COMPUTERISED DEAF, DUMB AND BLIND

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INTRODUCTION:

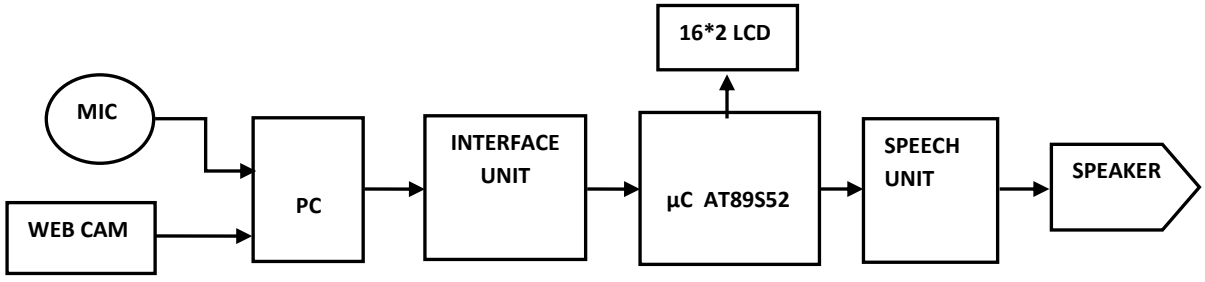
About nine billion people in the world are deaf and dumb. Communications between deaf-mute and a blind person have always been a challenging task. The blind people can talk freely by means of normal language whereas the deaf-dumb have their own manual-visual language. The only means of communication available to the vocally liable is the use of "Sign Language**".** Sign language is the main technique for deaf, dumb communication. This language cannot be recognized by most of the normal people and blind people. They face difficulties in their way of communication. This problem motivated us to implement blind, deaf, dumb computerized communicator. The long-term goal is to enable communication between visually impaired (i.e., blind), people on the one hand and hearing and speech impaired (i.e. deaf and dumb), people on the other. Since the former cannot see and the latter use sign language, there is currently no means of communication between such people who are unfortunately in significantly large numbers in a country such as India. The main aim of the project is to design and develop a user friendly technology to communicate between the deaf as well as dumb person and a blind person

In this project image processing is used to recognize gesture, comparing that with stored database, recognizing correct expression using MATLAB and displaying output in the form of voice through voice processor. And on other side speech of blind person is transmitted to pc through mike. Speech signal is processed through MATLAB present in the pc and displaying as text through LCD by interfacing with micro controller.

OBJECTIVE:

The main aim of this project is to create friendly user technology to communicate the physically liable people like dumb, deaf and blind. This project uses the image and speech processing and microcontroller to make real time communication between disabled people. This project uses the image processing to convert dumb actions into speech and similarly, speech processing to convert voice into images using MATLAB.

METHODOLOGY



Micro controller AT89S52 is used, as it has 8KB of memory which is sufficient to store the data. Power supply of 230V AC is converted to 19V AC ,50 Hz by Transformer.Output of this is given to bridge rectifier to convert AC to pulsating DC, then it is passed through capacitor to get pure form of DC. This DC supply is given to 7805 regulator to get 5V DC which is given to the micro controller. In order to connect micro controller with PC, USB to UART converter is used. For the display of text corresponding to the speech id 16x2 LCD is used which is connected to port 1 of micro controller. Whenever the speech id generates, micro contrller triggers corresponding port to dislay the text on LCD. Port P0.0 to P0.3 pins are connected to the voice processor APR33A3 which is having record and playback system in it. Whenever gesture id generated corresponding port is triggered so that any one of the pin of voice processor is activated and corresponding voice gets played through speaker.

1. A person's hand gestures and voices are initially stored as database in MATLAB.
2. Each stored data has particular id number.
3. For stored voices corresponding texts are stored in microcontroller and for stored hand gestures corresponding voices are stored in voice processing unit.
4. Each stored texts and voices have id numbers with respect to the id stored in the MATLAB.
5. Test voice is given as input to the mike, which is processed in MATLAB using MFCC and vector quantization as feature extraction algorithms and comparison is made using Euclidean distance algorithm.
6. After comparing with the stored voices, if it matches then the corresponding id is passed to the microcontroller.
7. After processing in microcontroller appropriate text is displayed on the LCD.
8. The gesture of a person is captured through web cam.
9. Captured image is processed in MATLAB using SIFT as feature extraction algorithm and comparison is made using Euclidean distance algorithm.
10. After comparing with the stored gestures, if the image is matched then corresponding id is sent to the microcontroller.
11. Microcontroller triggers speech processing unit and the appropriate voice is heard through speaker.

