Tongue Controlled Wheelchair

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ABSTRACT

According to the World Health Organizations report on disability, currently about 15% of world population lives with some type of disability out of which 2-4 % people experience significant difficulties in their day to day activities .There are cases of patients using wheelchair are not only limited to paralyzed people but also blind ,physically handicapped and people having neuromuscular and spinal cord issues . Many of them uses electrically powered wheelchairs (PWC) that are the most helpful tool allowing individuals to complete daily tasks with greater independence and community environments. We provide solution for them by introducing Tongue Drive System (TDS). This system comprises PIC microcontroller and uses current continuity principle. According to movement of tongue, wheelchair will move in respective direction. Also IR sensor is provided which will help to detect obstacle present in the path..

INTRODUCTION

We use the tongue to operate the system because unlike the feet's and hands ,which are connected by brain through spinal cord, the tongue and brain has a –direct connection through cranial nerve that generally escapes damage in severe spinal cord injuries or neuromuscular disease. Tongue movements are fast, accurate and do not required much thinking, concentration or effort. As tongue is the strongest muscle in body it can work without getting much tired. People with different physical disabilities (handicapped, blind, dumb etc.) are using electrical wheelchairs controlled by voice, eyes, arm etc. All of them can use tongue operated wheelchair. Paralyzed peoples can be independent for movement with tongue controlled wheelchair. So, there will be huge demand for this type of assistive technology.

The system is controlled by microcontroller from PIC family. Metal contacts and Motors are interfaced to microcontroller for detection of tongue movement and moving wheelchair in respective direction. In addition to this IR sensor is provided for obstacle detection in path.

LITERATURE SURVEY

More than 1 billion people in the world have some form of disability. This corresponds to about 15% of the world's population. Between 110-190 million people have very significant difficulties in functioning. People with disabilities are more likely to be unemployed than non-disabled people. In **Organization for Economic Cooperation and Development** countries, the employment rate of people with disabilities (44%) is slightly over half that for people without disabilities (75%).[1]

The study was published on Nov. 27 in the journal *Science Translational Medicine*. Jeonghee Kim and Hangue Park, who are working on the Tongue Drive System as graduate students at Georgia Tech, are co-authors of the study.[3] The idea for a glued-on tongue magnet was the inspiration of Anne Laumann, M.D., professor of dermatology at Feinberg and a lead investigator of the Northwestern trial.[2]

Monika Jain Member IEEE, IETE, Professor-Dept. of Electronics & Instrumentation Engg. Galgotias College of Engineering & Technology GR. Noida, India This paper presents an efficient, low cost solution to all the issues encountered in previous AT's. Detailed analysis of various design processes has also been discussed. Complete system

proposed in this paper has been designed around PIC microcontroller and a RF module. The design has been tested and result achieved confirms the design approach illustrated.[4]

