

Design and Implementation of Air Mouse using Accelerometer Sensor

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Abstract: With the day to day advancements in technology, the interaction between the human and the digital world is diminishing. The main aim of this project is to work with accelerometer sensors and translate the motion or the tilt of the hand into various applications in virtual world. The advancement of technology in the field of wireless made it possible for any applications. Gesture based operation of electrical appliances is becoming increasingly desired technology. Here we are using accelerometer sensor in order to translate the hand motions or tilts into virtual world. The most commonly used hand motion control in a computer is that of a mouse. The mouse will be a hand mounted device. Appropriate gestures, such as hand swipes in which we will be wearing the accelerometer sensor and other interfacing devices as a virtual mouse, are a safer and faster way to control the device.

Keywords: Components: Accelerometer Sensor, Gestures, Zigbee transceiver, ARM-7 microcontroller, LCD Display, Power Supply.

1. INTRODUCTION

With the rapid development of technologies, intelligent and smart information products would be necessities of modern. Nowadays the wireless usage has become very popular by using the sensors. Gesture recognition technology identifies the human movements through mathematical representation. This technology has given the solution for the key topic that how to improve the interaction between machine and human. The touch screen technology is mature, but also the people would like to operate in a space freely. The use of accelerometer is to sense the motion of the hand particularly in any given direction; hence the mouse pointer will move. Different values have been fed into the accelerometer sensor with respect to their particular gestures or actions to be performed. Zigbee is used in order to transmit and receive the data sent by the accelerometer sensor and PC respectively. Here we use Zigbee as its transmission range is high compared to other transceivers.

2. SYSTEM ARCHITECTURE

In this proposed system architecture we use accelerometer as a sensor in order to detect the motion of the hand. The accelerometer sensor is interfaced with ARM-7 microcontroller. The wireless module we use here is the zigbee transceiver. The power supply is given to the microcontroller. The LCD Display is interfaced with the ARM-7 microcontroller. A-D converter is interfaced in between the accelerometer sensor and the ARM-7 microcontroller.

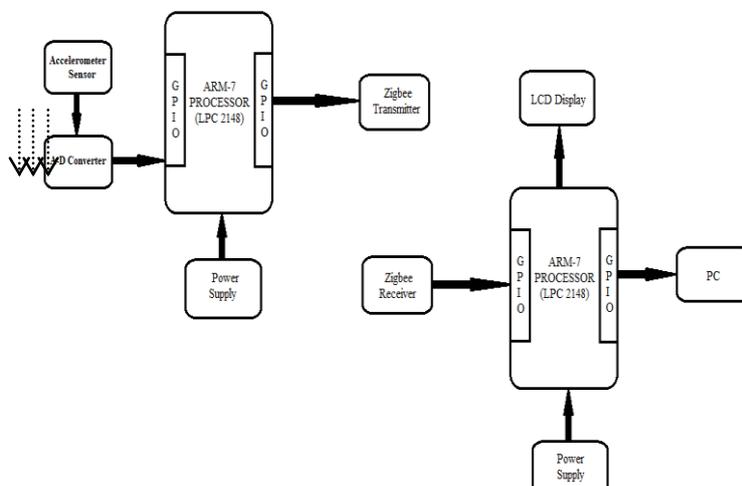


Fig.1. Block Diagram of Air Finger Mouse using Accelerometer Sensor

2.1 Accelerometer Sensor

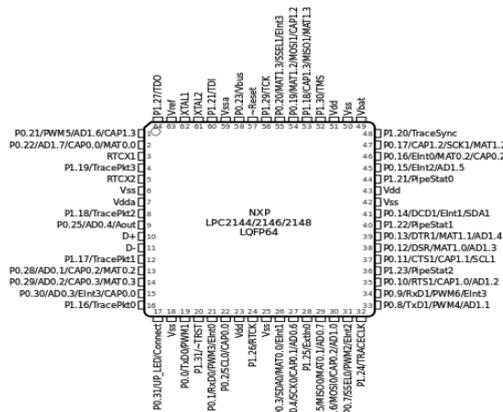
An accelerometer is a micro electromechanical sensor that helps in detecting tilt or orientation. It consists of 5 pins, in which the pins X Y and Z give the tilt along each of the axis. It can be used to sense the movement of the human particularly in given direction.

2.2 Power Supply

A power supply is an electronic device that supplies electric energy to an electrical load. The function of a power supply is to convert one form of electrical energy to another form of energy. Therefore, power supplies are sometimes referred to as electric power converters.

2.3 ARM-7 LPC2148 Microcontroller

ARM is an acronym of Advanced RISC (Reduced Instruction Set Computer) Machine. It is a 32-bit RISC processor architecture. This architecture was developed by the British company Arm Holdings. Arm is neither a processor nor controller, it is an architecture used in many processors and microcontrollers. LPC2148 from ARM-7 family is the widely used IC. It is manufactured by NXP Semiconductors (Philips). It is pre-loaded with many inbuilt peripherals to make it more efficient.



recognition etc. gestures can create a richer user experience. These gestures make the man and machine interaction very effectively.

5. MARKET POTENTIAL AND COMPETITIVE ADVANTAGE

Gesture recognition is achieving rapid market adoption as it evolves and matures. Adding support for various types of gestures to electronic devices enables using our natural “language” to operate these devices, which is much more intuitive and effortless when compared to screen touch, handling a mouse or remote control, tweaking a knob or pressing a switch.

CONCLUSION

In this paper, we have developed air mouse in order to make the humans work more easily by transmitting the X Y and Z values to the ARM-7 microcontroller. This approach is completely based on gestures or the hand tilts. We used accelerometer sensor in order to sense the motion of the tilt in particular direction performed by the user. Accordingly the mouse cursor is moved with respect to the tilt performed.

REFERENCES

- [1] Sohel Ahmed, Mohammed Abdullah Zubair, Irshad Basha Shaik, “Accelerometer based Wireless ir Mouse using Arduino Micro-controller Board”, Global Conference on Communication Technologies(gcgt 2015).
- [2] D. Ionescu, “Gesture control and the new and intelligent man-machine interface,” 2011 6th IEEE International Symposium on Applied Computational Intelligence and Informatics(SACI), 19-21 May,2011,pp.291.
- [3] Manav Kataria, Vinu Bhaskar, Abhishek Sharma, Mizan Abraha “ACCELEROMETER MOUSE” (2011, 04). Air Mouse. StudyMode.com. Retrieved 04, 2011Andres, Giovanni; Guayacundo; Marcela, Diana, "Evaluation of Accelerometers as Inertial Navigation System for Mobile Robots," Robotics Symposium, 2006. LARS '06. IEEE 3rd Latin American , vol., no., pp.84,90, 26-27 Oct. 2006
- [4] Lombardi, A.; Ferri, M.; Rescio, G.; Grassi, M.; Malcovati, P., "Wearable wireless accelerometer with embedded fall detection logic for multi-sensor ambient assisted living applications," Sensors, 2009 IEEE, vol., no., pp.1967,1970, 25-28 Oct. 2009
- [5] Sa-kwang Song; Jaewon Jang; Soojun Park, "A Phone for Human Activity Recognition Using Triaxial Acceleration Sensor," Consumer Electronics, 2008. ICCE 2008.