

Human Head Movement Based Voice Enabled Wireless Communication

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Abstract— Human Head movement based voice enabled wireless communication system is a translator system of human head gestures pointed to physically challenged peoples. This system helps them to do their purposes without any dependents. The user can wear this device to head and with simple head movements he/she can request the basic needs like water, food or medicine by using mems technology. User can also control the electrical devices like light and fan with the help of head movements. In transmitter section a microcontroller takes the readings from MEMS sensors (accelerometer) which is wear on head. Then the controller matches the values with pre-settled one via program and produces the corresponding command via ZigBee communication. In receiver section a ZigBee transceiver access the command and gives to the microcontroller interfaced with it. An auto record/playback chip with a speaker is connected with the Receiver microcontroller. We should record the essential voices in voice IC which are frequently used in daily life. According to the commands from the transmitter section corresponding voice played in receiver section automatically. (via program in the Receiver-microcontroller). An LCD provides a visual output. The device ON-OFF is also possible via the commands from transmitter side. This device is portable.. User can wear it to his head like a band and can operate it by tilting the MEMS sensor. Here we are using pic 16f877A microcontroller.

Key words: MEMS, Head movements, ZigBee, Patients, Device control

I. INTRODUCTION

Conducting survey prior to begin a research project is Very important in understanding a human head movement based system, as this will supply the researcher with much needed additional information on the methods and technologies available. This chapter provides a summary of literature reviews on key topics related to the topic head movement based voice enabled wireless communication system.

It is a translator system of human head gestures pointed to the physically challenged peoples. This system helps them to do their daily purposes without any dependents. The user can wear this device to head and with the simple head movements he/she can request the basic needs like water, food or medicine by using MEMS (Micro Electro Mechanical System) technology. User can also control the electrical devices like light, fan etc with the help of head movements. In transmitter section a microcontroller takes the readings from MEMS sensors (accelerometer) which is wear on head. Then the controller matches the values with pre-settled one via program and produces the corresponding command via ZigBee communication.

In receiver section a Zigbee transceiver access the command and gives to the microcontroller interfaced with it. An auto record/playback chip with a speaker is connected with the Receiver microcontroller. We should record the essential voices in voice IC which are frequently used in daily

life. According to the commands from the transmitter section corresponding voice played in receiver section automatically. (via program in the Receiver-microcontroller). An LCD provides a visual output too. The device ON-OFF also possible via the commands (gestures) from transmitter side. This device is portable and this system operation is entirely driven by wireless technology. User can wear it to his head like a band and can operate it by tilting the MEMS sensor.

II. SYSTEM CAPABILITIES

In our system ,we have designed a “Human Head Movement Based Voice Enabled Wireless Communication” device. Now the person who is physically challenged can wear this device to the head and with the simple head movements he can request the basic needs like water ,food or medicine. Using this, he can also control the electrical devices like light ,fanatic with the help of head movements.

The microcontroller that has been used for this project is from PIC series.PIC microcontroller is the first RISC based microcontroller fabricated in CMOS that uses separate bus for instruction and data allowing simultaneous access of program and data memory.

The main advantage of CMOS is that it has immunity to noise than other fabrication techniques. Technology that is used in PIC16F877A is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877A.

Micro electro mechanical system (mems) is the integration of mechanical elements ,sensors, actuators and electronics on a common silicon substrate. Through micro fabrication technology mems are also referred to as micro machines or Micro System Technology-MST. And also called as accelerometer. It is a highly sensitive sensor capable of detecting the tilt.

The ideal voltage for the PIC is 5V (direct current) it should not be higher than 5.6 because it will go blow up. It also should not be less than 2V because it will not operate. There are various types of supply such as battery and DC adapter. The problem is, if battery is used, it is hard to fine normal battery into 5V. So a 9V battery is used which can be step down to 5V.The voltage regulator used here is LM7805. Play back and record options are managed by an chip circuitry. The APR9600 samples the incoming signals and stores the instantaneous voltage samples in non-volatile flash memory cells. Total sound recording time can be varied from 32 seconds to 60 seconds by changing the value of a single resistor. Each memory cell can support voltage ranges from 0 to 256 levels. A relay is electrically operated switch . Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be ON or OFF. So relays have 2 switch positions and they are double throw switches. Relays allow one circuit to switch a second circuit in which can be completely separated from first. Relays are used where it is necessary to control a circuit by low power signal or where

several circuits must be controlled by one signal. ZigBee is based on an IEEE 802.15.4 standard. Its low power consumption limits transmission distances to 10–100 meters line of sight, depending on power output and environmental characteristics, ZigBee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. ZigBee is typically used in low data rate applications that require long battery life and secure networking (ZigBee networks are secured by 128 bit symmetric encryption keys.) ZigBee has a defined rate of 250 kbit/s, best suited for intermittent data transmissions from a sensor or input device. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi.

