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AN ARTIFICIAL SPEECH SYSTEM FOR DUMB AND BLIND PEOPLE

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Abstract— In our country around 2.78% of people are not able to speak (dumb).The communication with others are made only by using the motion of their hands and expressions. Some people can easily understand the information from their motions, but the remaining cannot understand it. In order to overcome the complexity, the artificial speech system is introduced. An artificial speech system will be very helpful for them to convey their thoughts to others. The system is based on motion sensor. According to dumb people, for every motion there is a separate meaning, whose message templates will be taken and kept in the database. In real time, the template database is fed into the microcontroller and the motion sensors are fixed on their hand. For every action the motion sensors get accelerated and passes the signal to the microcontroller. The microcontroller matches the motion sensor signal with the database and produces the speech output in the speaker. By properly updating the database the dumb will speak like a normal person using the artificial mouth.

Key Words- Gesture recognition, accelerometer sensor, flex sensor, ultrasonic sensor.

I. INTRODUCTION

Sign language is the language used by deaf and dumb people and it is a communication skill that uses gestures by hand movements instead of sound to convey, shapes, orientations and movement of the hands, arms or facial and body expressions to express continuously thoughts a speaker's.Signs are used to communicate words and sentences to audience. A gesture sign language at particular movement of hands with a specific shape made out of them.

A sign language usually provides sign for entire words. Thus for all letters It provide sign to perform words that don't have corresponding sign in that sign language. In this project Flex Sensor and accelerometer sensor plays the major role, Flex sensors are sensors that depends on the amount of bends when it varies in resistance. In this project data glove is implemented to capture the hand gestures of a user.

II.SYSTEM ANALYSIS

In human communication, the use of speech and gestures is completely coordinated. Machine gesture and sign language recognition is about recognition of gestures and sign language using gloves.A number of hardware techniques are used for gathering information about body positioning; typically either image-based (using cameras, moving lights etc.) although hybrids are beginning to come about. However, getting the data is only the first step.The second step, that of recognizing the sign or gesture once it has been captured is much more challenging, especially in a continuous stream. But the continuous stream was unpredictable using the PC with mat lab or other peripherals. The results will show that despite the noise and accuracy constraints of the equipment, the reasonable accuracy rates have been achieved.

III.PROJECT DESCRIPTION

The data gloves are fitted with accelerometer sensor on the center and flex sensors along length on each thumb and the finger. The flex sensors output a stream of data that varies with degree of bend. The output of the sensor is in the form of analog and it is fed to the microcontroller. It converts analog to digital signal and processes the signals. The resulting digital signal is encoded and transmitted through RF system.

RF receivers will fed to the gesture recognition section through the decoder when it receives the signal.The gesture is recognized and corresponding text information was identified. In this section ext to speech conversion takes place in the voice section and play out through the speaker. It also includes a obstacle detection avoidance for the blind people. This is based on the ultrasound sensors that acquire a range data from the objects in environment by estimating the time- of-flight of the ultrasound signal.While the obstacle is present,speech alert is generated by using ultrasonic sensor.For every action the motion sensor gets accelerated and give the signal to the microcontroller and the speech output in the speaker.

VI.BLOCK DIAGRAM

The data has been analyzed from the instrumented data glove for use in recognizing of some gestures and signs . A system was developed to recognize the signs and the conversion into the speech. The system considers only single handed gestures; therefore the subset of an ISL have been selected for an implementation of BoltayHaath. The basic concept involve the use of an computer has

interfaced with data gloves has been worn by a disabled person who makes a signs.The computer analyzing these gestures and minimize the variation and synthesize a sound with the corresponding letter or word for normal people to understand. The system aims at bridging communication gaps between the deaf community and the normal people. When the fully operational system will help in minimizing communication gaps, easier collaboration and will also enable sharing of ideas and experiences.

It has also includes obstacle detection for visually impaired people,while the object was present the ultrasonic detects and fed to the microcontroller , speech output has been generated.

