

Speech Reorganization Wheel Chair Using MEMS

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Abstract— Physically challenged and old people those who face many problems in life have to be dependent on a third person to move from one place. Many scientists have been working for this solution for a long time. The invention of wheel chair is a great boon to them but it still restricts their motion. In order to make their life a bit easier, many developments in wheel chairs came into existing such as electric-powered, gesture based etc.

This can be further improved by using voice recognition techniques. In this paper, we present with a concept of moving wheel chair using speech/voice recognition and also movement gestures using MEMS technology. The physically challenged people can move the wheel chair in different directions such as right, left, forward and backward independently only with the help of their own voice/movement gestures. This project can also be useful not only for handicapped but also for handicapped with mum people.

Keywords— wheel chair, voice recognition, MEMS, electric motor based wheel chair

I. INTRODUCTION

Many people are suffering from disabilities which may be caused due to from accidents or from birth. There are many cases where walking is difficult or even impossible in some cases. This may be temporary or permanent. The invention of wheel chair became a boon to such people which makes their life easier to travel to places, even though there is need of other person for the movement of wheel chair, still it is easier as moving the wheel chair is much better than carrying a person on one's own and which has its own risks or difficulties. The creation of wheel chair is boon but still there is need to improve it to remove the dependency of that one person too. As the technology today grows rapidly, different types of wheel chairs came into light. Now there is a need for wheel chair with voice controlled technology which completely removes the need of other person and also gesture based wheel chair for those people with disabilities and also who are dumb too. The combined technology of voice control and gesture based makes a better solution for the present world.

A. Literature Survey

[1] Authors here discuss about a technology where the wheel chair has a laptop and a eye tracker setup as been made. Through laptop display the person sitting on the wheelchair can choose the direction to move. The commands are sent through vision with the help of live web stream from a webcam. The main disadvantage here is this technology cannot be used for people with blindness.

[2] In this paper, authors have made some suggestions for the present design of wheel chair. Their suggestions include adjustable back rest, arm and leg rest which gives the comfort for the user who wants to sleep or rest. These suggestions are made by taking the survey of several disabled people. This paper doesn't present any idea about movement of wheel chair, but while these suggestions can be made for the modern wheel chair which helps the users for their comforts.

[3] In this paper, the authors proposed and implemented the design of wheel chair with voice controlled technology. Here users control the wheelchair by giving commands through speech/voice. This system is implemented in Japanese languages (for voice commands) such as susume which means move forward. This system was tested and got a success rate of about 98.3%.

MEMS abbreviated for Micro-Electro-Mechanical Systems[4] is a technology is shaped using micro fabrication techniques. The sizes of MEMS devices may differ from 1 micron to several millimetres. In like manner, the kinds of MEMS gadgets can differ from moderately straightforward structures having no moving components, to greatly complex electromechanical frameworks with various moving components under the control of incorporated microelectronics. The one primary model of MEMS is that there are in any event a few components having a type of mechanical usefulness regardless of whether these components can move. The term used to characterize MEMS shifts in various parts of the world. In USA they are vigorously called MEMS, but they are also known or called as "Microsystems Technology" or "micromachined gadgets" in various other parts of the world. Most of the MEMS functional elements include sensors, microelectronics such as microactuators, microsensors, etc., and transducers which are used for converting energy from one form to another. On account of microsensors, the gadget ordinarily changes over a deliberate mechanical flag into an electrical flag.

Crystal Oscillator: An electronic circuit or electronic gadget that is utilized to create intermittently wavering electronic flag is called as an electronic oscillator[5]. The electronic flag delivered by an oscillator is commonly a sine wave or square wave. An electronic oscillator changes over the immediate current flag into a substituting current flag. The radio and TV transmitters are communicated utilizing the signs produced by oscillators. The electronic beep sounds and computer game sounds are created by the oscillator signals. These oscillators create signals utilizing the rule of swaying. There are diverse kinds of oscillator electronic circuits, for example, Linear

oscillators – Hartley oscillator, Phase-move oscillator, Armstrong oscillator, Clapp oscillator, Colpitts oscillator, et cetera, Relaxation oscillators – Royer oscillator, Ring oscillator, Multivibrator, et cetera, and Voltage Controlled Oscillator (VCO). There are diverse sorts of piezoelectric resonators, however normally, quartz precious stone is utilized as a part of these kinds of oscillators. Thus, these oscillator electronic circuits are named as precious stone oscillators.

