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A REVIEW ON MOUTH GESTURE RECOGNITION SYSTEM

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Abstract: **In the recent era there are lots of techniques available for the gesture recognition. These gestures were made from hands, facial, eyes etc. Getting a three dimensional pose of the gesture using camera and matching it with a already recorded gesture and meanwhile producing the equivalent voice or text is the technique of gesture recognition. Some of the techniques where skin detection, single hand, double hand, skeletal image detection etc. These techniques were failed due to the inconvenience faced by the individuals of doing difficult poses for communication and the poses weren't easily absorbed by all. In this paper we are going to propose a new method such that it recognizes the gesture made by our mouth named "MOUTH GESTURE ". And moreover we are going to make this technique useful for the patients who were suffering from VOCAL CORD PARALYSIS, LARYNGECTOMEE, and FUNCTIONAL APHONIA.**

Keywords: **Mouth gesture, kinect depth camera, video searching of gestures.**

I. INTRODUCTION

Our mouth has a peculiar action for each words that we use in our day to day life. For example in the given example the pronunciation of words **beat and bat** differs. We are going to use the movements of the mouth as a gesture. Our mouth different parts as we seen in our down given figure.

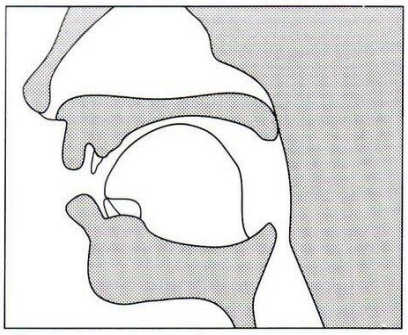


Figure 2.14: The position of the tongue in the pronunciation of the high front vowel in the word 'beat'

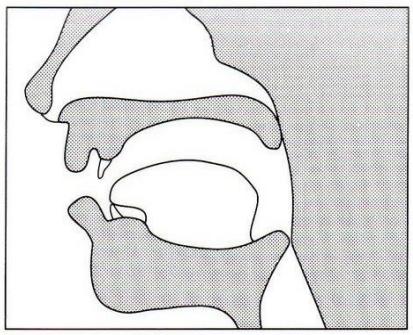
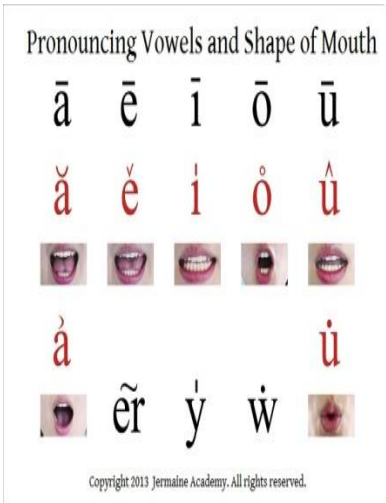


Figure 2.15: The position of the tongue in the pronunciation of the low front vowel in the word 'bat'



For each word that we pronounce these positions will differ according to the word that we use. So we are going to take a depth image video of these positions while pronouncing of some words using KINECT camera and we are going to match it with already stored videos of the same word. One of the important note making our technique possible with these patients is that they can **pronounce the words like a normal one but with no sound due to removal of vocal cord during operation.**

