefield, Bangalore- 560067, India.
Email: rkrbharath@gmail.com
[3] Assistant Professor, Department of Electronics and Communication Engineering,
MVJ College of Engineering, near ITPL, Channasandra
Whitefield, Bangalore - 560067, India
Email: praphulmn@gmail.com

Abstract— **This venture depicts the plan of a voice controlled wheelchair. Proposed configuration underpins voice acknowledgment framework for seriously debilitated people. Renesas Microcontroller (R5F100LE) and V3 voice acknowledgment pack are utilized to bolster the wheel seat. This is an exceptional framework joining wheel seat control through voice which gives unwavering quality, security and solace.**

Index Terms— **Wheel chair, Renesas Microcontroller, V3 voice recognition kit.**

I. INTRODUCTION

Using voice enacted innovation for controlling the movement of the wheelchair is to demonstrate that it can be a one of a kind idea that would stand separated from whatever is left of the normal tasks. The utilization of this new innovation in conjunction with a mechanical framework keeping in mind the end goal to rearrange regular day to day existence and it would start enthusiasm for a constantly developing present day society. Many individuals with incapacities don't have the expertise important to control a switch on an electrical wheelchair. This can be an incredible for the quadriplegics who is for all time not able to move any of the arms or legs. They can utilize their wheelchair less demanding just utilizing voice summons. The point of this venture is to execute a fascinating application utilizing little vocabulary word acknowledgment framework. The technique received depends on gathering a microcontroller with a discourse perceive advancement pack for secluded word from a needy speaker. The subsequent outline is utilized to control a wheelchair. For crippled individual in light of the vocal charge. To pick up in time configuration, tests have demonstrated that it is ideal to pick a discourse acknowledgment pack and to adjust it to the application.

II. HISTORY

Explores in the range of wheelchair control framework are as yet going on. For a case the wheelchair is controlled by utilizing a tongue. It is plan particularly for the quadriplegics. This is intended to be utilized by the crippled individual who can just move the body parts over the neck. It uses an in-mouth position sensor to control the developments. Another case, a Semi-Autonomous Wheelchair Mobility System (SAWMS) which utilizes visual following innovation that uses a shading camera, sonar, infra-red sensors, contact sensors and a PDA based interface which utilizes for the remote correspondence .Mohamed Fezari et. al. utilized and

executed an immediate voice order wheelchair control framework in their plan for an impaired people. They utilized a discourse acknowledgment unit which beforehand had been executed in the control of Automatic Vehicle Guided (AVG). They utilized a voice acknowledgment pack 'Voice Direct 364' (VD364) fabricated by Sensory Incorporated, USA. In their outline an amplifier is specifically associated by utilizing wires to the contribution of the voice processor module. This strategy may decrease the adaptability and effectiveness for the client development contrasted with the remote amplifier .Richard Simpson, ET. Al. built up a model of a Smart Wheelchair Component System (SWCS) to be added to a business wheelchair with negligible adjustments. They embraced an innovation which initially produced for versatile robots to make a "brilliant wheelchair'. Their model can give route help on wheelchair utilizing two diverse information techniques which are simple joystick and switch joystick.

The Smart Wheelchair Component System is utilized as a segment to be changed it up of business power wheelchairs with insignificant alterations. It is good with numerous brands of wheelchair. A few reviews have demonstrated that both youngsters and grown-ups advantage generously from access to a methods for free versatility. While the necessities of numerous people with incapacities can be happy with manual or controlled wheelchairs, a fragment of the impaired group thinks that its troublesome or difficult to utilize wheelchairs autonomously. To oblige this populace, scientists have utilized advances initially produced for portable robots to make shrewd wheelchairs

III. PROPOSED SYSTEM

Autonomous versatility is a fantasy for each individual with a few or the other physical handicap particularly on account of quadriplegics and numerous sclerosis. These are the patients who are deadened beneath neck. Individuals with incapacities meet boundaries of all sort. People groups who experiencing spine issue and knee joint issue. We realize that innovation is manual wheelchair yet according to study more than 70 percent of manual wheelchair clients will create bear torment sooner or later in their life. Yet, in any case the quadriplegic and knee joint patients can't move any of the appendages beneath the neck. Subsequently manual and even joystick worked wheelchair are out of question for the quadriplegic patients and the knee joint issue patients. So the improvement of voice worked wheelchair will tackle the inquiry about the versatility of patient and make them autonomous of portability.