RESULTS AND CONCLUSION:

Training phase:

Voice database

1. Hello
2. Good
3. You
4. Bye

Image database

5. Gesture 1(Hi)

6. Gesture 2(How are you?)

7. Gesture 3(Fine)

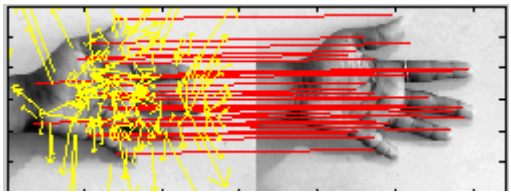
8. Gesture 4(Bye)

In training phase 8 databases are stored. First 4 are voice databases they are given as ID1, ID2, ID3, ID4 and next four as image databases they are given as ID5, ID6, ID7, and ID8.

Testing Phase

Deaf and Dumb person:

Gesture 1 is given as input. It gets matched with the stored image database



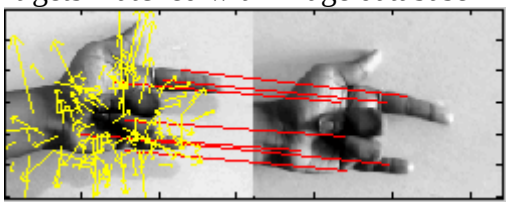
Voice is heard through loud speaker as "**HI**"

Blind person:

Blind will reply as "**HELLO**". It will be displayed on LCD as "**HELLO**"

Deaf and Dumb person:

Gesture 2 is given as input. It gets matched with image database

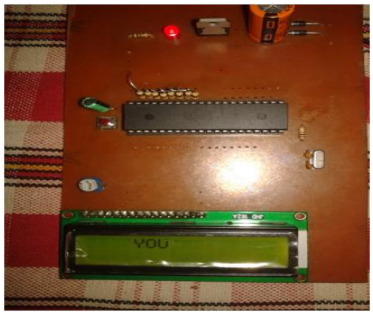


Voice is heard through loud speaker as "**HOW ARE YOU?**"

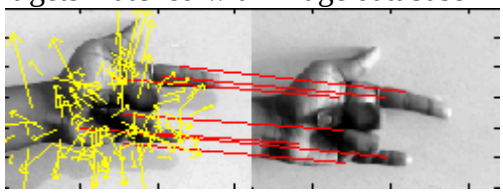
Blind person:

Blind will reply as "**GOOD**". It will be displayed on LCD as "**GOOD**"

Blind Person will again ask as "**YOU?**"

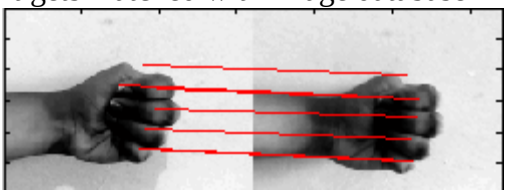


Deaf and Dumb person:
Gesture 3 is given as input. It gets matched with image database



Voice is heard through loud speaker as "**FINE**"
Blind person:
Blind will reply as "**GOOD**". It will be displayed on LCD as "**GOOD**"

Deaf and Dumb person:
Gesture 4 is given as input. It gets matched with image database



Voice is heard through loud speaker as "**BYE**"

This system is useful for dumb, deaf 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 blind people voice cannot be heard by deaf people. This system converts the voice into text which can be seen by deaf people and they can communicate with each other.

FUTURE SCOPE:

System can be built in such a way that it is capable of giving correct output even when the input is given in presence of noise. This system can be improved to provide output even when the background is not white. We can increase the database for more conversation. Hand gestures can be converted to text for better communication. System can be made possible. Instead of MFCC, PLP (Perceptual Linear Prediction) algorithm is used to implement voice processing.