

Talking Fingers For Speech Impaired People

Shakthipriya K, Senthil Kumaran R

Abstract: As per the demographic of the total population, there are 2.68 million people are differently disabled, among that 2 million people are suffering from speech disability. Communication play a vital role in human life. Mute people are used to communicate with others through the sign language but normal people cannot recognize gesture language. Sign language is known as gesture language. There is a communication gap between normal -mute people and mute-blind people. To overcome this, following project develop a device which capture hand gesture of speech impaired people and covert them to voice output by introducing a new methodology of Open CV and image processing

Index Terms: Microcontroller (AT89S52), Open CV, Voice Board, Talking Fingers, Hearing ability, Speech ability.

1 INTRODUCTION

Computer vision is an interdisciplinary field, how the computer can made to gain high level of understanding from the digital image. Open cv is a software tool or library is used for the computer vision, and it support java, C++ , python and it is use for face recognition for auto tagging in social platforms. Normally dumb people are facing a difficult task while communicating with normal people, because mute people are using their sign language for the communication, but normal peoples cannot know that gestures sign. So there is a communication barrier between them, to tackle the problem, this project is developing a device for mute people for conversion of hand signal to audio output .By capturing the video of gesture signal of impaired people through the web camera (open CV) ,then the inclined value of the gesture is detected. The detected inclined value is compared with value which have been preprogramed in controller i.e. template inclined value is already programmed in database. If both the inclined values are same, it displays the output in LCD and also generate the voice output

B.D.jadhav, et,al., designed a system using flex sensor and accelerometer for gesture capturing which result in voice output in regional language (Marathi)[5]. Wang Jingqiu, et.al., developed ARM based sign recognition using glove base system achieving high power function with 91 percentage of accuracy along with identifying the Chinese character[6]. Ahwathy M,et.al., have contrive The Dumb aid phone device which convert gesture to speech where GSM module is also interface with it [7]. Shubangi G. Shinde,et ,al., have done a work in Hand posture recognition using K-NN classifier along with (GLSM) for feature Extraction. Also, designed real time communication system using voice processing and digital image processing and digital image processing algorithm. Simulation is done with the help of MATLAB Software [8]. S.K. Imam Basha, et, al, have developed the system which convert the sign Language to the voice by using image processing system [9]. Ashvini, et.al. ,contrive the project for the aids for the communication of the people with speech disability using flex sensor for motion detection [10]. Sunitha K.A,et,,al., have developed the wearable communication device such as glove. Other hand held device is used for a Deaf and mute people communication with keypad along with LCD screen [11]. Anbarasi Rajamohan, et, al., have implemented the glove based deaf-mute communication interpreter system. This system include TTS block which translate the matched gesture [12]. Rupesh Prajapati, et,al., have contrive the Hand gesture recognition and voice conversion for deaf and Dumb. This system is developed for specially challenged people [13].

2 LITERATURE SURVEY

The motion based system using PIC controller include a text to speech block which interprets the matched gesture and have concluded that the projected arrangement is compact and also possible to carry at any place. P.Vamsi Praveen, et.al., have contrive the glove based communication interpreters system using ARM-LPC2148 and conclude that, this project is helpful in creating of communication responsibility cherish language between Deaf and Dumb people [1]. Prashant chaudri, et.al., designed a Hand recognition system and concluded that data glove system will be helpful in monitoring for rehabilitation purposes[2]. Komal Vede, et.al., devise the Embedded system for communicating device for Deaf and Dumb using Arduino Uno Board and concluded that this system convert the Indian sign language to speech[3]. Ram kumar, et,al., proposed a project for checking feasibility for sign recognition through prototype using glove shape[4].

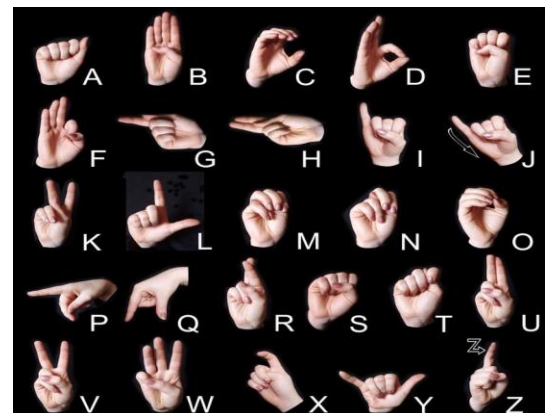


Fig.1. English alphabet signs in Indian Standard Language

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Sign language is a gesture language which is used by the dumb people to convey their message they are 135 different sign language in the world including American Sign Language (ASL), British Sign Language (BSL), Australian Sign Language (Auslan). (ISL) Indian Standard Language include nearly 3000 signs.

3 IMPLEMENTATION

In this project the technology Open CV (installed in Pc) is used to recognize the gesture signal of the user, where the web camera is used to capture the hand signal, later that open cv (python language which is programmed for recognizing, then they can be used compiled by Keil compiler and convert them to hexadecimal input) input signal is fed to the controller, where controller compare the both signal, if both signal is get matched, the voice output is generator.

