Noiseless Audio A Solution to Noisy Communication Using Silent Sound Technology

A1: Vinod Gouda

PG Scholar,Department of MCA, Dayananda Sagar College of Engineering, Bengaluru

CO -AUTHOR:Prof. Alamma B H

Assistant Professor, Department of MCA, Dayananda Sagar College of Engineering

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Abstract:Silent sound technology (SST) was developed to reduce noise pollution to provide assistance to those that have lost the voices and who unable to talk on the call. It's a technology allows to transfer data without the use of the voice box. This technology detects any lips movements and It is then converted into a computer-generated audio that is sent via cell.When there is a lot of noise behind us in a movie theatre, bus or train, we can't talk clearly on our phones. it reads your lips. Undoubtedly it would be a suitable option for those who gets irritated as others talk loudly on the call.

Keywords:Silent Sound, Digital Image Processing, Electromyography.

1. INTRODUCTION

In German, the "Karlsruhe Institute of Technology" developed silent sound technology.An idea called "Silent Sound" Technology was demonstrated in the 2010 CeBIT's "future park," with the aim of detecting any lips moving and converting them into sounds. Where an audible signal intensity is lacking, silent sound technology allows speech communication to happen. Is a technique which converts speech instead the use of the vocal cord (a set of muscles inside the throat), instead receiving an electrical signal by observing the elastic action of both the mouth, so it has been shown that the articulatory muscles (jaws and lips muscle)becomeinvolved whether or not air passes through it. As per scientific evidence, articulation muscles are still engaged whether air flows into them or not (the vocal cordsvibrate as you contract these muscles slightly and expel a little air). When you speak or hum, put your finger over your throat to demonstrate phonation, which is also known as "Fundamental Frequency of Sound".

It creates a digital representation of speech by collecting sensor data by human communication components processing process, such as the articulated structures, neuronal circuits, and the brain itself, that can be directly synthesized, translated to data, either Communication networks have been redirected.

Silent sound technology (talking without speaking) can eliminate unnecessary sound picked up by the mobile from the noise while making a call, particularly in noisy environments such as movie theatres, markets, and train stations [4]. Many that have lost their voices due to an accident or old age people who want to do a phone call can benefit from this technology. When you wish to use this technology, simply make a switch on the sound mode with no sound and begin collecting the articulation muscle's electrical impulse, ignoring other sounds in the environment, and transmitting that, and will be converted into audible sound for the listener

This new technology has the potential to be immensely beneficial ifa person loses his or her voice, when speaking to make quiet calls without distracting anyone, or even when we want to say a trusted friend or parent our PIN number without letting another person secretly listen to it.From other end, the audience can hear a strong accent. Another significant advantage is that it can be converted into any language desired by the customer. English, French, and German are all supported in this version. However, for languages such as Chinese, this is problematic since various tones may have a wide range of meanings [2].

OBJECTIVES:

a. Reduce noise pollution.
b. Help those who have lost their voices and who unable to talk on the call.
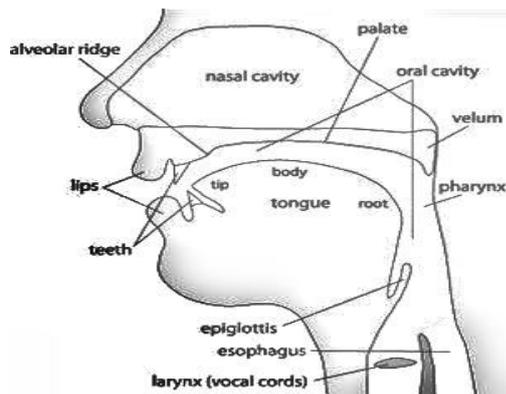c. In a crowded area, it is used to tell secret information.

2. METHODOLOGY

Fig. 1 Speaking Process in human body

Air can flow into your speech organ and lips, and therefore the sentences are created victimisation enunciation in your mouth and jaws, whether or not you speak forcefully or softly.Our capacity to communicate is dependent on the involvement of two folds of the vocal cord is a tissue situated at the highest of the trachea within the speech organ (voice box). When air flows between the vocal cords, whether forcefully or quietly, or sometimes when breathing out, vibrations occur, and the action of the tongue, mouth and cheeks transforms these sounds into coherent voice [1].