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II. REVIEW OF LITERATURE

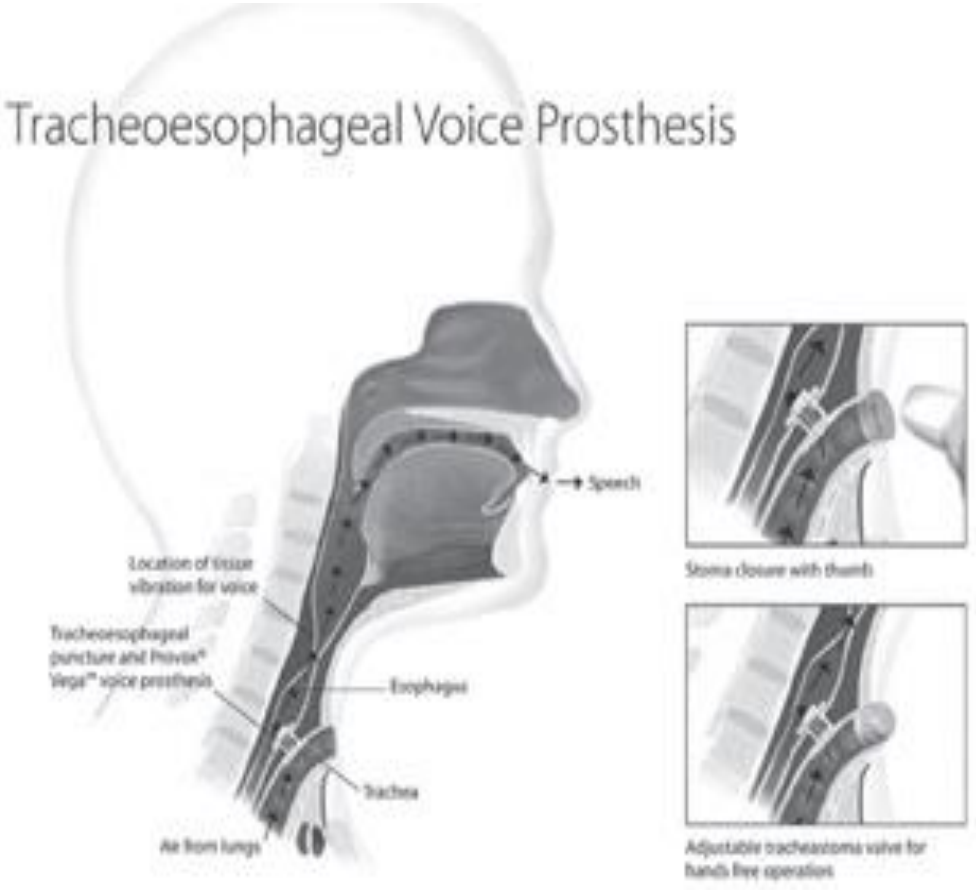
Different approaches have been used by different researchers for recognition of various hand gestures which were implemented in different fields. Some of the approaches were vision based approaches, data glove based approaches . The whole approaches could be divided into
three broad categories- Hand segmentation approaches, Feature extraction approaches and Gesture recognition approaches. Many researchers used skin filtering technique for segmentation of hand. In the technique separated the skin colored pixels from the non-skin coloured pixels, thus extracting the hand from the background. But it has been failed due to the fact that it is possible to detect the same skin colour[1] . The robust method of simple hand gesture for mouse control[2]. Another method of using FPGA for gesture recognition by record and rewind method[3] but this method failed because it can't record more number of messages. The unique method which uses binary pattern recognition of gesture. It uses the numbers from 0 to 9 as the fingers posture as active finger will be given as 1 and inactive(folded)fingers will be given as 0[4]. One of the existing system that provides a possibility of our system is that the getting of three dimensional pose using one more camera and arrangement of parts of that particular body part [5] is an great advantage of our system.

Problems Faced By The Patients Of Voice Disorders: The patients suffering from voice disorders are having chief complaints like **hoarseness, abnormal voice strength, wavering voice.** In total laryngectomee treatment the total vocal cord is taken off so that the individual cannot speak properly. In functional aphonia this happens in women aged from 20-40 and causes a high degree of breathy hoarseness, whispery voice although no voice sound is often produced when the patients cries, laughs or coughs.

Some Of The Existing Devices For Their Speaking Options:

There are other methods for these kind of patients to make an alternative speech.

