A Portable Human Computer Interfacing Device for Disabled People

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***Abstract*:- Interacting with desktop computers typically engages both hands of the user. This is not a problem for most people, but for people with certain disabilities this scenario may be untenable. Fortunately, there is considerable research on providing efficient access to computers for disabled users. Several interesting technologies and solutions have emerged such as blink-based text entry and voice-based mouse cursor control. People with severe disabilities who cannot use, or have limited use of, their hands and who cannot speak might not be able to control an on-screen cursor. Sometimes the only option is to use the motion of the head to control the cursor. However, commercial solutions are typically expensive. A solution that costs less would be highly desirable. A new method for head cursor control is proposed in this paper. Physically disabled and mentally challenged people are an important part of our society that has not yet received the same opportunities as others in their inclusion in the Information Society. Therefore, it is necessary to develop easily accessible systems for computers to achieve their inclusion within the new technologies. This paper presents a project whose objective is to draw disabled people nearer to new technologies. In this paper the assistive multimodal system is presented, which is aimed for the disabled people, which need various kinds of interfaces than ordinary people. The group of users in this system of persons with hands disabilities. The interaction between a user and a machine is performed by voice and head movements. Disabled people get the opportunity to carry over their work towards PC.**

I INTRODUCTION

In the evolution of computer user interfaces, the mouse and the keyboard have withstood challenges from other input devices such as joystick, light pen, track ball and many more devices. But still in most of the computer application we are using mouse and keyboard as standard devices. This is not same for the people who with severe disabilities. However as computers become more compact and powerful, e.g., PDAs, notebooks, wearable computer etc., traditional designs for the mouse and keyboard may not be suitable for interfacing with the small computing systems. But all these devices need physical connection with computer system. We believe that by combining the advent in sensors and wireless technologies, it is possible to development computer input system that could enable multi-functional input tasks and allow the overall shrinkage in size of the graphical and text interface devices. Our experimental results could be performed using MEMS based motion detection sensors. From our literature analysis, although there are many computer input devices available are not wearable multifunctional devices. Prince has developed finger mounted device using pressure sensors, but no hardware has been realized so far. B Thomas has done analysis on virtual keyboard, but it needs mouse as an alternative to give an input an individual character. The optical mouse has been used for controlling the computer system as a input device in various computer based systems. The optical mouse requires the solid surface for proper working and one also needs to connect it with the help of wire to the system. Several other existing devices can capture gestures, such as a “Wiimote,” joystick, trackball and touch tablet. Some of them can also be employed to provide input to a gesture recognizer. But sometimes, the technology employed for capturing gestures can be relatively expensive, such as a vision system or a data glove. There are mainly two existing types of gesture recognition methods, i.e., vision based and accelerometer and/or gyroscope based Hand gesture Signal conditioning Microcontroller FSK Transceive r Tri axis MEMS Computer C. To overcome the limitations such as unexpected ambient optical noise, slower dynamic response, and relatively large data collections/processing of Vision based method and to strike a balance between accuracy of collected data and cost of devices, a Micro Inertial Measurement Unit is utilized in this project to detect the accelerations of. hand motions in three dimensions Transmitter Section The proposed recognition system is implemented based on MEMS acceleration sensors. Since heavy computation burden will be brought if gyroscopes are used for inertial measurement , our current system is based on MEMS accelerometers only shows the system architecture of the proposed gesture recognition system based on MEMS accelerometer. It was human section where the gestures are passed to PC section. Cursor can be moved with the help of hand movements. 3-Axis Accelerometer will send the information about movement direction to Microcontroller. Microcontroller then passes the actual information to encoder. After Encoding it sends information using TX. Then receiver will decode the received information. Then Microcontroller sends data to PC through USB. It will perform the operation like operation for selecting any documents with the help left/right click. The details of the individual steps are described below. The sensing device senses acceleration in three axes .Those sensed signals are conditioned and given to the controller circuit. The system uses accelerometers to detect the user's hand tilt in order to direct mouse movement on the monitor. By clicking on the mouse it is activated by the user's eye blinking through a sensor.