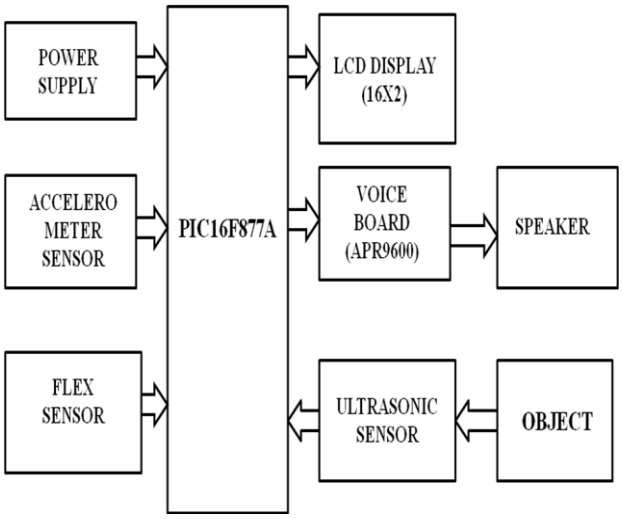

Fig:1 Block diagram of proposed system

A.ACCELEROMETER SENSOR

Accelerometer at the Gesture Vocalized system was employed as the tilt sensing element, which checks the tilting of the hand.ADXL335 measuring system .The tip product of the measuring system is provided to 3rd module, which incorporates pipeline structure of 3 ADC.

B.FLEX SENSOR

Flex Sensor is a sensor that changes its resistance depending on the amount of bend on the sensor. That converts the change in bend into electrical resistance value. Sensor on a thin flexible substrate in bent,produces the resistance output correlated on bend radius

C.ULTRASONIC SENSOR

Ultrasonic sensors (also a transceivers at both sending and receiving, but most generally called as transducers) works on the principle similar to the radar or sonar which can evaluate attributes of a target by interpreting the echoes from radio or sound waves .Ultrasonic sensor used to generate the high frequency sound waves and evaluate the echo which was been received back by a sensor.Sensors can calculate the time interval between sends the signal and receives the echo to evaluate the distance of an object. Thus the technology used to measure the wind speed and direction (anemometer),speed on air or water or channel level, and tank. To measure the direction or speed a device uses multiple detection and calculation on the speed from a relative distances to particulates in the air or water.To measure the channel level of tank and the sensor used to measure the distance of surface, on the fluid. Includes the Further applications: sonar, humidifiers, on-destructive testing, burglar alarms and medical ultrasonography.

Systems are typically use the transducer for to generates sound waves in the ultrasonic range, at above 18,000 hertz, by turning the electrical energy into the sound, then receiving the echo turn the sound waves into electrical energy which can be measured was displayed. Thus the technology limited by shapes of the surfaces and the density or consistency of an material. Foam, on particular, was distort surface level readings.

V.RESULTS AND DISCUSSION

The result and discussion of the project "An Artificial Speech System for Dumb and Blind People "is given below:

A.SIMULATION OUTPUT AT RANGING THE DIRECTION OF ACCELEROMETER IN 3 AXIS

Sensors are attached to the gloves of the person,when the movement occurs, the accelerometer sensor detectthe x,y,z axis and displays the range of values x=399,y=399,z=399 respectively.

