

## ARTIFICIAL VOICE FOR VOICELESS USING ENGLISH LANGUAGE

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### Abstract

Communication is an unquestionable necessity for people to communicate and the people who can't convey are confined in this general public. This work tracks down an answer for human race, where individuals are dumb yet not affected by deafness. The Fundamental reason for the work is to make a counterfeit voice in view of the tongue movement and with the assistance of the Telephones of the language mapping table for the dumb individual to meet their basic necessities. In this work the fundamental highlights included are tongue, lip and wind stream from nose and mouth. These elements are taken care of in to the PC through parallel port. These highlights are thus changed over as information and matched with the mapping table. In this work the mapping table is being framed picking English as a language. Though the mapping table should be possible for different dialects additionally, utilizing their own punctuation regulations and phonetics. A gadget which fits inside the mouth is utilized to extricate the tongue, lip movements and the wind stream inside the mouth. This gadget thus is associated with a PC to deliver the counterfeit voice. As a test many letters and expressions were articulated without uttering any sound. The PC articulated the letter and expressions accurately through speaker.

**Key words:** Mapping table, articulate, Parallel port & Telephones

### Introduction:

In antiquated days communication was exceptionally poor since it was done exclusively through sign language, later on language came in to presence. So, individuals began to discuss orally with one another through language. There are in excess of 7100 dialects in presence. This factual figure shows the significance of correspondence. There are three classifications of speech impaired individuals. (i) speech impaired by birth (ii) speech affected because of mishaps (iii) speech impaired because of malignant growth and different sicknesses. By and large malignant growth and particularly throat malignant growth has been an infection of the more seasoned men with history of tobacco and liquor use. Be that as it may, with the ascent in HPV diseases, rate in more youthful individuals is rising. In Tamil Nādu alone 13,260 individuals are impacted because of throat disease each year. For the most part 80% of the persistence with throat malignant growth loses their voice. Since they can't talk, they free their conveying power and begin feeling separated, which thus prompts mental wretchedness. This work is centred exclusively around speech impaired individuals to give counterfeit voice to the speechless<sup>4</sup>.

### Only for Speech Impaired

This gadget must be utilized for orally challenged individuals. The gadget can't be utilized for hearing impaired as well as speech impaired individuals since hearing impaired individuals can't hear sound and don't know about the language telephones. The principal standards of the work depend on the language telephones and the gesture of tongue, lip, and wind streams variations. For the above reasons this gadget can't be utilized for hearing impaired associated with speech impaired individuals. The work cycle engaged with the discourse is the utilization of organs, for example, the lungs, vocal line, the mouth, tongue and teeth and so on. The primary target of the work is to create counterfeit voice regardless of whether the vocal string is affected or fully damaged because of any reasons<sup>1, 6, 11, 13, 14</sup>.

### **English Language**

English started in Britain and is the predominant language of the US, the UK, Canada, Australia, Ireland, New Zealand, and different island countries in the Caribbean Ocean and the Pacific Sea. It is likewise a common language of India, the Philippines, Singapore, and numerous nations in sub-Saharan Africa, including South Africa. English is the best option of unknown dialect in most different nations of the world, and it is that status that has provided it with the place of a worldwide most widely used language. It is assessed that about 33% of the total populace, exactly two billion people, presently utilize English. Words previously recognized as things are referred to be noun & action referred as verb. In English, structures for customary pronouns, descriptors, and modifiers can likewise work as noun; modifiers and qualifiers as verb; and things, pronouns, and verb modifiers as descriptive words generally known as adjectives.

### **Methodology**

The work begins with a ceramic hard palate. The metal points are spread over the palate. The metal points are thus associated with the NOT IC 7404. Whenever the tongue contacts the metal point 5v variation is created. Electrode has two ends in which one is associated with the ground and the opposite end is set on the hand. This detection circuit recognizes the input 5. Two mikes are utilized, one to recognize the wind current in the mouth and the other one to identify the wind current in the surrounding. As indicated by the natural commotion the threshold is set. By utilizing the gesture of the lip, tongue and wind stream the corresponding letters are mapped with the mapping table and by utilizing auto detecting philosophy it frames the word or expression there by creating the sentence.

### **Block Diagram of the Hardware Setup**

The accompanying block outline (fig 1) can essentially make sense of the steps and hard ware arrangement in this work. The ceramic hard palate is associated with detection circuit which identifies the touch at the metal points present in the ceramic hard palate by the tongue. The result of detection circuit is associated with the multiplexer circuit. This circuit permits every one of the eight contributions to PC by means of equal port by permitting four contributions all at once. By checking twice every one of the information's are enrolled into the computer<sup>21</sup>.