III. SYSTEM ARCHITECTURE

Mainly the system architecture is divided into two parts:

- 1) Transmitter section
- 2) Receiver section.

In transmitter section a microcontroller takes the readings from MEMS sensors (accelerometer) which is wear on head. Then the controller matches the values with pre-settled one via program and produces the corresponding command via ZigBee communication. In receiver section a ZigBee transceiver access the command and gives to the microcontroller interfaced with it. An auto record/playback chip with a speaker is connected with the Receiver microcontroller. We should record the essential voices in voice IC which are frequently used in daily life.

According to the commands from the transmitter section corresponding voice played in receiver section automatically. (via program in the Receiver-microcontroller). An LCD provides a visual output too. The device ON-OFF also possible via the commands (gestures) from transmitter side.

TRANSMITTER SECTION

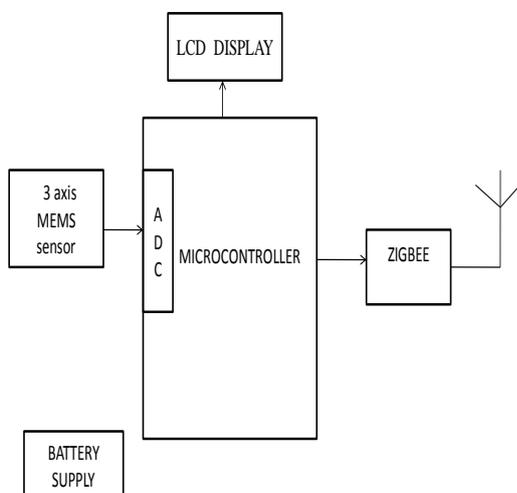


Fig. 1: Block Diagram of Transmitter

RECEIVER SECTION

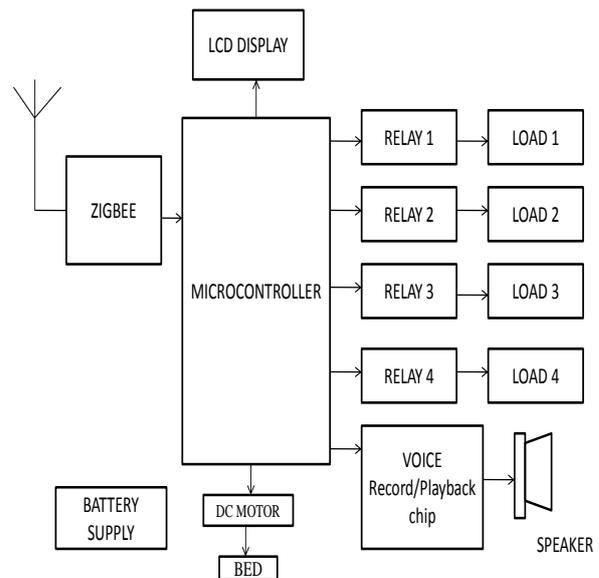


Fig. 2: Block Diagram of Receiver

IV. APPLICATIONS AND ADVANTAGES

- Simple design and operation.
- Very use full for disabled people to make their daily life independently.
- The wireless nature of this system helps the free-handling and more comfortable usage
- The deployment cost is reasonable.
- The system is automatic and user friendly
- Less man power is required
- User can also control the electrical devices like light and fan with

V. CONCLUSION

The head movement based voice enabled wireless communication a translator system of human head gestures pointed to the physically challenged peoples. The advantages of this system are the user can wear this device to head and with the simple head movements he/she can request the basic needs like water, food or medicine by using MEMS (Micro Electro Mechanical System) technology. User can also control the electrical devices like light, fan etc with the help of head movements. This device is portable and this system operation is entirely driven by wireless technology. User can wear it to his head like a band and can operate it by tilting the MEMS sensor. Important features are Simple design and operation. Very use full for disabled people to make their daily life independently. The wireless nature of this system helps the free-handling and more comfortable usage. In transmitter section a microcontroller takes the readings from MEMS sensors (accelerometer) which is wear on head. Then the controller matches the values with pre-settled one via program and produces the corresponding command via ZigBee communication. In receiver section a ZigBee transceiver access the command and gives to the microcontroller interfaced with it. An auto record/playback chip with a speaker is connected with the Receiver

microcontroller. We should record the essential voices in voice IC which are frequently used in daily life. An LCD provides a visual output too

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