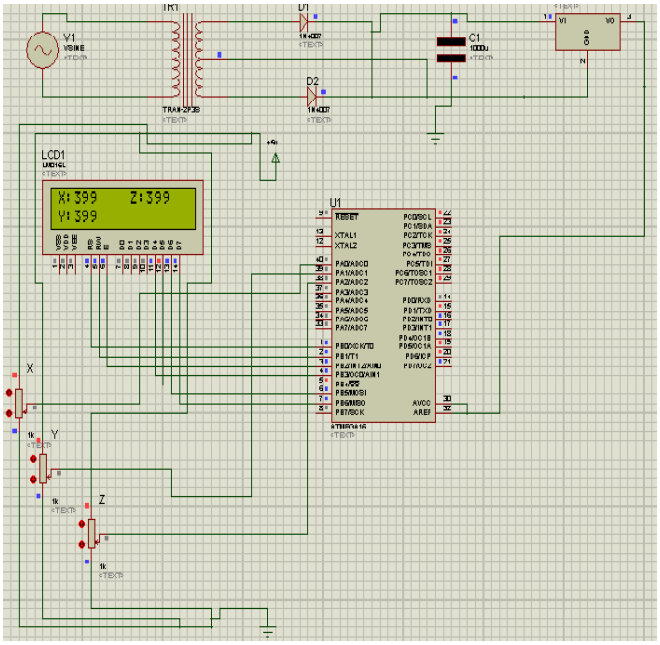

Fig:2 Accelerometer Output(x,y,z axis)

B.GESTURE OUTPUT CONVERTED INTO TEXT FORMAT

The input from the sensor at the x,y,z axis at 399 is given to the microcontroller, it matches with pre-defined axis values and displays the corresponding output "Hello Sir…",in LCD.

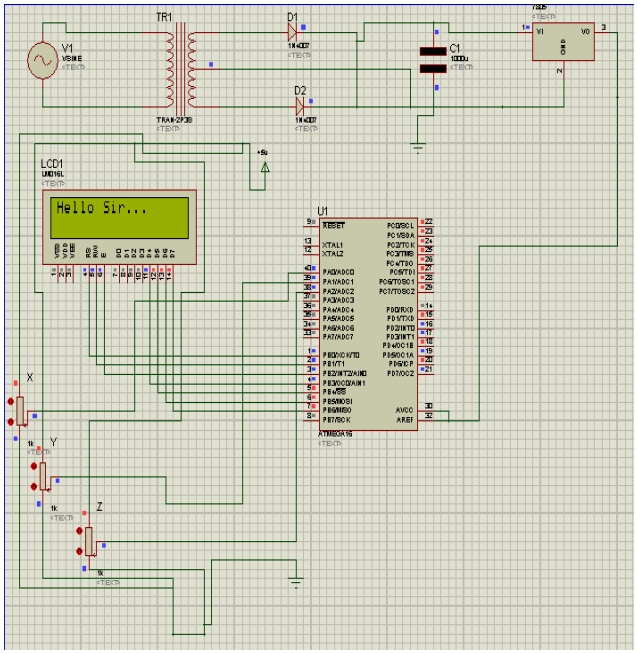

Figure 3 Gesture Output in LCD Display

V. CONCLUSION

This paper describes the design and working of a system which is useful for dumb and blind people to communicate with one another and with the normal people. The dumb people use their standard sign language which is not easily understandable by common people and blind people cannot see their gestures. This system converts the sign language into voice which is easily understandable by blind and normal people. The sign language is translated into some text form, to facilitate the deaf people as well. This text is display on LCD.

REFERENCES

[1] Sangeetha and Barathi Krishna,Mar(2014), "Gesture detection for deaf and dumb people", International Journal of Development Research,Vol.4,N0.3,pp. 944–980.

[2] M.Sornalatha and Shreyashi Narayan Sawant,May(2014), "Hand gesture recognition and voice conversion system for dumb people",Vol 5,No 2,pp.4487–4494.

[3] JoyeetaSingha, Karen Das,(2013)"Indian Sign Language Recognition Using Eigen Value Weighted Euclidean Distance Based Classification Technique",(IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 4, No. 2, pp. 188-195.

[4] Tavari and Deorankar, Dec (2013) ,"A Review of Literature on Hand Gesture Recognition for Indian Sign Language",Vol.1,No.10,pp. 1693–1701.

[5] Mark, H., Rebecca, P., Peterv,(2013). "A voice-input voice-output commu-nication aid for people with severe speech impairment", IEEE *Transactions on neural systems and rehabilitation engineering*, Vol. 21, No.1,pp. 1534-4320.

[6] Adithya and Usha Gopala krishnan, (2013),"Artificial Neural Network Based Method for Indian Sign Language Recognition" , IEEE Conference on Information and Communication Technologies (ICT),Vol.4,No.2, pp. 1080-1085.