II LITERATURE SURVEY

MEMS accelerometer measures the acceleration of the signal in three co-ordinates such as x-axis, y-axis, and z-axis. To

capture the hand motions online, the general MEMS sensor which can be operated without any external reference and limitation in working conditions is used. However, motion recognition is comparatively tough for different users since they have different styles and speeds to generate various motion trajectories. Thus, several researchers have tried to avoid this type of problem for increasing the accuracy of handwriting recognition systems Gruber et al. and Bashir et al. have proposed online signature verification based on novel biometric smart pen authentication device using techniques based on the finger grip pressure, physical acceleration, and tilt data using the ensemble techniques and algorithm for dynamic time wrapping. Sayed et al. have proposed mouse gesture dynamic authentication system which performs static authentication in short time. However these authentication techniques involves the neural network environment and also these systems rely on the algorithm of complex data processing for biometric authentication, which may not scale when deployed in the environment of globally distributed network.

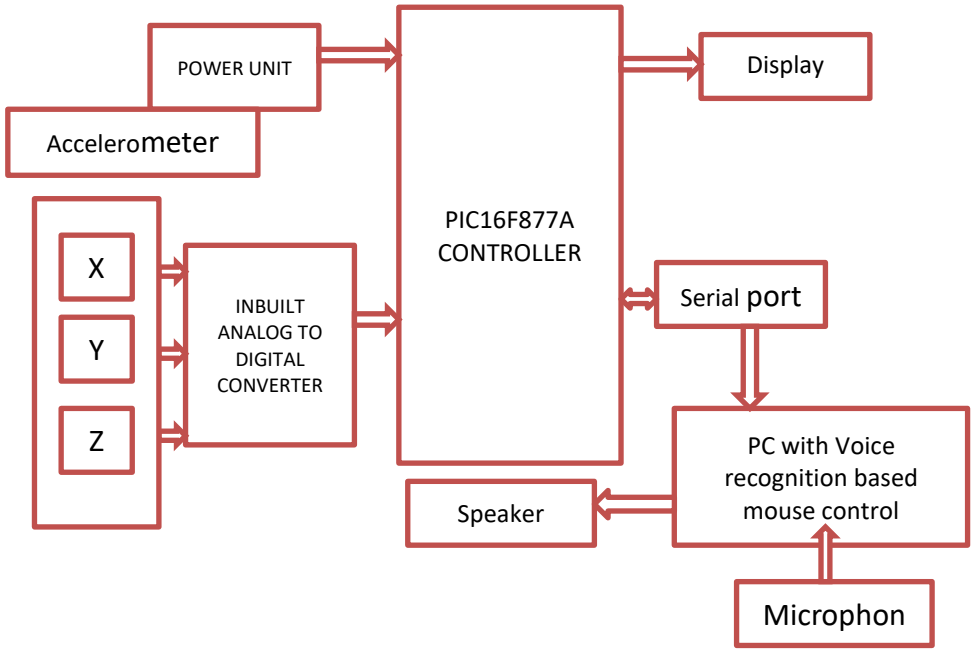
III EXISTING SYSTEM

In Eye movement based HMI that can't provide100% efficiency in dim environment. Due to Itching or irritations.
In brain controlled HMI the major problem of this method is human impulse varies from person to person.
To overcome the above mentioned challenges we proposed the following voice controlled HMI method.

IV PROPOSED SYSTEM

This project focuses on the invention of a head operated computer mouse that employs one tilt sensor placed in the head to determine head position and to function as simple head-operated computer mouse. A tilt sensor(3 axis accelerometer) is used to detect both lateral and vertical head movements to navigate the mouse cursor position placed on helmet. Clicking of mouse is activated by the user's voice commands. Voice recognition section is used to identify the small letters which are pronounced by the paralyzed user.

BLOCK DIAGRAM:



V SOFTWARE USED:

- Visual studio 2010 (PC side display)
- Embedded c (language)
- MBLAB IDE (platform)
- Micro burn (program burner)
- Language tool:-cross-compiler

ACCEROMETER USED:

An accelerometer is needed to sense the head motion.

- 2 axis sensing (+x, -x, +y and –y axis).
- X axis for left an right motion.
- Y axis for forward and backward motion.
- Right and forward are the positive motion.

VI CONCLUSION:

In this paper, we proposed the portable human computer interfacing device should be controlled by the voice command of the human as well each and every character of the alphabet will perform various function and they are 100% efficient and it is mainly helpful for the disabled person.

REFERENCES:

[1] Ohno T., Mukawa N., and Kawato S., "Just blink your eyes: A head-free gaze tracking system ", Extended abstract of the ACM Conference on Human Factors in Computing Systems, CHI2003, Apr 2003, pp.950-951.AAA

[2] S. Card ,W. English, and B. BURR, "Evaluation of mouse, rate controlled isometric joystick, step keys, and text keys for text selection on a CRT", Ergonomics 21, 8 (1978), pp. 601-613