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Wheel Chair Assistant Using Tongue Moment

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ABSTRACT: The number of elderly and disabled people worldwide has increased and their day-to-day activities depend on others' help. Improving the quality of life of these people has become the most important responsibility of society and it is the role of technology specialists to make their life as normal as possible and easy so that they can do their day-to-day activities at the right time without others help. Many researchers have proposed several solutions, but they have limitations such as poor performance and usability. In this paper, we propose a smart wireless base wheelchair system that completely controls Tongue Drive Wheelchair is a non-invasive development that explores how technology can be assistive for individuals with severe disabilities to communicate with their environment. This tongue control system leads to a more self-supportive independent life. This paper discusses a project based on a contact sensor attached to a headset that is connected to a circuit. The circuit is triggered by the sensors to control the wheelchair's motors. Results occurring from the contact between the cheek and the sensor, due to the tongue movement, apply order to the motors to work allowing the person to move right, left, forward and even to stop according to his needs. This development was accomplished to make patients feel more satisfied because it is a safe and easy technology that doesn't need any complicated programs to realize and perform the movements. Movement commands using an Arduino microcontroller that is directly connected to the wheelchair and moves it. The proposed system has been simulated, and the obtained results show the effectiveness of the proposed system and its applicability for use by most physically disabled persons.

KEYWORDS: IR Sensor, Motor Drive, LCD, Microcontroller, Battery.

I. INTRODUCTION

This project is conceived as an idea to ease the lives of those among us who are unfortunate enough to have lost the ability to move their legs due to a significant amount of paralysis, accident or due to old age. Many differently abled people usually depend on others in their daily life especially in moving from one place to another. For the wheelchair users, they need continuously someone to help them in getting the wheelchair moving. Their lives are made difficult by the fact that there is lack of an intuitive control system for their wheelchairs that allows moving independently. Using an electrical wheelchair leads to a large amount of independence for persons with a physical disability who can neither walk nor operate a mechanical wheelchair alone as it requires great. Using a smartphone as the "brain" of a robot is already an active research field with several open opportunities and promising possibilities. Another recent and very successful technology, Bluetooth has changed how people use digital device at home or office, and has transferred traditional wired digital devices into wireless devices. This research is based on voice-controlled wheelchair 2 design based on mobile platforms, by means of Bluetooth technology, design and implementation of wireless remote control solutions. The project also incorporates use of ultrasonic sensors to detect obstacles within range of 4 meters and notifies the system and stop the wheelchair till further command.

This work, smart wheelchair control using Arduino Uno microcontroller and Bluetooth module via android application is presented. The rest of this paper is organized as follows: section 2 specializes to display the related most recent works. Section 3 concerns with the flowchart of the project and application instruction.

II. PROPOSED SYSTEM

In this paper, we propose a smart wireless base wheelchair system that completely controls Tongue Drive Wheelchair. This is a non-invasive development that explores how technology can be assistive for individuals with severe disabilities to communicate with their environment. This tongue control system leads to a more self-supportive independent life. This project discusses a project based on a contact sensor attached to a headset that is connected to a circuit. The circuit is triggered by the sensors to control the wheelchair's motors.

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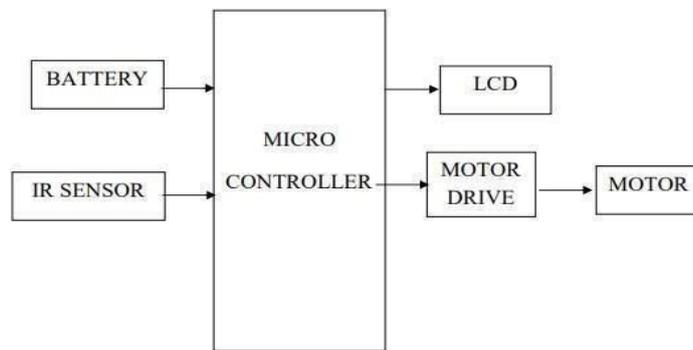


Figure.1. Block Diagram

PROTEUS Proteus PCB design electronic circuits can computer-aided design and circuit boards are designed. The ISIS Intelligent Schematic Input System (Intelligent Switching input system), is the environment for the design and simulation of electronic circuits. The component library includes claims more than 10,000 circuit components with 6000 Prospective Simulations models. Own components can be created and added to the library. The VSM Virtual System Modeling provides a graphical SPICE circuit simulation and animation directly in the ISIS environment. The SPICE simulator is based on the Berkeley SPICE3F5 model. It can microprocessor-based systems can be simulated.

III. SOFTWARE RESULTS

One of the main components of Proteus 7.0 is the Circuit Simulation -- a product that uses a SPICE3f5 analogue simulator kernel combined with an event driven digital simulator that allow users to utilize any SPICE model by any manufacturer. Proteus VSM comes with extensive debugging features, including break points, single stepping and variable display for a neat design prior to hardware prototyping.