[7] Amarjot, S., Devinder, K., Phani, S., Srikrishna, K., and Niraj,(2012),"An intelligent multi-gesture spotting robot to assist persons with disabilities", *International journal of computer theory and engineering*, Vol.4, No. 6, pp.1290-1420.

[8] EbrahimAhdal&Nooritawati,Dec(2012),"Review in Sign Language Recognition Systems'' Symposium on Computer & Informatics(ISCI),IEEE, Vol.11,No 5,pp:52-5.

[9] Noor Adnan and RafiqulKhan,July(2012),"Survey on Various Gesture Recognition Technologies and Techniques" International Journal of ComputerApplications, Vol.50,No.7,pp. 685–693.

[10] Archana,Ghotkar,RuchaKhatal,SanjanaKhupase, Jan(2012), "Hand Gesture Recognition for Indian Sign Language'' International Conference on Computer Communication and Informatics (ICCCI),IEEE ,Vol.7,No.5 pp:1-4.

[11] Divya Deora1, NikeshBajaj,Jan(2012), "Indian Sign Language Recognition" 1st International Conference on Emerging Technology Trends in Electronics, Communication and Networking,,IEEE,Vol.4,No.8, pp:1-5.

[12]DeepikaTewari, Sanjay Kumar Srivastava,Dec(2012),"A Visual Recognition of Static Hand Gestures in Indian Sign Language based on Kohonen Self-Organizing Map Algorithm", International Journal of Engineering and Advanced Technology (IJEAT), Vol.2, No.7,pp. 165-170. [13] Noor Adnan Ibraheem, RafiqulZaman Khan, (July2012), "Survey on Various Gesture Recognition Technologies and Techniques", International Journal of ComputerApplications, Vol. 50, No.7, pp. 38-44.

[14]Bhavina Patel, Vandana Shah andRavindra Kshirsagar, Dec(2011), "Microcontroller based gesture recognition system for the handicap people", Journal of Engineering Research and Studies, Vol.2,No.9,pp. 186–193.

[15] Istvan,Zoran and Nikola,Dec(2011),"Hands-free voice communica-tion with TV", IEEE *Transactions on consumer electronics*, Vol. 17, No. 2, pp. 1378-1695.

[16] Rajam, P. Subha and Dr G Balakrishnan, Dec(2011)"Real Time Indian Sign Language Recognition System to aid Deaf and Dumb people", 13th International Conference on Communication Technology(ICCT), Vol.1,No.4, pp 737-742.

[17] Dipak Kumar Ghosh ,Samit,May(2011),"A Static Hand Gesture Recognition Algorithm Using K-Mean Based Radial Basis Function Neural Network", IEEE,Vol.4,No.7,pp.1–7.

[18] Nasser H. Dardas and Petriu,Dec(2011), " Hand Gesture Detection and Recognition Using Principal Component Analysis" international conference on computational intelligence for measurement system and application (CIMSA), IEEE,Vol.3,No.9,pp:1-6.

[19]KekreandVaishali,K,May(2010),"Speaker identification by using vector quantization,"IEEE Transactions on mechatronics, Vol. 15, No. 1,pp. 4285–4292.
[20] Donglin, W., Ajeesh, P., Hye, K., and Hosub,(Jan2010),"A Deconvolutive neural network for speech classification with applications to home service robot," IEEE *Transactions on instrumentation and measurement*, Vol. 59, No. 12, pp. 2334-4620.
[21] Zhengmao, Z., Prashan, R., Monaragala, N., Malin,,June(2010),"Dynamic hand gesture recognition system using moment invariants", IEEE *Transactions on neural networking and computing*, Vol. 21, No. 1, pp. 1034-1320.
[22] Pravin R Futane , Rajiv v Dharaskar, May(2011),'' Hasta Mudra an interpretatoin of Indian sign hand gestures'', international conference on digital object identifier,IEEE, Vol.2,No.5, pp:377-380.

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