The venture composed here is a microcontroller based implanted framework interfaced with voice acknowledgment unit to perceive the words. The voice processor on program mode stores the word string of 1.5 sec length in an EEPROM and the processor can store 10nos of such information string on the EEPROM. The voice processor is associated with a nearby mouthpiece to acknowledge coordinate voice.. The word strings are additionally handled programmable by the client. The voice processor yield is an advanced ID for the specific word string and that is nourish to a Renesas microcontroller and decoded to control the gadgets associated with the microcontroller through the particular driver IC. This is an installed framework intended to process voice and perceive the word string and disentangle the words to play out the activity. The RL78 Family of microcontrollers (MCUs) consolidates propelled low power innovation, extraordinary execution, and the broadest line-up in its class for the most requesting 8-and 16-bit implanted applications.

The RL78 MCUs' inventive "Nap" mode accomplishes ultra-low power by permitting ADC operation and serial correspondence, all while the CPU is killed. This makes the RL78 MCUs best in class for low power applications
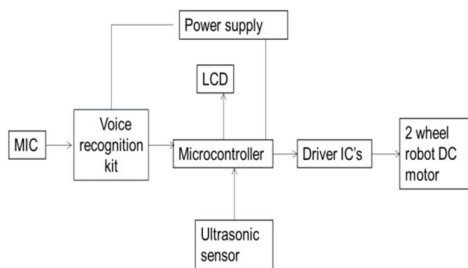
IV. BLOCK DIAGRAM

Figure 1: Block diagram showing voice controlled wheel chair

In fig 1, the operator gives voice as input in order to drive the wheelchair to the desired position. MIC which converts the voice signal to the electric signal and the signal is given to the voice recognition module. The voice recognition module converts the analog signal into digital signal and the signal is transferred to the pic microcontroller. The microcontroller will take the decision to move forward or backward or left or right with help of relay switching unit.

V. COMPONENTS AND THEIR DESCRIPTION

A. *Components And Their Description*

On V3, voice summons are put away in one expansive gathering like a library. Any 7 voice orders in the library could be foreign made into recognizer. It implies 7 charges are compelling in the meantime. Bolster most extreme 80 voice orders, with each voice 1500ms (maybe a couple words talking). Most extreme 7 voice orders powerful at same time. It is anything but difficult to control with UART/GPIO and has client control General Pin Output.
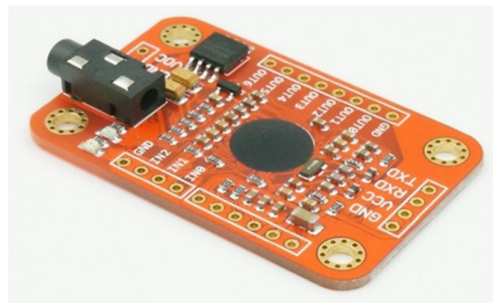

Figure 2: V3 voice recognition kit

B. *Renesas Microcontroller (R5F100LE)*

It has the following features:

- a) 16 bit microcontroller which belongs to RL78 family
- b) 4kb RAM and 64 kb ROM
- c) 4kb flash memory
- d) 10 bit input ADC
- e) Inbuilt Crystal oscillator 32 MHz
- f) 11 ports in total
- g) Out of 64 pins, 58 are GPIO pins, 6 are reserved pins(VSS, VDD, V0, E, RS, RW)
- h) 3 UART channels
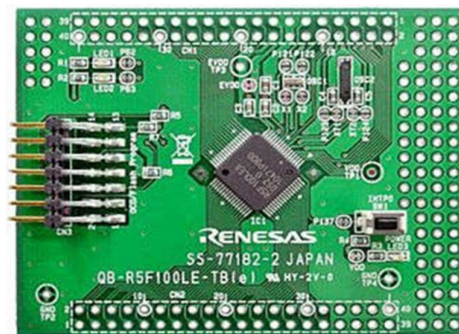- i) 8 timers (16 bit)

Figure 3: Renesas Microcontroller (R5F100LE)

C. Ultrasonic Sensor

This is the HC-SR04 ultrasonic running sensor. This efficient sensor gives 2cm to 400cm of non-contact estimation usefulness with an extending exactness that can reach up to 3mm. Each HC-SR04 module incorporates a ultrasonic transmitter, a recipient and a control circuit.

There are just four sticks that you have to stress over on the HC-SR04: VCC (Power), Trig (Trigger), Echo (Receive), and GND (Ground).

