Movement based and Voice enabled Device Switching for basic needs of Physically Challenged Persons

B. Ramana Reddy[1], J. V. Sharma[2]

[1]Department of Electronics and Communication Engineering
CVSR College of Engineering, Hyderabad, India
ramanaboilla410@gmail.com

[2]Professor and H.O.D
Department of Electronics and Communication Engineering
CVSR College of Engineering, Hyderabad, India
jvsharma@yahoo.com

Abstract: *The main aim of this project is to provide the basic needs for physically challenged persons like food, water and medicine and to control the electrical devices like Fan, bulb by using switch buttons and also for controlling wheel chair by using MEMS technology. MEMS are a micro electro mechanical sensor which is a highly sensitive sensor capable of detecting the tilt. This device is portable and this system operation is entirely driven by wireless technology. User can wear the MEMS to his finger and can operate it by tilting up, down, left and right side respectively. This system is also makes use of Microcontroller like LPC2148.This project also makes use of switches which are operated by physically challenged persons to control the electrical appliances like fan, bulb and some other devices Using AT89S52 Micro Controller and wireless technology like Zigbee. Here one zigbee is placed on Wheel chair and another Zigbee with AT89S52 microcontroller is connected to all electrical appliances. These switches can also be used to control APR 9600 for audio announcement which is programmed with the help of embedded c instructions.*

Keywords: Wheel chair, LPC2148, MEMS, Zigbee and software tool like keilμvision

1. Introduction

The aim of this project is to controlling a wheel chair and electrical devices by using MEMS ACCELEROMETER SENSOR (Micro Electro-Mechanical Systems) technology. MEMS ACCELEROMETER SENSOR is a Micro Electro Mechanical Sensor which is a highly sensitive sensor and capable of detecting the tilt. This sensor finds the tilt and makes use of the accelerometer to change the direction of the wheel chair depending on tilt. For example if the tilt is to the right side then the wheel chair moves in right direction or if the tilt is to the left side then the wheel chair moves in left direction. Wheel chair movement can be controlled in Forward, Reverse, and Left and Right direction along with obstacle detection using ultrasonic sensor. These had greater importance than any other technologies due its user-friendly nature. The obstacle detection mechanism is done by an ultrasonic sensor that makes uses of ultrasonic waves to find the presence of an obstacle in its path. It makes use of the ultrasonic sensors to detect the obstacle present in its expected trajectory and dynamically changes.

This microcontroller is capable of communicating with transmitter and receiver modules. The MEMS ACCELEROMETER SENSOR based sensor detects the tilt and provides the information to the microcontroller (on board computer) and the controller judges whether the instruction is right movement or left movement instruction and controls the direction respectively. The controller is interfaced with two dc motors to control the direction of the wheel chair.

2. Related Work

There are many system developed for the free movement of physically and Visually Impaired. There are wheel chairs for physically challenged. There is much advancement in the technology of wheelchairs. Today there are automatic wheel chairs but all are restricted to small distance. In the existing method to control the robot we require remote to control the movements. Handling remote for controlling the robot makes difficult to change the direction of by pressing particular buttons to move it away from the obstacle .In this existing system, the wheel chair is operated automatically or manually by turning the wheels chair using hand or external aids. But this system is not helpful for paralyzed persons. Wheelchairs are a way of reincarnating the purpose of life in the lives of disabled people. Effective and efficient ways of delivering a cost-effective and affordable wheelchair to the common masses, which is not only at par with the present day technology, but is much easier to use are presented herewith. Replacement of the popular joystick stick controlled wheel chair with a hand-glove control system for easier maneuvering by bending the fingers, is discussed in this paper. Intended users control the system by wearing an instrumented glove fitted with flex or bend sensors for controlling the movement and direction of the wheelchair.

3. Frame work

In this we develop an Intelligent Wheelchair (IW) system for the severely disabled people. The main function of our system is two-fold: 1) user intention recognition using vision technique and 2) sensor-based obstacle detection

and path finding. The proposed system enable a user to control IW using his mouth shape and face movement. Furthermore, to fully guarantee user's safety, the 10 range sensors are used to detect obstacles in environment and avoid them. To assess the effectiveness of the proposed IW, it was tested with users and then the results show that it can provide a user unable to drive a standard joystick with friendly and convenient system.

