

SILENT SOUND TECHNOLOGY

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Abstract :

When we are in movie theatre, bus, there is lot of noise around us. We can't speak properly on a mobile phone. In future this problem is eliminated by Silent Sound Technology. It is a technology that helps you to transmit the information without using vocal cords. This technology notices every lip movement and transforms them into computer generated sound that can be transmitted over phone. Hence person on another end of phone receives information in audio. Silent sound technology is the perfect solution for the people who lost their voices but wish to speak on mobile devices. This device is developed by Karlsruhe Institute of Technology Germany. It uses Electromyography and Image Processing for monitoring the tiny muscular movements that occur when we speak and converting them into electrical pulses that can then be turned into speech without a sound uttered. When demonstrated, it seems to detect every lip movement and internally converts electrical pulses into sound signals and sends them neglecting all other surrounding noise. So, basically it read your lips. It definitely going to be a good solution for those annoyed while other speak loud over phone.

Key words:

Electromyography, Muscular movements, electrical pulses, image processing.

I. INTRODUCTION:

SST is a technology for devices that helps for communication purpose in the nasty environment. The uses of this technology are immense for people who are vocally challenged or have been rendered mute due to some accidents or others. Lip detection is a complex problem because of high variability range of lip shapes & color [1]. Lip-reading is an inference and inspired guesswork because of fast speech, poor pronunciation, bad lighting, faces turning away, hands over mouths, moustaches and beards etc. Lip Tracking is one of the biometric systems based on which a genuine system can be developed. With multiple levels of video processing, it's possible to obtain lip contour and location of key points in the subsequent frames is usually referred to as lip tracking [14]. A large category of techniques referred to as model based, build a model of the lips and its configurations are described by a set of model parameters [1]. Most of these techniques include tracking of the lip in sound speech may be with different accent & other facial parts consideration. Our effort is to work on silent speech which means no sound is incurred; a device oriented package to design and implement for the purpose of lip reading that can recognize mandarin words, single sentence or even continuous sentences of the people of different regions in China country considering their non-speech accent and pronunciation by observing their every movement of the lip and facial expression.



Figure1:Silent Sound Technology

OBJECTIVE:

Aim of this research work is to analyze and understand -every movement of the lips and facial expressions then transform them into text and audio output: Capturing the video using an integrated camera and process it based on histogram equalization for gray scale mode selection or normal mode. Skin segmentation and morphological operation helps to locate facial features in the interior of the face and color coded perimeter with fitting points on the contour of the lip. Obtained multi image montage of lip will be converted to an average threshold value that helps to set the matching parameters to a very close value of other known templates in the database so as to test the feedback provided by the system will be a match or a miss-match to obtain text and sound output.

II. NEED FOR SILENT SOUND TECHNOLOGY:

- For better way of communication in noisy public place.
- Gives a better and new way of communication for those peoples who lost their voices.
- Helps peoples for giving any confidential information's over a phone without worrying about others.

III. WORKING:

To proceed with this research work, the Process Model assumed is Iterative Process Model since it is more adaptable for this work. Once the face detection and mouth region detection is achieved, speech analysis can be performed with the use of lip motion features strategies and emotional expression with the use of other facial parts. If efficiency with identification technique is not proper, then the threshold value falls out of the defined unique index value and retrial has to be made. Those are one of the main reasons to choose the Iterative Process [11]. Fig.1 shows the overall architecture of the process model and its working methodology

As the live video is captured by a high-resolution camera, the video can be processed as normal or grayscale color mode /or saved as Mpeg, Avi Flv etc. for customization. Region of Interest (ROI) video is segmented from which Facial features like Mouth, nose & Eyes are detected.

