Artificial Facilities for Handicap Person using Tongue Drive System

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Abstract **The Tongue Drive system is a tongue operated assistive technology developed for people with severe disability to control their environment. The tongue is considered an excellent appendage in severely disabled people for operating an assistive devices. Tongue Drive consists of an array of Hall effect magnetic sensors mounted on a dental retainer on the outer side of the teeth 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 movements of a cursor on a computer screen or to operate a powered wheelchair, a phone, or other equipment's. The principal advantage of this technology is the possibility of capturing a large variety of tongue movements by processing a combination of sensor outputs. This would provide the user with a smooth proportional control as opposed to a switch based on/off control that is the basis of most existing technologies. We modeled the effects of position and orientation of the permanent magnet on the sensors in FEMLAB and experimentally measured them. We built a prototype system using off-the-shelf components and tested it successfully by developing a graphical user interface (GUI) in LabVIEW environment. A small battery powered wireless mouth piece with no external component is under development.**

Keywords: Assistive technologies, Magnetic red switch, RDNO development board, Laptop.

I. INTRODUCTION

Tongue drive system use various application like disable person can communicate with other persons, Send the message to doctor or family members, Play and select songs from computer, Voice generation System.

The Tongue Drive system is a tongue operated assistive technology developed for people with severe disability to control their environment. By using Tongue Drive system user will communicate with each other using voice generation, sends the message, voice calling and user will also play the songs. and require users to have the ability to control their often weak neck and diaphragm muscles, which are prone to fatigue and not possible for some. Therefore, although individuals with disabilities have access to the above technologies, they have not been able to adapt them to their routine lives for various reasons,

The Tongue Drive System (TDS) was developed to overcome some of the aforementioned problems by enhancing the functionality and usability of a wireless and wearable AT that recognizes the voluntary movements of a user's tongue by processing changes in the magnetic field, generated by a small magnetic tracer on the tongue, and translating them into user-defined commands. The magnetic tracer should either be glued to the tongue for short-term temporary use (a few hours) or embedded in a titanium tongue stud for attachment to the tongue via a piercing for medium to long term use.

A digital-to-analog converter in the TDS-PWC smartphone interface converts the commands into necessary voltages to control the PWC in linear and angular directions. A specific TDS command is designated to control the power switch in the PWC mode, changing it from drive mode to weight-shift mode through a 3.5 mm audio jack. To avoid repeating of the training procedures on the smartphone, the TDS-PWC smartphone interface wirelessly receives TDS calibration and training data from the PC. Details of the eTDS headset, TDS-PC transceiver, and TDS-PWC smartphone interface can be found0.

The SSP algorithm consists of two parts: electromagnetic interference (EMI) attenuation and command classification. To reduce the effects of EMI, the algorithm subtracts the output signals of the 3-axis magnetic sensor on one side from the other side after mathematically rotating the signals to bring them parallel; then the algorithm minimizes common mode signals such as the earth's magnetic fields and EMI and maximizes the differential mode signals generated by the tongue magnetic tracer, called the "calibration procedure". These magnetic sensor outputs.

II. LITERATURE SURVEY

Unfortunately, the number of disabled people is increasing by tragic accidents. Some victims of the accidents are suering from abnormal life with serous spinal injuries. According to a recent study conducted by

Christopher and Dana Reeve Foundation, 5,596,000 people in the US live with paralysis. About one million, 16cannot carry out daily task without continuous help. The hardship as a result of the unfortunate accidents is given not only to the patients but also to their family or friend. In statistics, 400 million disabled people live in the developing countries. According to Healthy People 2010, an annual cost of 300 billion is spent for 54 million people who have some level of disabilities. About 4 billion every year currently costs for lifelong special care services for the people. Many assistive technologies are also developed to support to care for the people. Wheelchair is widely used device by disabilities. The normal electric powered wheelchair needs to be operated through joystick by hand. However, the hand function may be limited or even not available in some patients with severe disabilities. The idea of the alternative wheelchair control is to use other part of the body rather than hand to operate some sort of a proportional control joystick.

The alternative wheelchair control includes sip-n-pu_ control, chin control, head control, speech control and tongue-operated solution each of those can in some form be found on the market nowadays.

