Asian Journal of Applied Science and Technology (AJAST)
Volume 1, Issue 1, Pages 114-116, February 2017

Gesture Based Wireless Air Mouse using Accelerometer

R.S.Mathu Bala[1], R.Gokulapriya[2], E.Anisha[3] and R.Anupriya[4]

[1]*Assistant Professor, Department of ECE, Vivekanandha College of Engineering for Women, India. Email: mathubala991@gmail.com*
[2]*UG Student, Department of ECE, Vivekanandha College of Engineering for Women, India. Email: gokulapriyaECE21@gmail.com*
[3]*UG Student, Department of ECE, Vivekanandha College of Engineering for Women, India. Email: anisharose213@gmail.com*
[4]*UG Student, Department of ECE, Vivekanandha College of Engineering for Women, India. Email: riyariya908riya@gmail.com*

Article Received: 13 February 2017 *Article Accepted: 23 February 2017* *Article Published: 26 February 2017*

ABSTRACT

The main objective of this project is to develop wireless air mouse using accelerometer sensor. This implementation is done by using a sensor which detects hand gestures. The sensor is placed on the user side, attached to the hand to sense the movement and gives the output to a PIC microcontroller to process it. Needed modifications are done by the PIC microcontroller. These values are transmitted through a RF module to the PC. At the receiving end a mouse control program which contains functions to control the mouse reads these values and performs many operations which is user friendly because it helps in many ways like changing the slide, pointing purpose and for open a folder without using mouse pad.

Keywords: RF module, Gestures, Accelerometer sensor, PC and PIC microcontroller.

1. INTRODUCTION

Nowadays the wireless usage becomes very popular by using sensors. The advancement of technology in the field of wireless made it possible for any applications. Gesture recognition technology is used to identify the human hand movements. Gesture recognition technology identifies the human movements through mathematical representation. Gesture recognition technology can be used in various applications. The accelerometer can be used to sense the movement of the human particularly in given direction. The sensor would sense the motion of hand and the mouse pointer will move. The accelerometer senses the change in motion, in the tilt of the hand. The change in the acceleration values of the accelerometer which would be transmitted to the PC. The software applications take control and move the mouse pointer. PIC microcontroller would be used in our proposed system which gets input from the accelerometer sensor. Main advantage is easily programmable and has massive online support. To make the mouse wireless, RF Modules were used because they are cheap compared to other modules like Bluetooth and Zigbee.

2. PROPOSED SYSTEM

In our proposed system accelerometer sensor is used to detect the motion of the gesture. Accelerometer is interfaced to a microcontroller. PIC microcontroller gets the input from the accelerometer sensor. The microcontroller process the sensor input data and transmits it through a wireless transmitter module. The transmitter transmits the signal to the PIC microcontroller through the RF module interfaced with it. The wireless receiver receives the data and stores it into the computer through one of the interfaces. The accelerometer senses the change in motion, in our case the tilt of the hand. The change in accelerometer would be transmitted to the PC. Then the software applications take control and move the mouse pointer where it's necessary. The sensor which gets input from the movement of the gesture and the values would be changed in the accelerometer this would be continuously transmitted through the transmitter and which is processed by the PIC microcontroller and then received by the receiver and given to the PC and it would be moves the mouse pointers.

3. SYSTEM ARCHITECTURE

The proposed system architecture uses accelerometer as a sensor to detect the motion. Accelerometer is interfaced to a PIC microcontroller. The microcontroller does the necessary processing on the sensor data and transmits it through a wireless transmitter module. The wireless receiver receives the data and feeds it to the computer through one of the interfaces.

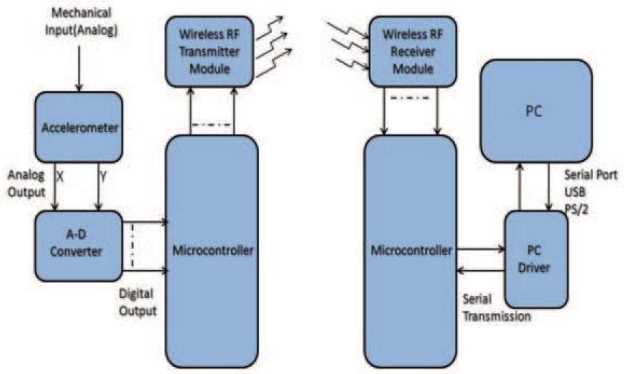

Fig.1. Block diagram of Gesture based wireless air mouse using accelerometer

The application running on the PC analyzes the received values and performs the necessary action on the mouse pointer. The input from the accelerometer is given to the A-D convertor. The output from the accelerometer is in the form of analog. Thus we use A-D convertor to convert the analog signal into digital signal. Then it is interfaced with the PIC microcontroller from which the information is passed to the wireless transmitter. Then the signal must be received by the wireless receiver. Then it is given as input to the PIC

© 2017 AJAST All rights reserved.

microcontroller then which would be stored in the personal computer where which would be processed according to the motion of gesture. The data stored in the PC through the PC driver through the serial port (RS 232). Then the data is processed and moved without the help of mouse pointer.