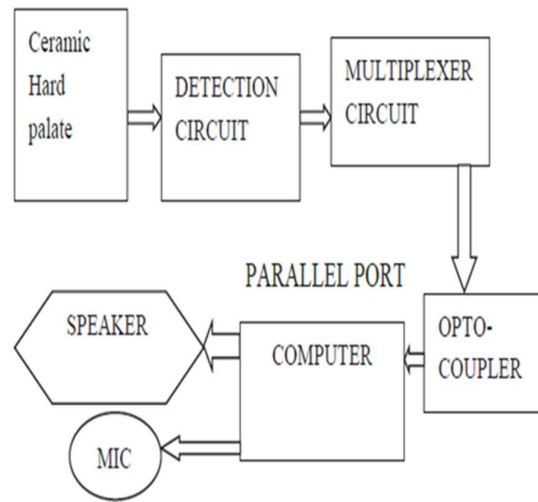


Figure 1. Block diagram of hard ware set up22

**Mapping Table:**

The mapping table is created based upon the placement of the tongue, lip and wind stream. In order to train the system, the corresponding picture for each letter pronunciation is used. Based up on the tongue position for each alphabets the regions are marked accordingly in the hard ceramic palate and it is named as follows.

- a) Front Teeth Lower Teeth b) Upper Lip
- c) Lower Lip d) In-between two Teeth’s
- e) Bilabial f) Bilabial Back Side g) Labiodental h) Dental i) Dental Downside j) Alveolar
- k) Palatal l) Velar & m) Glotal

Based upon the permutation of the lip and tongue placement the mapping table mentioned below was created.

**Table 1. Mapping Table Created for English language**

I.NO	ALPHABETS	CORRESPONDING PICTURES	FRONT TEETH		UPPER LIP		LOWER LIP		INBETWEEN TWO TEETHS		BILABIAL BACK SIDE		LABIODONTAL	DENTAL	DENTAL DOWNSIDE	ALVEOLAR	PALATAL	VELAR	GLOTAL	ACTIVE ARTICULATORS	PASSIVE ARTICULATORS
			Unnamed: 4	Teeth	LIP	LIP	Teeth	Teeth	Back Side												
1	A	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN
2	B	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN
3	C	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
4	D	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	YES
5	E	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
6	F	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
7	G	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	YES	NaN	NaN	YES
8	H	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	YES
9	I	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN
10	J	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN
11	K	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	YES	NaN
12	L	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
13	M	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN
14	N	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
15	O	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	YES	NaN

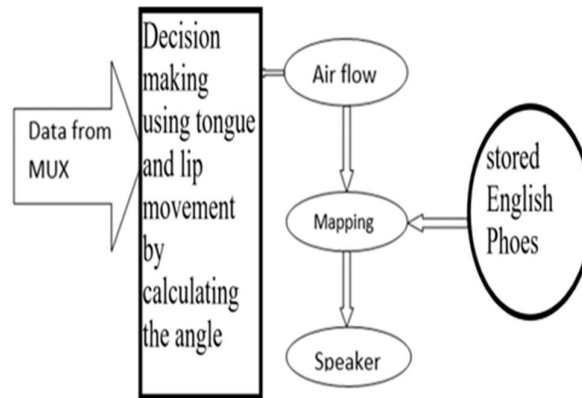


Figure 2. Flowchart of software Part22

In this work the principal highlights included are placements of tongue & lip touch as well as wind stream from the nostril and the mouth. These elements are taken care of by passing those signals as waves in to the PC through parallel port.

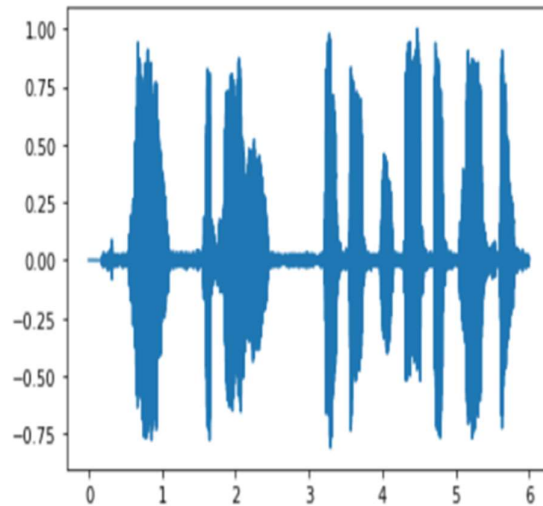


Figure 3. Voiceless Signal as Wave

As a next step the system analyses the duration of the wave and plots the wave with respect to the time.

`"segment.segment(start=1.1,duration=0.005).plot()"`.

Followed by that the system tries to capture it as a spectrum and from that spectrum, with the help of the mapping table, the words or phrases are matched up accordingly and by using auto detection and correction of words philosophy it provides the output as a text initially.