III. SYSTEM ARCHITECTURE

The Tongue Drive system is a tongue operated assistive technology developed for people with severe disability to control their environment. The tongue is considered an excellent appendage in severely disabled people for operating an assistive devices. Tongue Drive consists of an array of Hall effect magnetic sensors mounted on a outside the mouth 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 movements of a cursor on a computer screen or to operate a powered wheelchair, a phone, or other equipment. The principal advantage of this technology is the possibility of capturing a large variety of tongue movements by processing a combination of sensor outputs. This would provide the user with a smooth proportional control as opposed to a switch based on/off control that is the basis of most existing technologies. We modeled the effects of position and orientation of the permanent magnet on the sensors in FEM LAB and experimentally measured them. We built a prototype system using Off the shelf components and tested it successfully by developing a graphical user interface (GUI) in Lab VIEW environment. A small battery powered wireless mouth piece with no external component is under development.

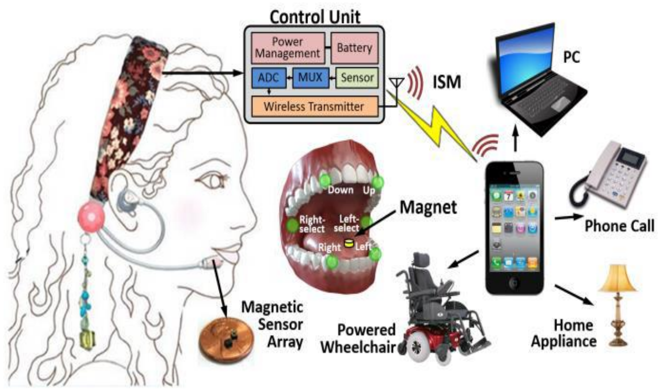

Fig. 1 Program Architecture

A description of the program architecture is presented. Subsystem design or Block diagram, Package Diagram, Deployment diagram with description multiple sclerosis (17%). As people with severe disabilities strive to improve their quality of life, they are eager to adapt to and to incorporate innovative assistive technologies (AT) in their daily lives, particularly important to these persons are input devices to access computers, wheelchairs, smartphones, and home/office appliances. Several ATs such as EEG-based brain-computer interfaces (BCIs), electromyography (EMG), speech recognition, head arrays, eye trackers, and sip-and-puff (SnP) switches have been introduced in the market. However, each device has limitations that prevent its use in daily life. For instance, BCIs are useful to those with high levels of paralysis, but they are prone to motion artifacts and interference, and cannot be easily adapted to daily activities. The EMG-controlled switches help people with disabilities access computers, or navigate electric-powered wheelchairs (PWC), but the number of commands is limited and long term use can cause muscle. Speech recognition systems have become widely available on computers and smartphones. Although these technologies allow people to type efficiently, they are not efficient for cursor or wheelchair navigation. In addition, because speech recognition is sensitive to acoustics, they are unreliable in noisy environments. The eye-tracker is efficient for controlling a mouse cursor on a computer screen. However, because it requires a camera in front of the user's face, it can block the line of sight, rendering it not useful for mobile conditions. Head arrays and SnP switches are the most popular ATs individuals with tetraplegia use for driving PWCs. They are affordable and simple, but they offer only a limited number of commands and require users to have the ability to control their often weak neck and diaphragm muscles, which are prone to fatigue and not possible for some. Therefore, although individuals with disabilities have access to the above technologies, they have not been able to adapt them to their routine lives for various reasons, leading to an AT abandonment rate of 35% to 75% due to issues such as poor performance, low reliability, environmental barriers, and changes in the users' functional abilities The Tongue Drive System (TDS) was developed to overcome some of the aforementioned problems by enhancing the functionality and usability of a wireless and wearable AT that recognizes the voluntary movements of a user's tongue by processing changes in the magnetic field, generated by a small magnetic tracer on the tongue, and translating them into user-defined commands, shown in Fig Show. The magnetic tracer should either be glued to the tongue for short-term temporary use (a few hours) or embedded in a titanium tongue stud for attachment to the tongue via a piercing for medium- to long-term use. The performance and learning of able-bodied (AB) participants using the TDS were evaluated with a computer and a PWC in previous studies. More recently, we published quantitative and qualitative results from both AB participants and those with tetraplegia (TP) using the TDS, and compared to their performance using SnP or their current ATs. Here, we report the results of additional experiments conducted with the same study group that quantify performance using the TDS to control a computer, a PWC, and a smartphone. This study compares the performance of AB and TP participants in five and six sessions, using the TDS and conventional computer input devices, respectively.

IV. CONCLUSION

In this way we work with paper and conclude that The person will select the sensor and the operation on that sensor will be performed the person will select sensor then voice will be generated for communicate with each other when it will select second sensor then voice calling will be done. By selecting third function message will sends to selected number. When person will select forth sensor then then song will be selected from the list and it will be played.

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