National conference on Engineering Innovations and Solutions (NCEIS – 2018)
International Journal of Scientific Research in Computer Science, Engineering and Information Technology
© 2018 IJSRCSEIT | Volume 4 | Issue 6 | ISSN : 2456-3307

Alternative Communication Device For Stroke People

Shalom Priya C, Sinduja K, Supreetha P, Jagadesha .N
Electrical and Electronics Department, GSSSIETW, Mysore, Karnataka, India

ABSTRACT

Adults with acquired neurological disorders (stroke, Traumatic Brain Injury ...) develop their disability for verbal communication and literacy capabilities as typical speakers and writers. Depending upon their neurological condition, they gradually or suddenly lose their speech or language capabilities and are required to rely on Alternative Communication systems(ACS) to meet their communication needs.

This technology offer valuable opportunities to people with physical disabilities. The attractive features of this system include noninvasive signal recording, little training requirement, and a high information transfer rate. This project presents the design and development of a system that brings out a disabled person from the condition of prisoner in his own body. Stroke is one of the main causes of disability in the world. About 20% of stroke patients experience aphasia, with 20-30% of these individuals exhibiting severe communication deficits for at least a portion of their recovery period. Alternative Communication (ACS) encompasses the communication methods used to supplement or replace speech or writing for those with impairments in the production of spoken.

Keywords: (ACS)-Alternative Communication systems, (AT) Assistive technology, PIR Sensors, ARDUINO , Signal conditioning.

I. INTRODUCTION

Much research work has been devoted in the past twenty years to developing Assistive Technology (AT) devices aiming at offering to people suffering a disability associated to disorders of verbal communication, the possibility of communicating with the persons in their entourage and having some control on their environment. These AT devices are operated by human-machine interface sensors receiving information provided by the person with disabilities [1].

When working in the area of alternative communication, one of the recurring problems is selecting the sensor that will be best suited, whatever the type of AT devices (communication aid, assistance when using the computer, etc.) used. As a consequence, one of the first tasks to be done is identifying the proper sensor from among the set of devices available on the market or developed in research labs. One of the major difficulties encountered in the quest for a well-adapted AT devices is that the selection process is strongly influenced by the user's specific needs, which in turn has an impact on the type of sensor to be used. Thus, this process cannot be carried out without taking full account of the human-machine system to which it is going to be applied. It is therefore necessary to study the performances of the user-sensor-system. The purpose of this paper is to report about our study regarding the several technologies employed in the

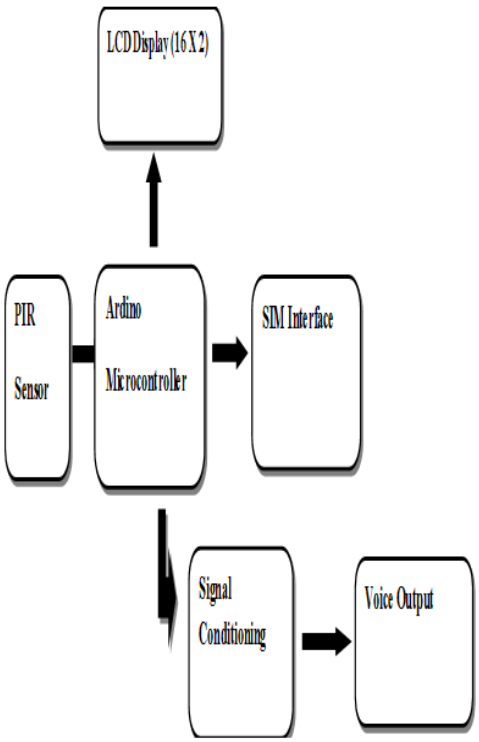
restricted area of alternative communication systems. Many people have communication problems after a stroke. About a third of stroke survivors have some difficulty with speaking or understanding what others say, and this can be frightening and frustrating.[2]