Max232 is composed by Maxim Integrated Products[6]. This IC is generally utilized as a part of RS232 Communication frameworks in which the transformation of voltage level is required to make TTL gadgets to be perfect with PC serial port and the other way around. This chip contains charge pumps which draws the voltage to the Desired Level. It can be controlled by a solitary +5 volt control supply and its yield can reach +_7.5 volts. MAX232 comes in 16 Pin Dip and numerous different bundles and it contains Dual Drivers. It can be utilized as an equipment layer convertor for 2 frameworks to impart simultaneously. Max232 is one of the adaptable IC to use in the vast majority of the flag voltage level transformation issues.

II. EXISTING SYSTEM

There are different types of wheel chair. One of the way to distinguish them is based on mode of power used for driving. There are mainly 2 types and they are:

1. *Manual*: This type of wheel chair is driven with the help of other person. No external source of energy is used. Here man power is used as energy. These type of wheel chair are mostly used in airports for moving patients to seats. These can be further classified as

- 1.1. Rigid Wheel chair – These cannot be folder and occupies no space.
- 1.2. Foldable Wheel chair – This type of wheel chair can be folder to fit into small places.

2. *Electric powered wheel chair*

These wheel chairs are designed to use electric motor for the movement of the chair. These are also called as electric-powered wheelchair. This wheel chair needs navigational controls for movement. These can be controlled with help of various type of joysticks based on the need.

III. PROPOSED SYSTEM

The figure below shows the modules are mounted together onboard in order to ease the wheelchair movement. The voice module is placed nearest to the user mouth. when the user triggers his voice to the voice module the analog signal is compared with the previously stored data in memory of Microcontroller to determine the corresponding output command like left, right, backward, forward. Then the data is

latched which is in binary coded decimal to input port A and port D of Microcontroller. This BCD signal is processed by Microcontroller and the output is sent to L293 Driver which inturn leads motors to run. These signals makes the wheelchair to move.

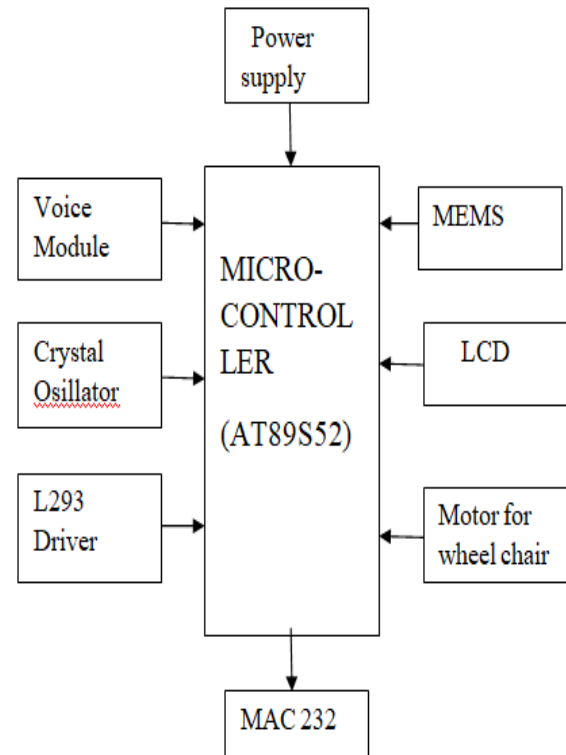


Fig 1: Block Diagram of Speech Recognition Wheel Chair using MEMS

The LCD displays the commands issued through voice module. Crystal oscillator stabilises the signal to eradicate the distortions in the analog signal. power supply used here is of 12v and the Microcontroller has capability to retrieve upto 5v.inord to convert 12v supply to 5v we use MAC 232.MEMS provides hand gesture sense by converting analog signals to micro electro mechanical signals that makes the wheel chair move left, right, backward, forward.

