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Tongue Driven System a wireless Assistance Technology

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Abstract

The "tongue drive system" is a tongue-operated assistive technology advanced for people with severe disability to manipulate their surroundings. The tongue is considered an amazing appendage in severely disabled people for working an assistive device. Tongue force consists of an array of hall-impact magnetic sensors to measure the magnetic discipline generated by way of a small permanent magnet secured at the tongue. [1] The sensor indicators are transmitted throughout a wi-fi link and processed to control the moves of a cursor on a computer display screen or to perform a powered wheelchair, a telephone, or different equipments. The foremost benefit of this technology is the possibility of capturing a big kind of tongue moves through processing a combination of sensor outputs. this would offer the person with a easy proportional manage rather than a switch primarily based on/off manipulate this is the premise of maximum existing technology. [2]

Keywords—*Tongue drive system, Wheel chair and Hall Effect sensor*

INTRODUCTION

Wheelchair is controlled by using tongue motion as its name implies. we will use the tongue for controlling wheelchair. There are two sections transmitter segment and receiver section. Transmitter phase is located on the handset placed on the pinnacle and receiver section is located behind the chair. we will design this venture for handicapped or specifically for paralyzed person who've to rely on the other character or their daily activities. inthe transmitter segment we can vicinity the magnet on the center of the tongue and the four hall effect sensors are placed at the outer facet on the headset. we can repair the magnet both permanently or quickly. The everlasting magnet solving technique is referred to as tissue piercing and temporarily magnet fixing technique is referred to as tissue adhesive. while magnet is touched to the left sensor then chair can be moved to the left facet. when magnet is touched to the proper sensor then wheel chair can moved to the right aspect. we are able to fixed the magnet

permanently by using operation of quickly by way of the use of one form of liquid. [1]

MOTIVATION

In the market the types of wheel chair available are Joystick controlled, head pad controlled, sip and puff. Speech recognition controlled wheelchair is also available. Each of this wheel chair is driven by different driving factors and each of them has a disadvantage in itself.In the sip and puff controlled wheel chair, to drive the motorized wheelchair, the person on the wheel chair must make a sucking sound or exhale quickly. His "sip-and-puff" chair responds to four instructions he provides along with his breath. but the commands are not intuitive, and the straw that relays his orders wishes ordinary cleansing and sits in the front of his mouth. [2] The speech recognition controlled wheelchair acknowledges the speech of the person but it has a downside it can prevent with the speech of the character in the daily sports. It additionally proves to be a disadvantage to the ones who have speech associated problems. joy stick controlled wheelchair proves to be vain to folks that can't even circulate their arms or palms. Head pad controlled wheelchair has many advantages in comparison to different wheelchair technology besides for the truth that it is annoying for a spine-related injured character to transport his head to and fro for steering the wheelchair. for that reason a wheelchairtechnology wishes to be developed that is simple, clean to command and flexible in comparison to other era. The tongue-directed wheelchair is simpler to govern and allows for faster using than the sip-and-puff model. A headset interprets the actions of a magnet embedded in his tongue (just like the tongue piercings a few humans get) and relays them to a software on his mobile smart phone, which drives the wheelchair ahead or again, right or left. A significant benefit of tongue force system is it that it could be used to interface many other gadgets. If a person who makes use of a sip-and-puff gadget wants to manage a pc mouse from bed, they cannot use the one on their wheelchair, however they might with this new gadget.the opposite key advantage of the tongue gadget is that it's all however invisible. This had reduced in size the era down so it now will in shape inner a dental retainer that the affected person can wear inner his or her mouth. Tongue drive gadget is some other step towards bringing power wheelchairs into the following century.

Present theories and practices

A large group of assistive devices are available that are controlled by using switches. The switch incorporated hand splint, sip and puff device, chin manipulate gadget, and electromyography (EMG) switch are all transfer based systems and provide the user with limited tiers of freedom. a set of head-mounted assistive gadgets has been developed that emulate a pc mouse with head moves [3]. Cursor moves in these devices are managed by way of tracking an infrared beam emitted or contemplated from a transmitter or reflector connected to the consumer's glasses, cap, or headband. Tilt sensors and video-based computer interfaces that can music a facial feature have also been implemented. One hindrance of these gadgets is that most effective those human beings whose head motion is not inhibited may avail of the technology. another limitation is that the user's head must constantly be in positions inside the variety of the tool sensors. For example the controller may not be accessible when the user is lying in bed or not sitting in front of a computer. Another category of computer access systems operate by tracking eye movements from corneal reflections and pupil position. Electrooculographic (EOG) potential measurements have also been used for detecting the eye movements. A major