Imagine for a moment, that you wake up one day and you are completely paralyzed. How would you communicate with others in the room? How would you get your morning coffee, or breakfast for that matter? You can't effectively say what you want so you are now at the mercy of a dietician who choose foods that are "best" for you. How can you tell them that you don't like the taste of lemon in your tea or burnt toast? For that matter, how will you be able to communicate anything with others regarding pain levels, basic needs and anything else you have to say? For you, this was just an exercise, a learning experience that you can leave at any time and communicate freely with anyone you choose about anything you like. For some, especially those who are partially or completely paralyzed due to injury or disease, this is the harsh reality of their life. They face these challenges every day and have a hard time communicating something as simple as a "Hello". How do these people with significantly impaired mobility communicate with others? What means of communication are available to them?[3]

A stroke is an injury to the brain. The brain controls everything we do including everything we interpret and understand. A stroke can cause problems with communicating if there is damage to the parts of the brain responsible for language. These functions are controlled by the left side of the brain in most people. As one side of the brain controls the opposite side of the body, many people who have communication problems after stroke also have weakness or paralysis on the right side of their body. Stroke can also cause communication problems if muscles in the face, tongue or throat are affected.[2]

So on top of all these condition this paper is our effort in giving a transformation for speech disabled people from disabled to be abled in all ways that is in terms of communication.

II. BLOCK DIAGRAM



III. WORKING

The basic working principle of this is, that it detects near proximity (also known as touch) without depending on physical contact. In simple words, we can understand that its working is same as a simple switch (or) circuit. This simple switch used here is nothing but the PIR Sensor. A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors.

When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves.

Therefore, when any physical medium touch moves in front of this surface of this sensor, the internal clot get closed inside the sensor and current starts flowing. Here, this movement sensor is connected to the Arduino Microcontroller. The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller.

Whenever the disabled person wants to convey an emergency message, he waves his finger or any other part of the body and this sensor recognizes this movement and passes message to the microcontroller and this Arduino microcontroller receives the signal from the sensor. The microcontroller counts the number of movement the sensor makes and this received information as an output is obtained in three different ways.

i. Firstly, The Arduino Microcontroller is interfaced with the LCD display, so the emergency message to be conveyed is displayed on the LCD screen.
ii. The Arduino Microcontroller is interfaced with a GSM SIM, by this the emergency message to be conveyed will be sent as a SMS to the other persons mobile phone.
iii. The emergency message is conveyed as a voice output through signal conditioning. Signal conditioning is the manipulation of a signal in a way that prepares it for the next stage of processing.

IV. CONCLUSION

1. It is one of the innovative way helpful for disabled people who are facing problems in conveying their information.
2. This brings out the disabled person from the condition of prisoner in his own body.
3. The basic needs of the person can be easily fulfilled.
4. Develops an augmentation mode for disabled people to participate in wider variety of options.

V. REFERENCES

1. Ghedira S, Pino P, Bourhis G. Conception and Experimentation of a Communication Device with Adaptive Scanning. ACM Trans Access Comput. 2009;1:1–23.
2. Junker A, Sudkamp T, Eachus T, Mikov T, Wegner J, Livick S, Heiman-Patterson T. Yellow Springs.Brain Actuated Technologies Inc; 2001. Hands-free computer access for severely disabled.
3. Barreto AB, Scargle SD, Adjouadi M. A practical EMG-based human-computer interface for users with motor disabilities. Journal of Rehabilitation Research and Development. 2000;37:53–64.[PubMed]
4. Kim D, Agarwal AK, Delisle M, Tyler M, Beebe DJ. Annual International Conference of the IEEE Engineering in Medicine and Biology; 23 October 2002. Madison, WI, USA; 2002. Geometric optimization of a tongue-operated switch array; pp. 2441–2442.
5. Lee Y, Lee M. SMS Application Using EMG Signal of Clenching Teeth for e-Health Communication. Telemedicine and e-Health. 2008;14:593–597. doi: 10.1089/tmj.2007.0098.[PubMed] [Cross Ref]
6. Enderle JD, Blanchard SM, Bronzino JD. Introduction to Biomedical Engineering. 2. Elsevier Academic Press; 2005.