3.1 Power Supply

A power supply is a device or system that supplies electrical or other types of energy to an output load or group of loads. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

3.2 Zigbee

Zigbee is a high level communication and it is low-cost, low-power wireless communications solution, meant to be integrated as the main building block of ubiquitous networks. It is maintained by the Zigbee which develops the specification and certifies its proper implementation.

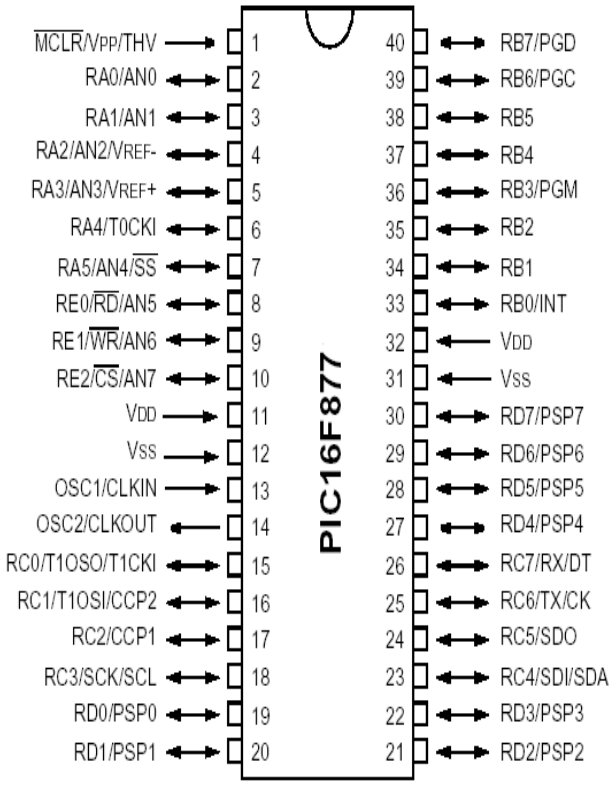

Fig.2. Pin diagram of PIC 16F877

3.3 RS232

RS232 is a serial communication interface which allows sending and receiving data via at least three wires. With the RS232 interface it is possible to setup a connection between a microcontroller and a PC or between two microcontrollers. The RS232 interface can be used for many purposes like sending commands from a PC to a microcontroller, send debug information from a microcontroller to a terminal.

3.4 Accelerometer

An accelerometer is an micro electromechanical sensor (MEMS) that measures acceleration. It is also helpful in detecting tilt or orientation with respect to the earth of a device it is attached. This application uses its property to detect the tilt of the hand to move the mouse pointer. MMA7260 3-axial Accelerometer from free scale is used. This accelerometer is a thin, low power 3-axial accelerometer which gives an analog voltage output. The voltage output is directly proportional to the accelerometer. When the accelerometer is kept stationary and rotated, the three values along each of the three axis X, Y and Z gives the tilt along each of the axis.

3.5 PIC (16F877)

Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in pic16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877.