1. Tracheoesophageal Speech (Tracheoesophageal Voice Prosthesis)



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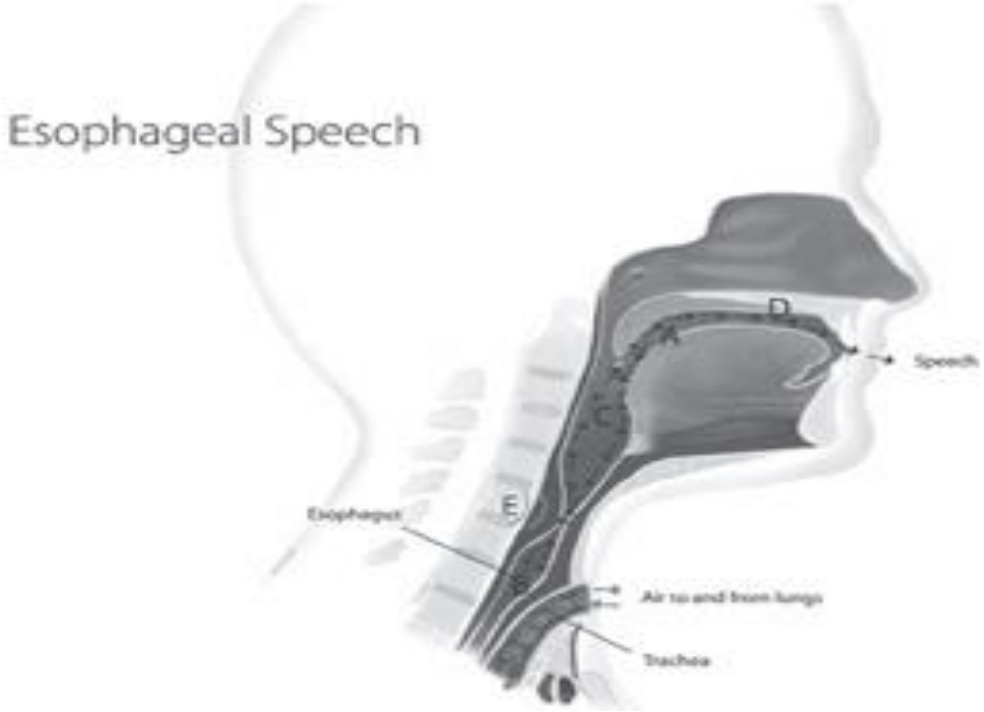
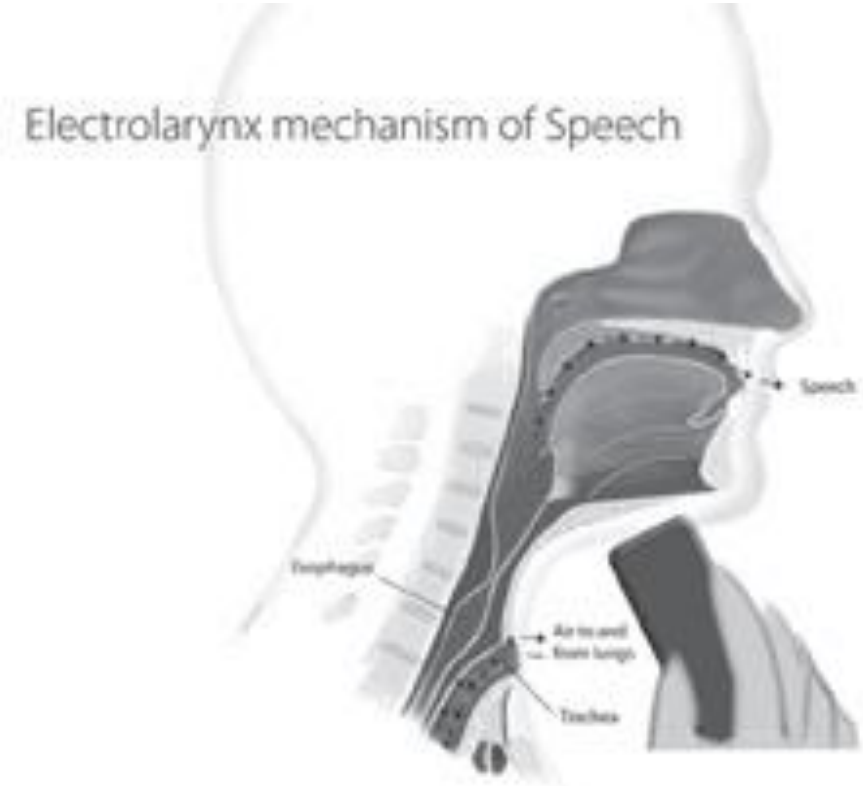
2. Esophageal Speech



3. Electrolarynx Or Artificial Larynx Speech



Mouth Gesture Recognition System: In our proposed system we are going to use kinect depth imaging camera to take the video of the gesture produced by mouth. For each word the positions of our mouth will change according to the word that we are going to pronounce. Since the vocal paralysed patients are just going to pronounce the words for communication rather then straining to produce sound. So our system will help them to communicate easily. In our system we are