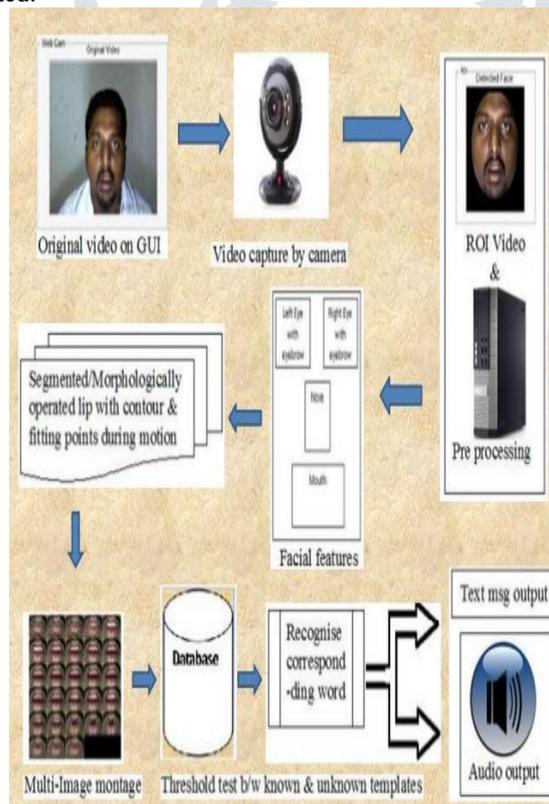


Figure 2: Working of Silent Sound Technology

IV. METHODS:

- Electromyography
- Image processing

ELECTROMYOGRAPHY

It is a technique which monitors tiny muscular movements and pulses generated by it. The transducers involved converts the pulses in to electrical signals.

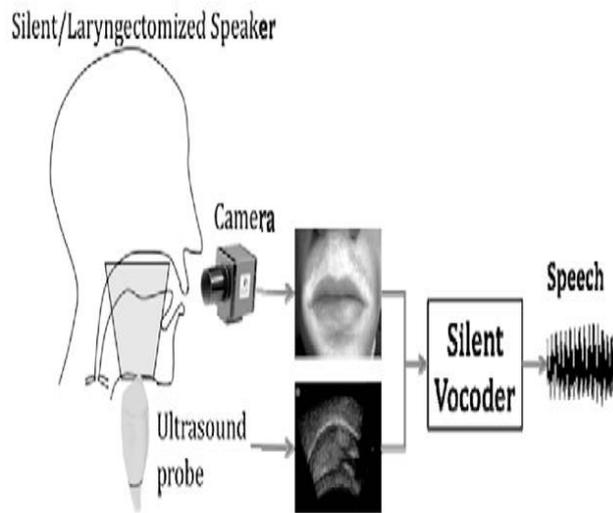


Figure 3:Electromyography

IMAGE PROCESSING

Convert digital tape in to a film image with minimal corrections and calibrations.Large main frame computers employed for sophisticated interactive manipulation of the data.

TYPES:

Analog image processing

Digital image processing

Analog Image Processing:

Analog image processing is applied to hard copy data such as photographs or printouts.It adopts certain elements of interpretation such as primary element and spatial arrangements.

Digital Image Processing:

It is the use of computer algorithm to perform image processing on digital image.It refers to manipulation of electronic data to specific data.

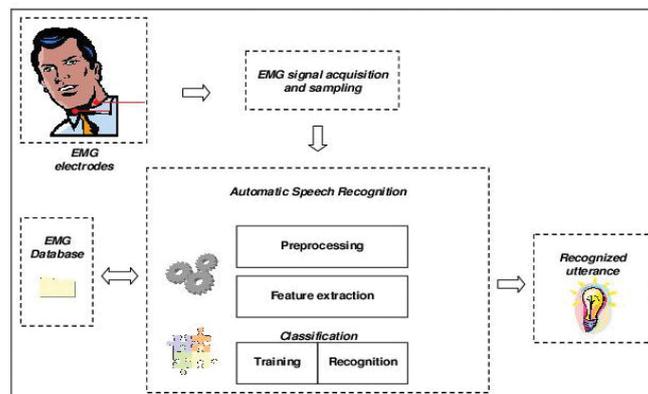


Figure 4:Image processing

IV. APPLICATIONS

- i. It will help people who have lost their voice as a result of accident or cannot speak loudly again as result of old age
- ii. It can be use a military for communication of secrete or sensitive information.
- iii. It is applicable if you want to make a call in conference meeting or library without disturbing the others
- iv. Speaker can speak his native language like German and listener can listen to it in his native language like English
- v. It is applicable for those who want to make a call in nosily environment e.g. people working in train station, Movies Theater, market etc.
- vi. As we know in space there is no medium for sound to travel therefore this technology can be best utilized by astronauts.

V. ADVANTAGES:

- Helping people who have lost their voice due to illness or accident.
- We can make silent calls even if we are standing in crowded place.
- Very useful for sharing confidential information like secret PIN number on phone at public place.



Figure 5: Silent calls in crowded place

VI. CONCLUSION:

- Engineers claims that the device is working with 99 percent efficiency.
- Silent Sound Technology one of the recent trends in the field of information technology implements “Talking Without Talking”.
- It will be done of the innovating and useful technology and in future this technology will be use in day to day life.

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