4. FLOWCHART

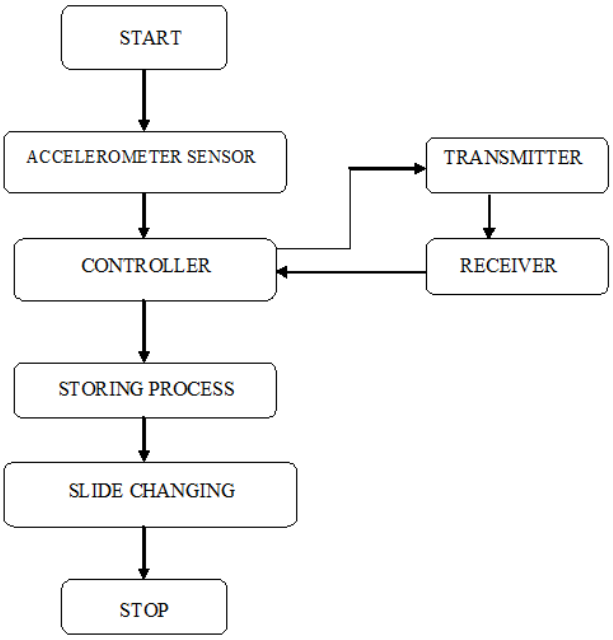

Fig.3. Flowchart for the Proposed System

5. CONCLUSION

In this paper, air mouse has been developed to ease the work of the human. Accelerometer based Wireless Mouse using PIC microcontroller is used in this paper. Accelerometer is used as a motion sensor with two axes of the accelerometer is used to sense the tilt in the particular direction and the mouse cursor is moved accordingly. Change of acceleration or a motion in the direction of human gesture, is used for click and release of the cursor of mouse. The aim of the project was to design an Air mouse which does not require a mouse pad and works on the hand motion and is designed successfully. In the proposed system, the cursor is made to move based on the gesture of the accelerometer. This is a gesture based approach.

6. FUTURE SCOPE

In our proposed system the gesture based approach is carried out. The position based approach can be tried in the future,

© 2017 AJAST All rights reserved.

where in the mouse cursor just follows the movement of the finger. The proposed system can be applied in digital classrooms, seminar halls, conferences, etc. It can also be used as a writing aid for paralyzed people. This can be made into a compact device which can be carried in the form of touch free anywhere and used for any purpose. This system can be further improved by increasing the processing speed and be implemented.

7. ACKNOWLEDEMENTS
First and foremost we thank our guide Asst. Prof. R.S.Mathu Bala, M.E., for constant encouragement and noble guidance. With great pleasure we extend our deep sense of appreciation to Dr.D.Sasikala, Head-Department of ECE for giving us an opportunity to get done our paper and to increase our knowledge. Lastly we wish each and every person involved in making our thesis successful.

REFERENCES

[1] Sohel Ahmed, Mohammed Abdullah Zubair, Irshad Basha Shaik, "Accelerometer based Wireless Air Mouse using Arduino Micro-controller Board", *Global Conference on Communication Technologies (GCCT 2015).*

[2] Volkhardt, M., Mueller, S., Schroeter, C., Gross, H.-M., "Playing hide and seek with a mobile companion robot" Humanoid Robots (Humanoids), *Eleventh IEEE-RAS International Conference*, 2011.

[3] Moore, S.I., Coskun, M.B., Alan, T., Neild, A., Moheimani, S.O.R., "Feedback-Controlled MEMS Force Sensor for Characterization of Microcantilevers", *Journal of Microelectromechanical Systems,* 2015.

[4] Lanata, A., Valenza, G., Nardelli, M., Gentili, C., Scilingo, E.P., "Complexity Index from a Personalized Wearable Monitoring System for Assessing Remission in Mental Health", *Biomedical and Health Informatics- IEEE Journal*, Volume 19, Issue 1, 2013.

[5] Xie, R., Sun, X., Xia, X., Cao, J., "Similarity Matching Based Extensible Hand Gesture Recognition", *Sensors Journal*, IEEE 2015.

[6] Barrett, S., "Arduino Microcontroller Processing for Everyone", *Synthesis Lectures on Digital Circuits and Systems*, 2013.

[7] Badamasi, Y.A., "The working principle of an Arduino" *Electronics, Computer and Computation (ICECCO), 11th International IEEE Conference*, 2014.

AUTHOR BIOGRAPHIES

Ms.R.S.Mathu Bala is working as an Assistant Professor in the department of Electronics and Communication Engineering at Vivekanandha College of Engineering for Women, Tiruchengode, Tamilnadu. She pursued her B.E Degree in Vivekanadha College of Engineering for Women. She pursued her M.E degree in Vivekanadha College of Engineering for Women, Tiruchengode.

R.Gokulapriya is pursuing her Bachelor of Engineering Degree in the stream of Electronics and Communication Engineering at Vivekanandha College of Engineering for Women, Tiruchengode, and Tamilnadu. Her area of interest is Embedded Systems.

E.Anisha is pursuing her Bachelor of Engineering Degree in the stream of Electronics and Communication Engineering at Vivekanandha College of Engineering for Women, Tiruchengode, Tamilnadu. Her area of interest is Embedded Systems.

R.Anupriya is pursuing her Bachelor of Engineering Degree in the stream of Electronics and Communication Engineering at Vivekanandha College of Engineering for Women, Tiruchengode, Tamilnadu. Her area of interest is Embedded Systems.

© 2017 AJAST All rights reserved.