Hands Free Methods of Controlling Computer Specially Designed for Disabled Peoples

S. Nandhini
UG Student
Department of Computer Science and Engineering
Valliammai Engineering College, Kattankulathur

Abstract

The Hands free method of controlling computer is a developing research area in order to help people with disabilities who have problems in handling computer with their hands. This work consists of some innovative hands free methods of controlling computer. The methods are speech recognition, eye ball movement detection, head movements with voice commands, shoe mouse and headset type computer mouse using gyro sensors. These methods help people to perform various task-from menial tasks to challenging tasks. Voluntary movements of the human are sensed by the computer using various sensors and the tasks are performed accordingly. These methods are widely accepted by the professionals and various new methods are being developed in order to improve the quality these methods.

Keywords: Speech Recognition, Eyeball Movement, Shoe Mouse, Headset

---

I. INTRODUCTION

A. *Automatic Speech Recognition:*

Speech control software is one of the most widely known and popular ways of controlling a PC hands-free, and Dragon Dictate is by far the most well-reviewed voice dictation program out there and the go-to choice if we were looking for superior voice recognition software. However, if we are looking for a free option, the built-in Windows Speech Recognition is a decent program. The Motorola HC1 Headset Computer puts the PC right on your head and utilizes both head movement detection and voice recognition technology to make it hands-free. This method is shown in the Fig 1.

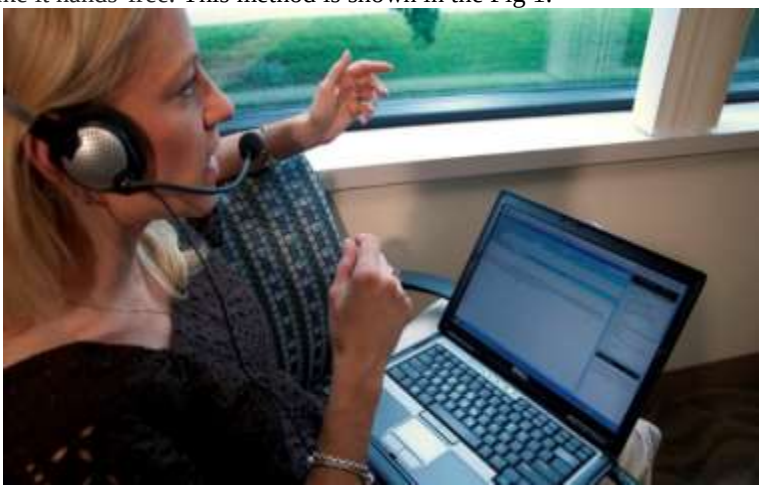

Fig. 1: automatic speech recognition

B. *The Foot Mouse:*

The Foot Mouse from BiLiPro is a mouse we may love. If we like the idea of using lesser-used skeletal joints to do our computing, then the cursor is controlled by using a right foot pedal and the clicking is done by hitting various buttons on a touchpad to the left. The pad has controls for clicks, double clicks, and shortcuts. This method is shown in the Fig 2.

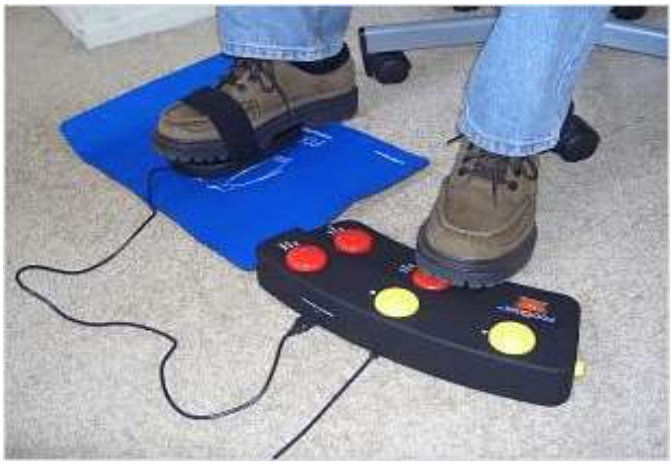

Fig. 2: The foot mouse

C. *Headset-type Computers Mouse using Gyro Sensors:*

This high-tech headset has a built-in camera and microphone to give it superior hands-free computing capabilities. The development of a headset-type computer mouse controlled by gyro sensors for the disabled is described. A novel hybrid operational mode is suggested for mouse movement and conscious eye blinking is used as a mouse click. This method is shown in the Fig 3.

Fig. 3: Headset-type computers

D. *Eyeball Movements:*

A vision based human-computer interface detects eye ball movements and interprets them as cursor control commands. The employed hough transform image processing method include webcam for detecting the face and template matching method based eye region detection. The Haar feature technique is used for eye feature extraction. SVM classification method is used for classifying the eye movement. This method is shown in the Fig 4.

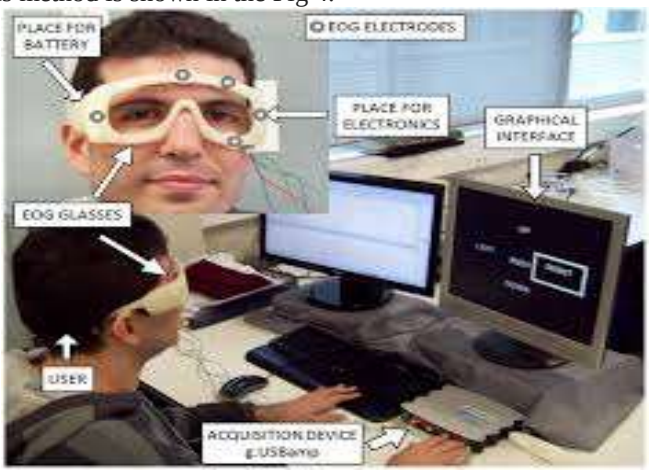

Fig. 4: Eyeball movements

E. Head Movements:

We can also use it as a hands-free mouse. It works by tracking our head movement using sensors. There are even other programs in the works that let us completely control the mouse by a left and right blinking. The web camera tracks head movement and moves the cursor in accordance, and lets us "Click" by hovering the mouse pointer. This method is shown in the fig 5.