limitation of these devices is that they affect the users' eyesight by requiring extra eye movements that can interfere with users' normal visual activities such as reading, writing, and watching. The needs of persons with extreme motor disabilities who cannot benefit from mechanical moves of any frame organs are addressed with the aid of using electric signals originated from mind waves or muscle twitches. Such brain pc interfaces (BCI), either invasive or noninvasive, have been the subject of predominant studies sports. BCIs that perform based totally on electroencephalography (EEG) signals are very slow and constrained in bandwidth. Implantable BCI technologies, then again, are extraordinarily invasive (require a brain surgical treatment) and closely depend upon signal processing and complicated computational algorithms, that can consequences in delays and cumbersome systems that can additionally be very high-priced.

Literature Review

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2]TorstenFelzer and Rainer Nordmann, Alternative Wheelchair Control, 2007.

The "Tongue Dive System" is a tongue operated Assistive Technology (AT) developed for people with severe disability to control their environment. Tongue Drive consists of an array of Hall Effect magnetic sensors mounted on a mouthpiece to measure the magnetic field generated by a small permanent magnet secured on the tongue. The sensor signals are transmitted across a wireless link and processed to control the powered wheelchair. In past a lot of Assistive Technologies have been designed but each one of them had certain demerits. The tongue is considered an excellent appendage in severely disabled people for operating an Assistive device. 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 ardiuno and a RF module. The design has been tested and result achieved confirms the design approach illustrated.

METHODOLOGLY

The block diagram of the system is given below:

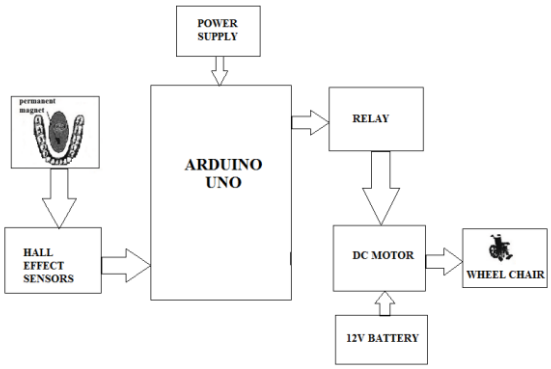

Fig.*Block diagram of Tongue Driven System*

The main components are:-

- Power supply
- Arduino
- Hall effect sensors
- Relay
- Display
- DC motor.

The main principle behind the working of this project is corridor effect. The corridor impact is the manufacturing of a voltage distinction (the corridor Voltage) across an electrical conductor, transverse to an electric powered present day inside the conductor and a magnetic field perpendicular to the present day. in this task we employ corridor impact sensors which is a transducer that varies its output voltage in reaction to the change inside the magnetic field. [7] depending on the change within the position of the magnet affixed at the tongue there is a voltage

exchange within the output of sensor values, which determines the movement of the tongue and also numerous directional control can be achieved through accelerated no of sensors, as a result achieving maximum directionality and manipulate over the wheelchair.

RESULTS AND DISCUSSIONS

Fig 2.*Snapshot of project*

When the tongue is moved the magnet also moves the hall effect sensor senses the voltage difference and the signals are send to the respective motors and the wheel chair is moved in that direction.

APPLICATIONS

- Helps patient to carry out his daily activities by his own.

ADVANTAGES

- Linear function
- Smoother
- Faster.
- Natural control.
- No surgery.

CONCLUSION AND FUTURE SCOPE

Our ultimate goal in developing the TDS is to assist people with excessive disabilities enjoy and preserve an unbiased, self-supportive lifestyles. The device uses an array of magnetic sensors to wirelessly song tongue actions by using detecting the position and orientation of a everlasting magnetic tracer secured at the tongue. Our destiny directions consist of improving the TDS hardware and SSP algorithms to make them smaller, faster, and more efficient. Also the possibilities of integrating the autonomous navigation features, such as environment sensing, path finding and remote audio-visual tracking and control for the care personnel need to be determined.

In future the project can be extended to control a robotic arm to use as natural arm.

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