4. Proposed method

The proposed method designs a wireless controlling Wheel chair with MEMS which is used to pick the things and to place things at required position and this is not controlled through any remote just by using hand movements. Here this finger movement is controlled by right hand to which different sensors connected to controller for recognizing the hand movement and to left hand same sensors are connected but this is used to control the movement of hand connected to robot which is used to pick the things. The system uses a compact circuitry built around arm 7 microcontroller Programs are developed in Embedded C. Flash magic is used for loading programs into Microcontroller.

In this proposed system the system presents the construction and design of voice based wheel chair .the voice of the person is detected by voice capture module which will compared by voice recognition module with pre defined voices loaded in to the system. According to the received voice, the destination is automatically understood and the wheel chair moves according to route which is predefined. This system is to provide the basic needs for physically challenged persons like food, water and medicine and to control the electrical devices like Fan, bulb by using switch buttons and also for controlling wheel chair by using MEMS technology. MEMS are a micro electro mechanical sensor which is a highly sensitive sensor capable of detecting the tilt. This device is portable and this system operation is entirely driven by wireless technology. User can wear the MEMS to his finger and can operate it by tilting up, down, left and right side respectively. This system is also makes use of Microcontroller like LPC2148.The following block diagram will explain everything as follows.
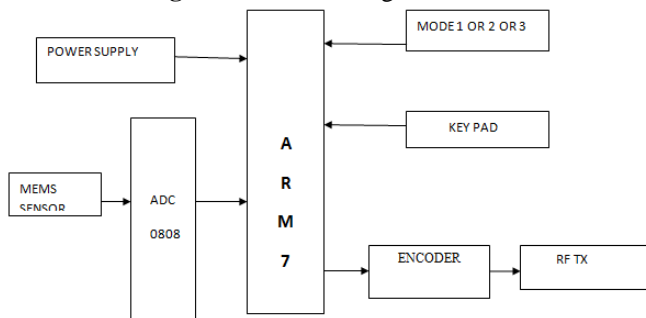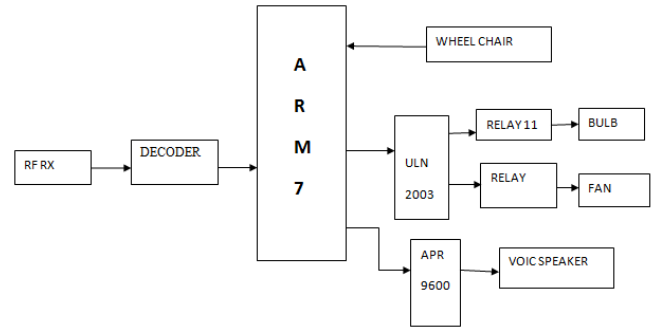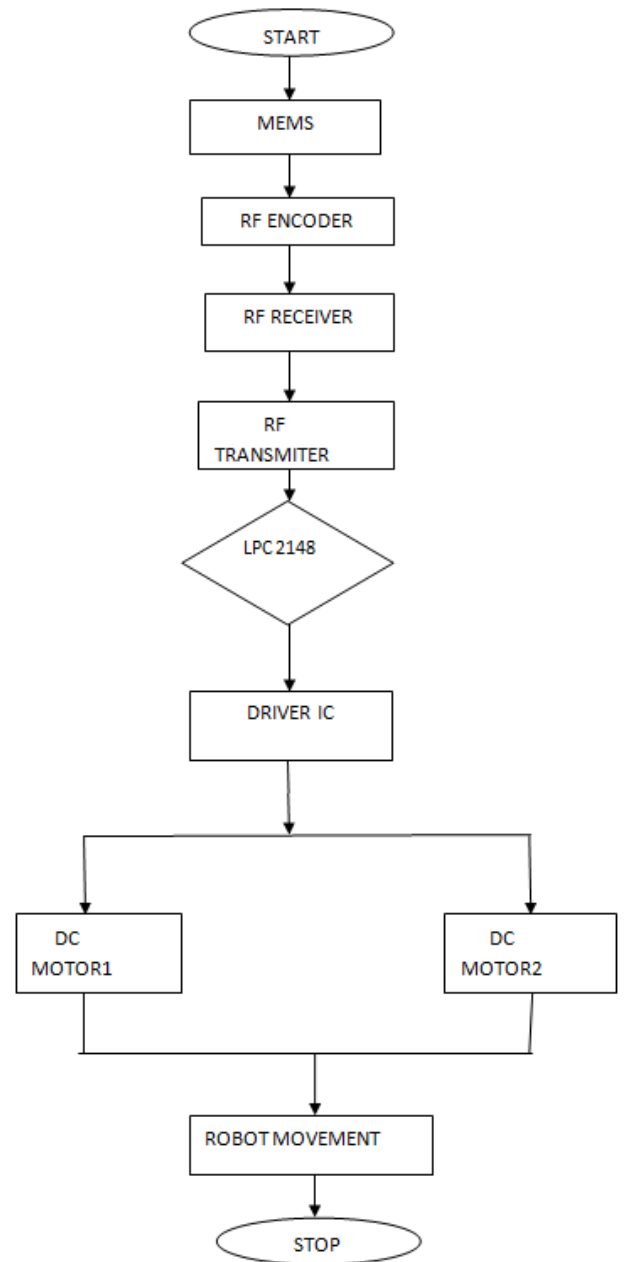
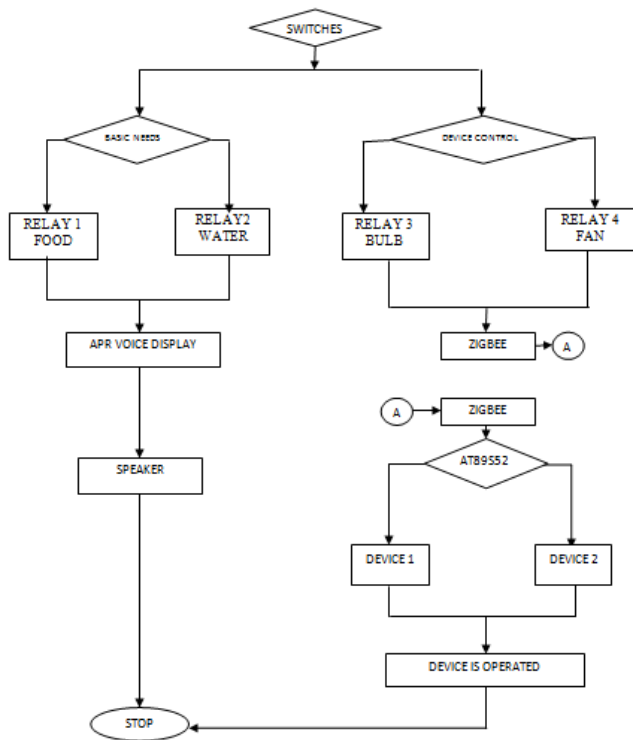**Figure 1:** Transmitting Section

Figure 2: Receiving Section

5. Flow chart

Figure 3: Wheelchair Movement

Figure 4: Devices and basic Needs

6. Conclusion

In this paper, we proposed a wheel chair movement by using MEMS sensors for physically challenged persons and electrical devices is controlled by using different types of switches and the basic needs of food ,water and some other basic needs are designed by the apr voice circuit with the help of voice ic. This microcontroller is capable of communicating with transmitter and receiver modules. . Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

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Author profile

B. Ramana Reddy received his   B. Tech   degree   in Electronics and communication engineering from Holy Mary institute of technology and science in 2010. M. Tech in Embedded systems from CVSR College of engineering.

J. V. Sharma received his B.E degree in Electronics and communication engineering from Andhra University . M- tech in Electronics and communication engineering from JNTUH university . He is pursuing PhD on Global Navigational satellite systems at Osmania University.