MODE 1-WHEEL CHAIR FORWARDING

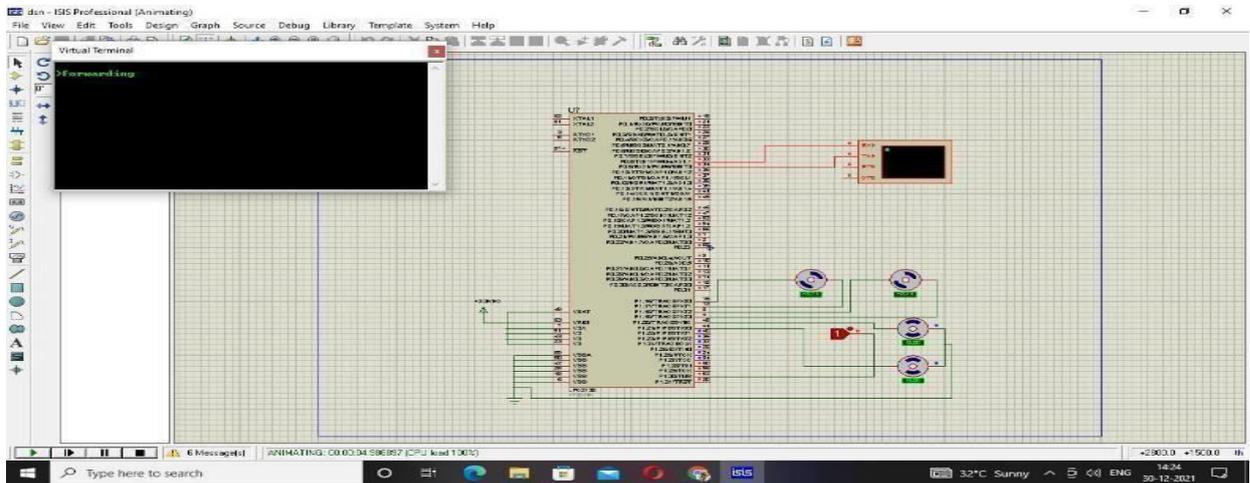


Figure.2. Forward Direction

MODE 2-WHEEL CHAIR TURNS LEFT

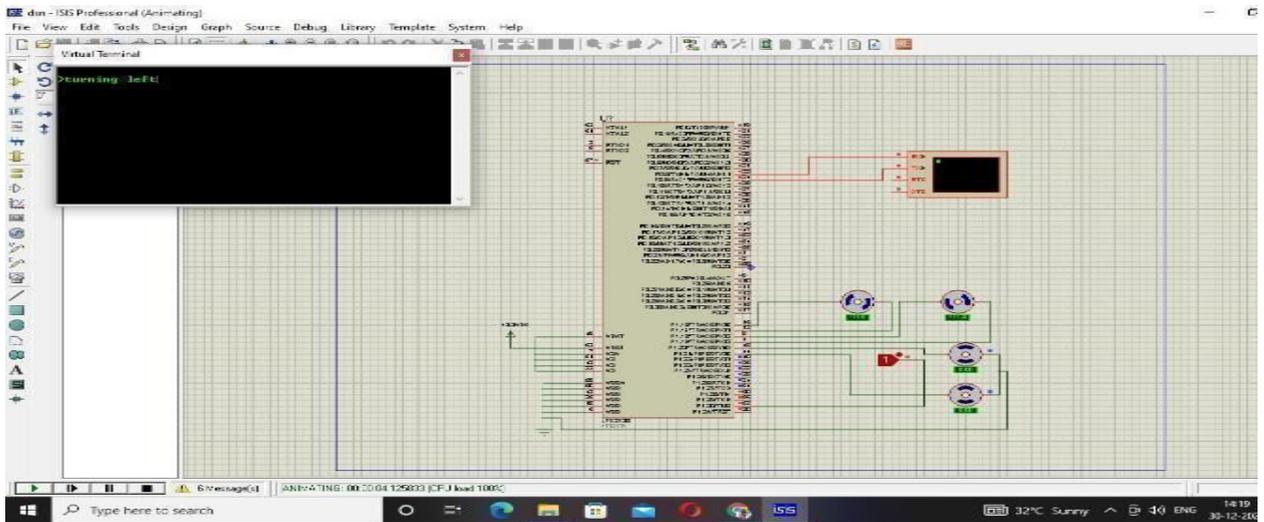


Figure.3. Reverse Direction

IV.HARDWARE IMPLEMENTATION

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL),[1] permitting the manufacture of Arduino boards and software distribution by anyone.

Proteus 7.0 is the program to use when you want to simulate the interaction between software running on a microcontroller and any analog or digital electronic device connected to it.



ARDUINO UNO MICROCONTROLLER

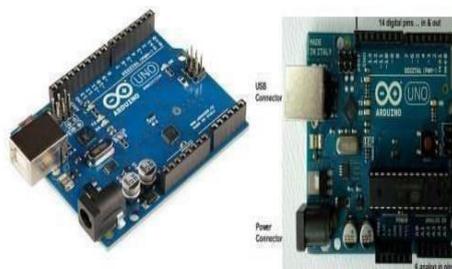


Figure.4.Arduino Uno SMDR3

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

INFRARED SENSOR

An infrared sensor is an electronic device that emits and/or detects infrared radiation in order to sense some aspect of its surroundings. Infrared sensors can measure the heat of an object, as well as detect motion. Many of these types of sensors only measure infrared radiation, rather than emitting it, and thus are known as passive infrared (PIR) sensors.



Figure.5.Infrared Sensor



Figure.6. Hardware Implementation

V.CONCLUSION

The result from using a contact sensor, attached to a headset, is to help people with general paralysis to live more independently. This acknowledgement reaches a lot of advantages and disadvantages. In contrast with the researches and wheelchairs done before, which were based on eye or magnetic movement, this project offered the patient a simple technology to use and benefit from. While using a magnetic sensor to obtain the patient movement, a magnet should be glued on the tongue or a surgical procedure should be made. This complex idea might avoid the patient from using this sensor even though; it might be very beneficial for his whole life. Moreover, using an eye sensor can also be avoided by patients because any wrong eye movement might cause the chair to take a wrong order leading to the person's injury.

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