3.1 Power Supply

Normally an electronic are operated in DC approximately from the range (0-24V), here step down transformer is used to down the power from 230V (AC) to 12V (AC), Next the bridge rectifier is used to convert 12V (AC) to 12V (DC) is supplied to the circuit, LCD operate only 5v supply so we used the LM7805 voltage regulator regulate the voltage and supplied to LCD.

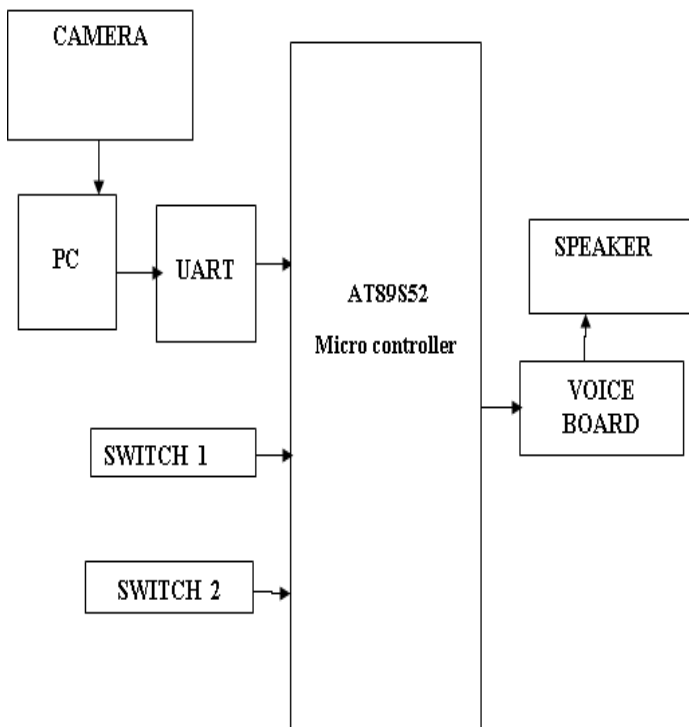


Fig .2 Block diagram for gesture recognition

3.2 OpenCV

Open CV is a software or a tool on which python tool is also to be invoked in it. They have been pre-programmed in python language for recognition of image, the main function is to capture the targeted image and it inclined value and then it blurred the unwanted background image rather than a hand gesture image. Inclined value is detected and then it sends to

the controller by using Keil compiler, because the microcontroller (AT89S52) does not support the high-level language, the Keil compiler with compile the input from open CV by converting them into hexadecimal value and send it to controller by using UART.

3.3 UART

Universal Asynchronous Receiver/Transmitter. It is a hardware used for the serial communication. It is a physical circuit for IC and Microcontroller, the main function of UART is to Transmit and receive the serial data without any losses. For a lossless transmission MAX232 IC based on TTL logic is used which convert the RX or TX signal from voltage to binary value and send them to controller.

3.4 AT89S52 Microcontroller

It is high performance low power 8bit CMOS Microcontroller with 8K bytes of in system programmable Flash Memory, 256 byte of RAM. It consists of 40 pins, 32 I/O pins, 6 interrupts, one pin for power supply (VCC) and one pin for grounding.

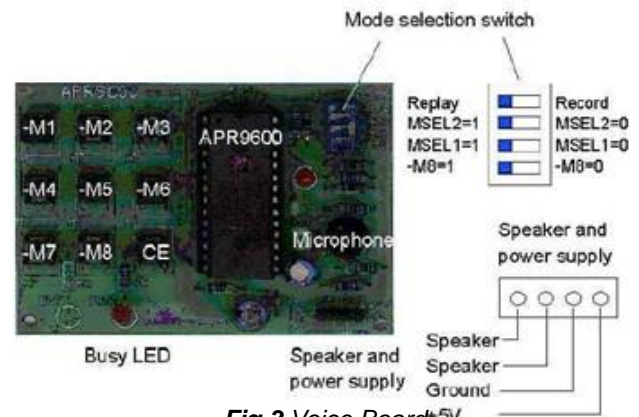


Fig.3 Voice Board+5V

Voice Board is an experimental APR9600 BOARD having a single chip and high quality of voice recording, it is not volatile flash memory technology, use for recording the voice or over recording the voice for generating a desired output.

3.5 LCD

Liquid crystal display is an electronic display which is used to display the output 16X2 LCD display is basic display used for general purposes, it denotes 16 character on sing row and there is 2 such row. The command registers which store the data given to LCD. The data register which display the stored data. The data is an ASCII value of character are displayed in screen.