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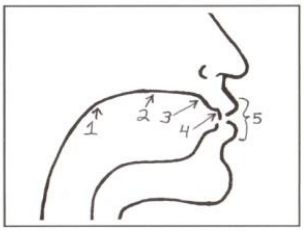
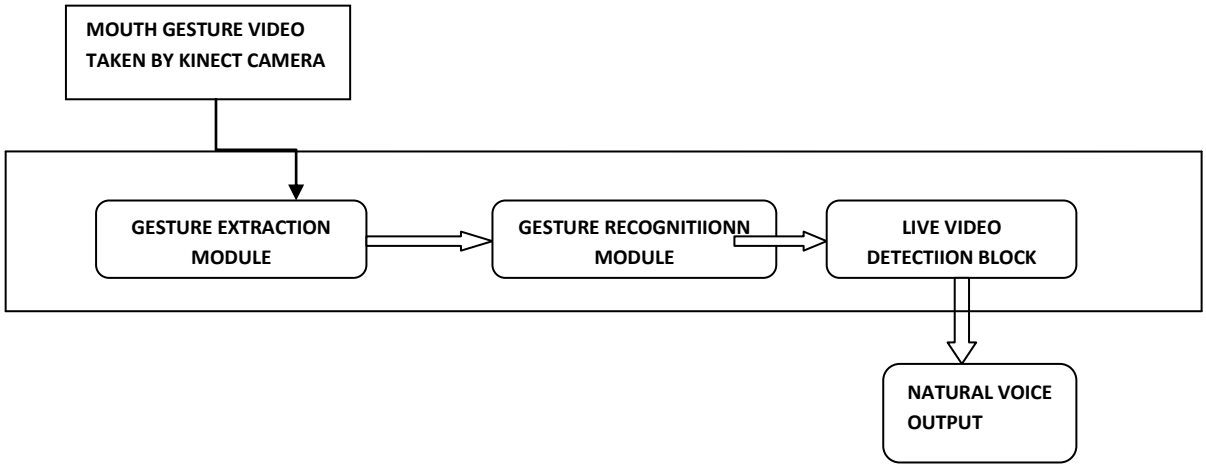
producing a live voice output using kinect camera. Our mouth has different movements for each and every word that we use and

MOUTH POSITIONS

		Part of Tongue Used
1	Guttural (or Velar) (back of throat)	Back
2	Palatal (beginning of hard palate)	Top
3	Cerebral (or Lingual or Retroflex) (upper front pocket of hard palate)	Tip
4	Dental (behind teeth)	Tip
5	Labial (at the lips)	Not used



Design:



Kinect Block:

In these the kinect camera takes the videographic depth image of our mouth and provides the video image to the gesture extraction module.

Gesture Extractiion Module:

The gesture extraction block extracts the gesture made by the various positions of our mouth and gives it to the gesture recognition block.

Gesture Recognition Block:

In gesture recognition block we have already stored videos of the gestures made by our mouth. When our input gesture video comes this block checks whether it is matching with the existing one and if it matches it produces and equivalent voice output.

Methodology: Our methodology falls under two category that recording of the gesture videos of new poses of different words if required and the normal gesture recognition using our system .

ALGORITHM 1: Recording of the unknown gesture

Step 1: take the video of the gesture using kinect depth imaging camera

Step 2: record the video and detect the various positions of the parts of the mouth.

Step 3: store it in the feature extraction block

Step 4: repeat steps 1, 2, 3 for recording of another gesture.

ALGORITHM 2: Mouth gesture recognition system

Step 1: Try to pronounce any word using your mouth.

Step 2: Try only the words that are recorded in our system

Step 3: Kinect camera takes a depth image of various positions of our mouth.

Step 4: gesture extraction module detects the gesture required.

Step 5: Gesture recognition module recognizes the gesture and checks whether it is in our system or not.

Step 6: if the gesture is matched with our recorded gesture then it produces the live sound output for the gesture which have already been recorded.

Step 7: if gesture is not found then it says unknown gesture and ask for the recording of that gesture.

III. CONCLUSION

Our newly proposed system will be useful for the patients after getting treatment for laryngectomee, functional aphonia and vocal cord paralysis can get an efficient use of our system.No strain in their vocal cord since they are just going to move their mouth positions without trying to produce sound as our system will do for them.They can also be able to speak like a normal person since we are producing a natural voice from our system.

Advantages: Our proposed system is advantageous in many ways as follows

1. Each individual can do their own mouth gestures.
2. Since we are using our natural way of speaking(mouth used for producing gesture), it the strain made by other sign languages.
3. Live video detection and equal natural voice production in our system will make the continous recognition of mouth gestures which makes the system reliable for them to speak like a normal one.

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