3. SPEECH INTERFACE

There are two approaches to process silent sound technology. They're as follows:
A. Electromyography (EMG)
B. Image Processing

A. Electromyography (EMG):

Electromyography (EMG) isa methodology for studying muscle function by analysing electrical activity emitted by the muscle. This electrical response, which appears as a signal, is caused by neuromuscular stimulation, which is linked to contraction of the muscles. The technique is used in SST (silent sound technology), where it detects muscle activity as we talk quietly and converts it toan electrical impulse signal.Electromyography (EMG) is a method for determining and evaluating skeletal muscle electrical function [8]. An electromyograph is used to measure EMG, which generates an electromyogram log [3].A medical instrument senses the electrical potential generated by muscle tissue as they're electrically or neurologically stimulated.
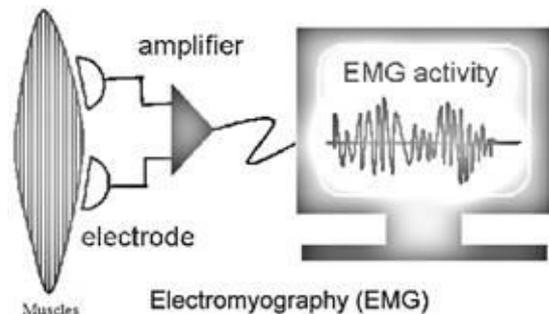

Fig. 2 Electromyography activity

B. Image Processing:

Theimage processing transforms a digital tape information into a scanned photo with the fewest possible modifications and computations.After that, massive mainframe computers are used to perform complex interactive data processing [3]. Any mode of signal process within which the input is associate degree image, like a photograph or video clip, is understood as image processingand the output is either a picture or a series of image-relevant characteristics or specifications in electrical engineering and computer science.
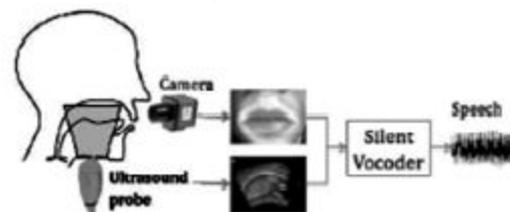

Fig. 3 Image Processing activity

There two types of image processing:

I) Digital image processing-

A collection of computer-assisted techniques for manipulating digital image is observed as digital image processing.There are some flaws in it. To address the defects and weaknesses in order to

obtain the data's originality, it must go through multiple processing stages [7].Digital image processing is divided into steps ofthree:a) Pre-processing Display b) Information extractionc) Enhancement

II) Analog image processing-

Hard copy files, such as images or printouts, are processed using the analogue processing technique [7]. It employs such interpretive components, such as the primary aspect, spatial structure, and so on. Through the use of a multi-concept approach to analysing remotely sensed data, we can determine not just what an entity is, but also its importance.

4. THE BENEFITS OF SILENT SOUND TECHNOLOGY

i.   It can assist human beings who've lost the voice due to an injury or who are unable to talkloudly due to old age.

ii.   Really useful for those who have lost their voices or have been deaf

iii.   It can be used If you ever need to take the call without distracting anybody in a library and meeting room.

iv.   Makes it easier to make phone calls in a noisy place. People who work in train stations, movie theatres, and markets etc.

v.   Very handy for exchanging sensitive information in public places, such as a secret number on a phone.

5. LIMITATION OF THIS TECHNOLOGY

It would not fit in a language where different tones have different meanings, such as Chinese. And when the electrode is implanted into the face does it perform perfectly. Since it will be speaking like a robot, there will be no emotional response to the voice.

6. FUTURE SCOPE:

Silent sound technology has a promising future, with everything from basic voice prompts to memos transcribed so over mobile all being reasonably conceivable in busy public spaces.

7. CONCLUSION

The invisible hearing system detects the action of lips and transmits a sound signal that is converted by an electrical impulse. This technology would be beneficial to those whom has lost the voices and choose to communicate via mobile device

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