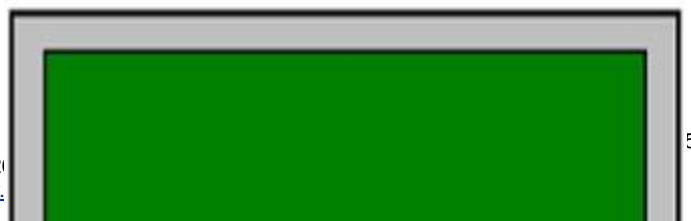
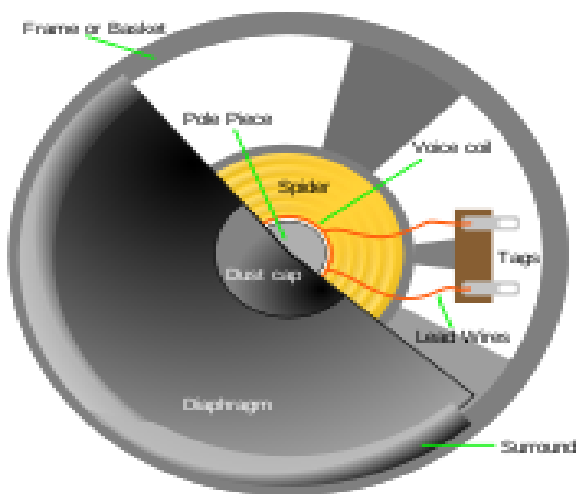


Fig.4 Liquid Crystal Display

3.6 SPEAKER

The Loud speaker which act as a transducer, the main function is to covert the electrical signal to the voice signal.

**Fig.5** Speaker

3.7 Switches

Switches is nothing it is a 1X5 keyboard which perform two operation 0 and 1 for voice selecting the languages of English and Tamil.

4 RESULT

The gesture signal of the impaired people is captured, and the text output is displayed in LCD, voice output is also generated.

5 CONCLUSION

The proposed system which convert the gesture sign to voice signal using new methodology Open CV and Microcontroller (AT89S52). This system is very helpful for the mute people to overcome from the communication gap this system is portable, more efficient, and accuracy level is very high when we compare to the glove system. Unlike other technology it is used in real time application.

REFERENCES

[1] P.Vamsi Praveen, K.Satya Prasad in their paper, "Electronic

Voice to Deaf and Dumb people Using Flex Sensor", International Journal of Innovative Research in Computer and Communication Engineering, Volume 4 ,Issue 8, August 2016.

- [2] Prashant chaudri, G.R Phulay, Ravindra Patil, "A Review on Hand Gesture Recognition System", International Journal of Advanced Research in Computer and Communication Engineering ,Volume 2, Issue 3, January 2013.
- [3] Komal vede,Priyanka vanjare,pradnya gaikwad, "sign to speech converter gloves for deaf and dump people", International Journal Of Innovative Research In Computer And Communication Engineering, volume 6, Issue 4, April 2018.
- [4] P A S Ramkumar, NSN Lakshmipathi raju,T Saran Kumar, V Vekateswarulu, "Hand Gesture Using Sign Language Transcription System" International Journal of Engineering Science And Computing, Volume 6, Issue 10, Oct 2016.
- [5] B.D Jadhav ,Nipun Munot, Madhura Hambarde, Jueli Ashtikar,"Hand gesture recognition to speech conversion in Regional Language, volume 4, Issue 1, Feb 2015.
- [6] Wang Jingqiu, Jhang Ting , " ARM Based Gesture Recognition System using data glove", 26th Chinese control and Decision Conference,2016.
- [7] Ashwathy M, Heera Narayanan, Surya Rajan, Uthara P M, Jeena Jacob, "Hand Gesture Recognition and Speech conversion for Deaf and Dumb using Feature Extraction" International Journal of advanced Research in Electrical, Electronics and instrumentation Engineering, Volume 6, Issue 3, March 2013.
- [8] Shubhangi G Shinde, Rajashri R Itkarkar, Anil kumar,"Gesture to speech conversion For Sign Language Recognition", International Journal of Innovation and advancement in Computer science, Volume 6, Issue 9 , Sep 2017.
- [9] S.K.Imam Basha, S.Ramasubba Reddy," Speaking System To Mute People Using Hand Gestures", International Research Journal of Engineering and Technology, Volume 05, Issue:09, Sep 2018.
- [10] Ashwini V Rewatkar, Abid G M Sheikh, Mohini S Rakshak, Neha D.Ranyat,"Implementation of Gesture To Voice Conversion For Hearing and Speech Disability, March 2016.
- [11] Sunitha K A, Anitha Saraswathi P, Aarthi M, Jayapriya K ,Lingam Sunny , "Deaf Mute Communication Interpreter" International Journal of applied Engineering Research-A Review, Volume 11,pp 290-296,2016.
- [12] Anbarasi Rajamohan, Hemavathy R, Dhanalakshmi M. "Deaf-Mute Communication Interpreter", International Journal of Scientific Engineering and Technology",Volume 2, pp:336-341, May 2013.
- [13] Rupesh Prajapati, Vedant Pandey, Nupur Jamindar, Neeraj Yadav, Neelam Phadnis." Hand Gesture Recognition and Voice Conversion for Deaf and Dumb People" International Research journal of Engineering and Technology, April 2018.