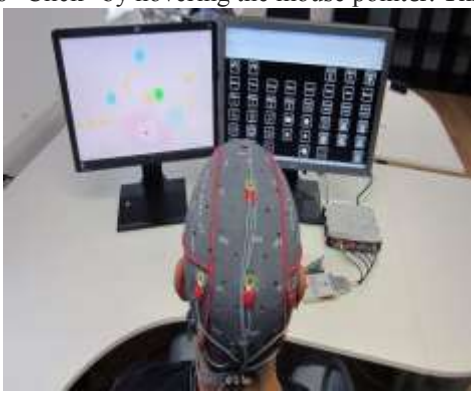

Fig. 5: Head movements

Paper Title	*Author*	*Year*	*Concept*	*Advantage*
Automatic Speech recognition: A review	*Preeti Saini, Parneet Kaur*	*2013*	*Study of basic approaches to speech recognition and also about the researches for dealing with the problems of ASR*	*Increases productivity* *Can help with menial computer tasks, such as browsing and scrolling* *Can help people who have cognitive disabilities* *Has long term benefits for students*
Eye ball movement to control computer screen	*Ramesh R, Rishikesh M*	*September 22, 2015*	*System for controlling the cursor position in a computer by human eye movements*	*Helpful for hand disabled person to move the cursor pointer using eyes* *Eye movement is faster than other current input media* *No training or particular coordination is required*
A prototype system for controlling a computer by head movements and voice commands	*Anis Ismail, Abd El Salam Al Hajjar, Mohammed Hajjar*	*August 2011*	*System for controlling a PC by head movements and also by voice recognition*	*Eliminate the disability of handicapped people so they can enjoy this world as a normal human being* *The operating time is minimum*
Shoe mouse: an integrated intelligent shoe	*Weizhong Ye, Yangsheng Xu, Ka Keung Lee*	*December-05,2005*	*System for controlling the PC by developing a sensor integrated shoe as acquisition platform to sense the foot motion*	*Helpful for people who have difficulties in operating the computer using their hands* *Easy to use since it is a wearable device* *Shoe mouse is compact and light*
Development of headset-type computers mouse using gyro sensors for the handicapped	*Young Wook Kim*	*December-10,2002*	*Development of headset-type computer mouse controlled by gyro sensors and eye blinking is used as a mouse click*	*Simple to install* *Easy to use* *It shall work on different computers (homework, school, MacOS, Windows, and Linux etc.)*

II. LITERATURE SURVEY

In automatic speech recognition: A review, the author conveys that speech recognition can be a very useful method to operate computers for people with disabilities and can have enormous scope for improvement. In Eye ball movement control computer scheme the author describes about a very different and new approach of controlling computers using eyes which is a better method than any other newly developed methods. In a prototype system for controlling computer by head movements and voice commands the author describes that this is the most efficient methods for controlling computers and there are less chances for errors. In shoe mouse an integrated intelligent shoe the author describes about the wearable device which is the most comfortable method than

any other methods. In development of headset type computer mouse using gyro sensor for the handicapped the author describes about the newly emerging gyro sensors which can be used to control computers by inserting it into a headset and eye blinking is used as a mouse click.

III. PROPOSED IDEA

In this proposed idea, the Pure embedded components where used, when comparing to existing Hough transform method. Digital image processing methods are not used, so the complex computations where reduced. It just taking the blinking of eye as a input with the help of camera. For processing this method requires very low cost when compared to all other existing methods.

IV. CONCLUSION

Wearable and hands-free technology are not only hot right now, it's here to stay, and the plethora of gadgets above prove this more than ever. While some of them require a definite change in your regular PC habits, if you can make the leap, your wrists and hands will reap the benefits in a big way for years to come.

REFERENCES

[1] Technology challenges for building Internet-scale ubiquitous computing, T. Nakajima; H. Ishikawa; E. Tokunaga; F. Stajano
[2] Optimal tactile sensor placement, A. Cameron
[3] Jini meets embedded control networking: a case study in portability failure, M. Beveridge,P. Koopman
[4] FTS: a high-performance CORBA fault-tolerance service, R. Friedman; E. Hadad
[5] Solving kinematic redundancy with impedance control: a class of integrable pseudoinverses, F.A. Mussa-Ivadi; N. Hogan
[6] PMU configuration for system dynamic performance measurement in large, multiarea power systems, I. Kamwa; R. Grondin
[7] Piezoelectrically actuated flextensional micromachined ultrasound transducers. I. Theory, G. Percin; B.T. Khuri-Yakub
[8] Piezoelectrically actuated flextensional micromachined ultrasound droplet ejectors, G. Percin; B.T. Khuri-Yakub
[9] Operating system performance in support of real-time middleware, D.C. Schmidt; M. Deshpande; C. O'Ryan
[10] Remote condition monitoring for railway point machine, F.B. Zhou; M.D. Duta; M.P. Henry; S. Baker; C. Burton