Advantages

By using this system Disabled person can independently move to particular place and reduces dependence on caregivers and family members and promotes feelings of self-reliance.

Limitations

The user voice must clear in short distance on microphone to ensure the accuracy of the pronunciations of the word-related (voice) was essential in this innovation. The weight of the load for this system must be less, so that wheel chair only can function properly.

III. RESULTS

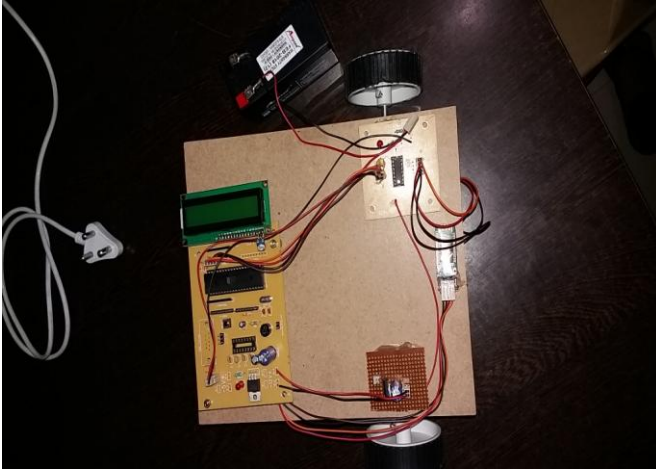


Fig 2: Moving wheel chair structure

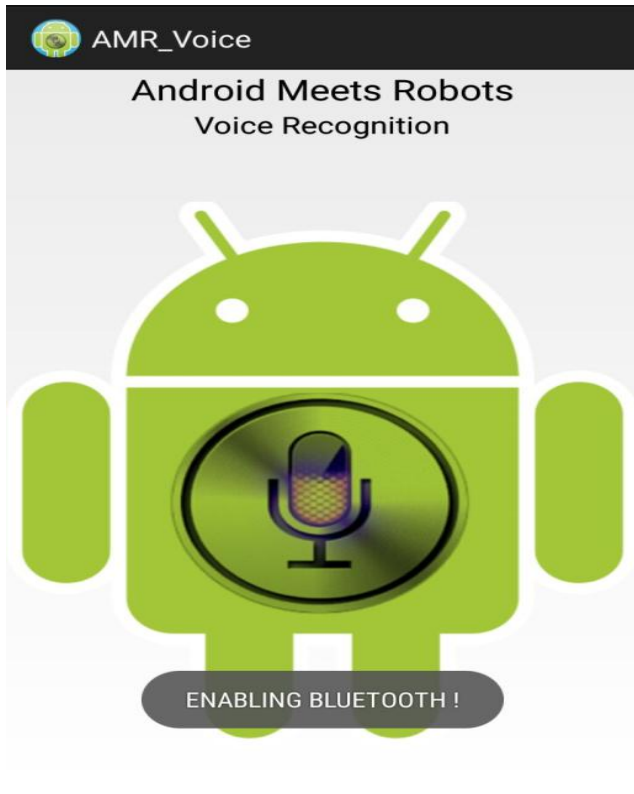


Fig 3: Voice Enabling App

IV. CONCLUSION

Even though there are many modern and electric motor controlled based wheel chairs, the proposed system supports many other disabled persons including mum people. The voice controlled system helps the easy movement of the wheel chair without the involvement of other person (independent system). This system is also cost effective and uses the latest technology such as MEMS. This system can be further improved by providing other comforts for the user such as adjustable rests for arms, leg, etc..

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