METHODOLOGY

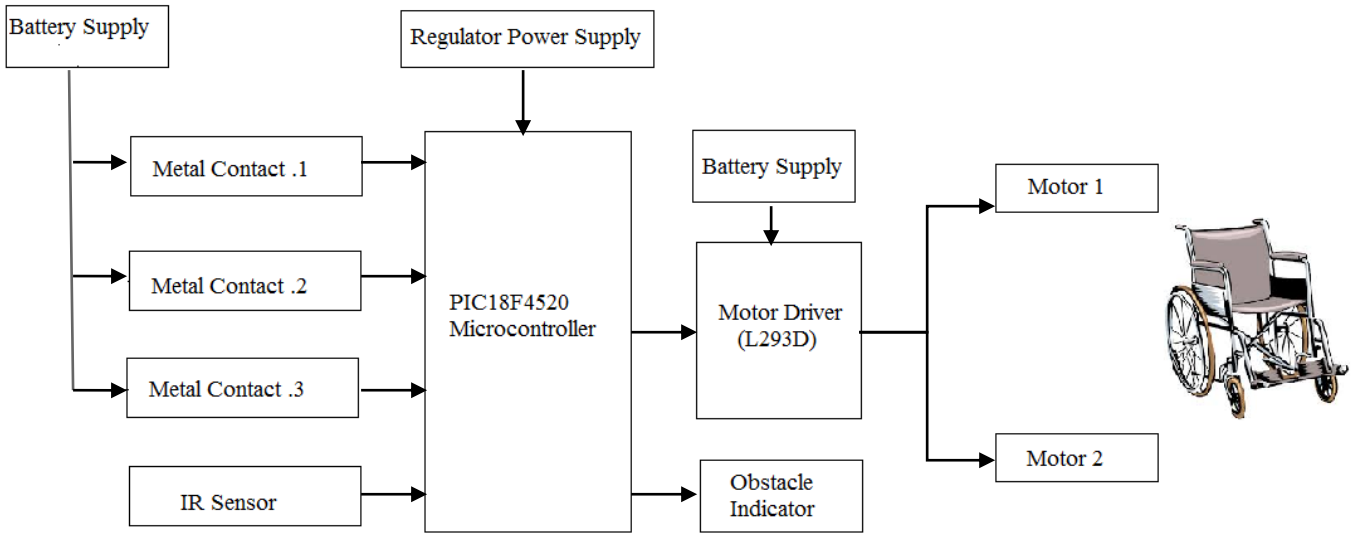


Fig. 1 Block diagram of Tongue Controlled Wheelchair

WORKING

In our project we have used three metal contacts to control two dc geared motors. Motors are connected to PIC microcontroller through L239 H-Bridge driver. Initially both the motors will remain in off state. When Metal contact1 is created by tongue movement then it causes forward movement of wheelchair .When Metal contact2 created then wheelchair moves to left. Similarly, when Metal contact 3 created then wheelchair moves to right. At last if none of them is created then chair remain in idle state.

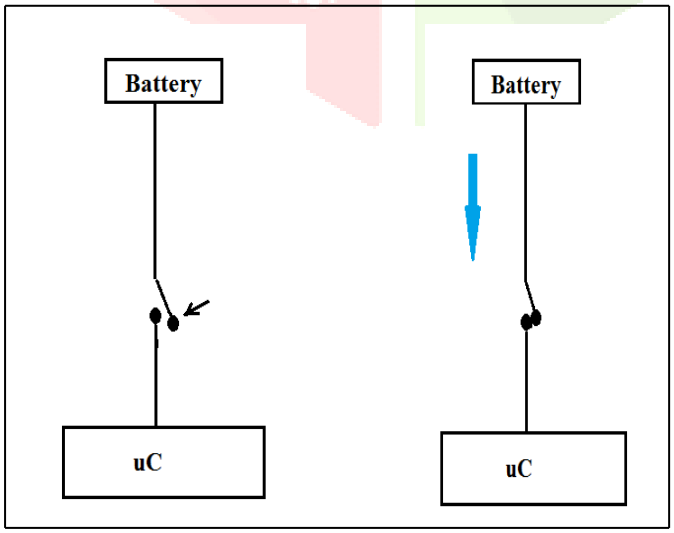
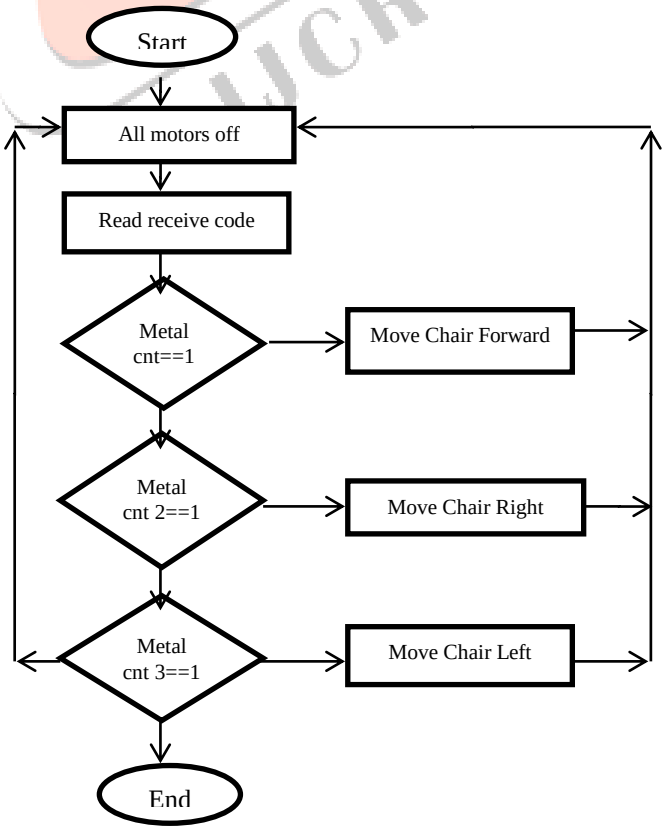


Figure.2 Current Continuity principle



EXPECTED RESULTS

Sr.no	Metal Contact 1	Metal Contact 2	Metal Contact 3	Motor 1	Motor 2
1	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	ANTICLKWISE	CLOCKWISE
3	ON	OFF	OFF	CLOCKWISE	ANTICLKWISE
4	OFF	OFF	ON	CLOCKWISE	CLOCKWISE

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CONCLUSION

People with physical disabilities are using electrical wheelchairs. All of them can use tongue operated wheelchair. Paralyzed people can be independent for movement using TDS. Thus this type of wheelchair will be developed to provide more comfort and features. This innovative project will come in handy for various people around the world who can't walk or are partially handicapped. We have described the system which is driven by the innovative technologies further advancements can be done through more research.

REFERENCES

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3. Jeonghee Kim and Hangue Park The journal Science Translational Medicine Nov.27(2003-04).
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