Figure 4: Ultrasonic sensor HC-SR04

D. L293D-Driver IC

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors. L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction.
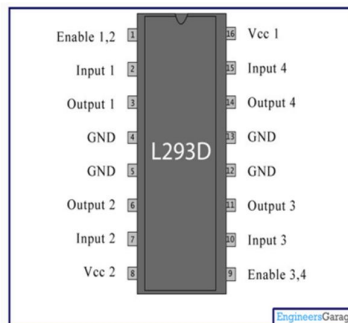

Figure 5: Pin details of L293D driver IC

Pin No	Function	Name
1	Enable pin for Motor 1; active high	Enable 1,2
2	Input 1 for Motor 1	Input 1
3	Output 1 for Motor 1	Output 1
4	Ground (0V)	Ground
5	Ground (0V)	Ground
6	Output 2 for Motor 1	Output 2
7	Input 2 for Motor 1	Input 2
8	Supply voltage for Motors; 9-12V (up to 36V)	Vcc_2
9	Enable pin for Motor 2; active high	Enable 3,4
10	Input 1 for Motor 2	Input 3
11	Output 1 for Motor 2	Output 3
12	Ground (0V)	Ground
13	Ground (0V)	Ground
14	Output 2 for Motor 2	Output 4
15	Input2 for Motor 2	Input 4
16	Supply voltage; 5V (up to 36V)	Vcc_1

Figure 6: Pin description of L293D driver IC

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E. LCD Display

LCD used here is QA1602A 16x2 display

F. DC Motor

a) DC supply: 4 to 12V
b) RPM: 60 at 12V

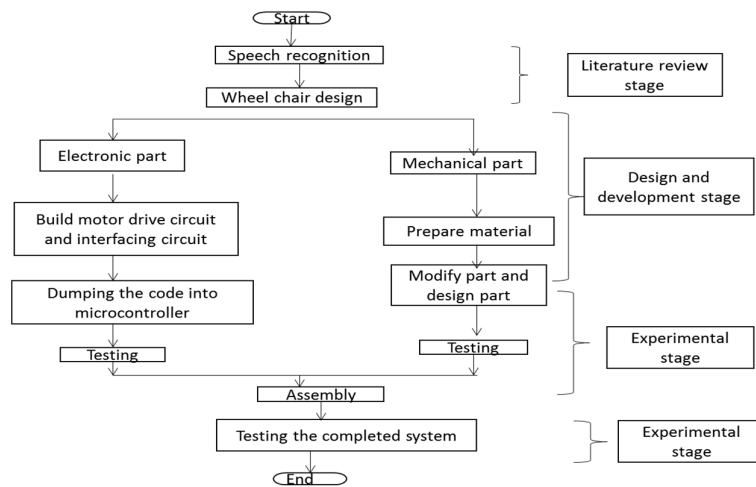*G. Software Used*

Cubesuit+

Flowchart

Figure 7: Flowchart showing system design

A flowchart is utilized as diagrammatic portrayal of the issue and furthermore gives a total arrangement in dissecting, planning, work process or program. The flowchart for framework configuration is appeared in Fig 3. The principle part of the outline is to control the movement of the wheelchair. There are four state of movements are viewed as, advancing, moving backward bearing, moving to one side and moving to one side. For the speed, the client may utilize moderate or quick speed summon. The framework begins by applying the supply voltage to the discourse acknowledgment circuit. For quick condition the framework will supply higher current to the engines. In the event that the client does not need the wheelchair move in rapid, the moderate speed summon can be set by applying low current supply to the engines.
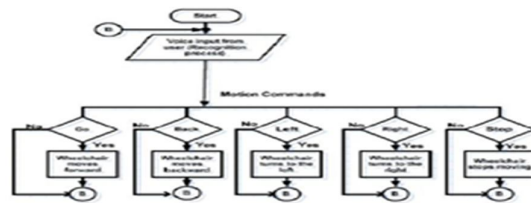

Figure 8: Flowchart showing operation of wheel chair

VI. FUTURE SCOPE

In real time, word string can store the Speech in More length. And by using hand movementet also the wheel chair can be control

VII. HARDWARE RESULTS

Figure9: Finalised model of wheel chair

VIII. CONCLUSION

In this paper the execution of a voice controlled wheelchair for incapacitated individuals utilizing V3 voice acknowledgment unit and Renesas microcontroller is utilized to control the wheel seat interfaced with voice. The course of the wheelchair now can be chosen utilizing the predetermined voice orders. The plan not just diminish the make cost contrasted and exhibit advertise additionally will give awesome aggressive with different sorts of electrical wheelchair. This venture has many favorable circumstances like wellbeing, solace, vitality sparing, full computerization and so on. Consequently a prepared voice is just expected to ride the wheelchair. The future outline can be enhanced by actualizing remote correspondence in the wheel seat. By enhancing this framework, we straightforwardly improve the way of life of the incapacitated individuals in the group.

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