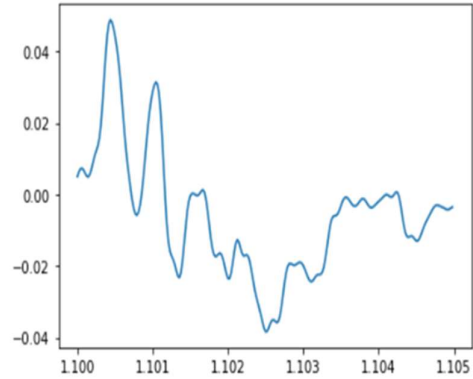


Figure 4. Duration of the Wave

**“spectrum=segment.make\_spectrum() spectrum.plot()”**

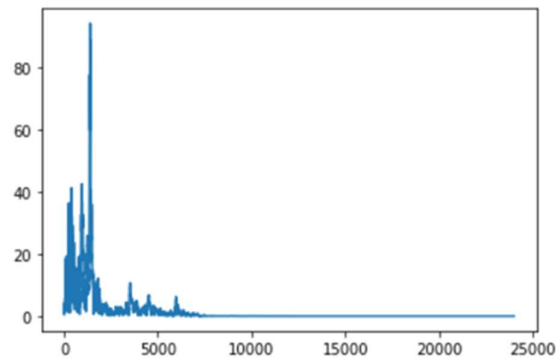


Figure 5. Conversion of wave in to Spectrum

The touch of the tongue corresponding to the metal points present in the ceramic hard palate is detected from the spectrum and the results are showcased in the Figure 6. The mapping table helps to match the alphabets, which is showcased in the Table 3. Once the signal is converted as text, in order to verify whether the proposed system has converted it in to exact text as what the speaker tried to speak, a manual option is provided. This is done only to ensure the accuracy of the system. Using this option, the speaker types the text in order to verify whether it is matching perfectly. This option in the system is available as an initial phase for the experimental setup only. The text 1(Computer produced sentence) and the text 2 (Manually typed by the speaker) is compared using the function “difflib .Sequence Matcher”. The difference will be highlighted if mismatch is there and the % of matching ratio will be showcased as a result. One experimental execution is listed below.

```
“ text1 = r.recognize_google(spectrum_data)
print(text1):'the quick brown fox jumps over the lazy dog'
text2 = 'the quick brown fox jumps over the lazy dog'
output = str(int(difflib.SequenceMatcher(None, text1, text2).ratio()*100))
```

**output = 100%”**

Finally, the text is converted in to artificial voice by using the below code.

```
from gtts import gTTS #Import Google Text to Speech

from IPython.display import Audio #Import Audio method from IPython's Display Class

tts = gTTS(text1) #Provide the string to convert to speech

tts.save('1.wav') #save the string converted to speech as a .wav file

sound_file = '1.wav'

Audio(sound_file, autoplay=True)
```

### Results and Discussion

The whole work was meant to identify the words or expression articulated by the speaker without making sound. True to form the genuine outcome got was effective in distinguishing the singular sentence accurately. During the test while trying to detect a paragraph, some letters got repeated and some letters were missed. This was because of the distinction in time taken for real articulation and the time fixed in the calculation. These blunders can be rectified by the utilization of powerful calculation. The proposed algorithm works 100% for single sentences. The experiment was performed with 30 participants including staff and students from DR. MGR. Educational and Research Institute, Chennai 95. The Participants tried to pronounce the sentence without making sound and the soundless data was identified by the proposed system there by producing the artificial voice. Randomly 10 Participant results are listed below.

**Table 2. Experimental results performed with Speech Impaired students.**

Si.No	Student	Sentence pronounced	% Attained By The proposed system
1.	Sri harish	Hi Iam doing good.	100
2.	S. Vyshnavi	I miss my Parents	100
3.	S. Suriya	Good Morning. I love my parents	100
4.	Dr. S Anandhi	My lifestyle is hectic due to over stress	100
5.	S. Jayasree	Tomorrow I am going to native	100

6.	R M Gopikrishna	My dog name is mavel	100
7.	M Vishnuram	My mom is the beautiful person	100
8.	E R Harish	I love strawberry juice	100
9.	G Manindra	My pet jojo is the naughtiest one	100
10	K Kavin	My favourite dish is biriyani	100

The result shows that the proposed system works well for single sentence. Fine tuning will help to achieve the same results for paragraph too. This proposed work can be extended for other languages also based up on the language phonetics and articulation.

Table 3. Alphabets matched with the mapping table by the system

I.NO	ALPHABETS	FRONT TEETH		Unnamed: 4	UPPER LIP	LOWER LIP	INBETWEEN TWO TEETHS	BILABIAL	BILABIAL BACK SIDE	LABIODENTAL	DENTAL	DENTAL DOWNSIDE	ALVEOLAR	PALATAL	VELAR	GLOTTAL	ACTIVE ARTICULATORS	PASSIVE ARTICULATORS
		CORRESPONDING PICTURES	LOWER TEETH															
20	T	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	YES
8	H	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
5	E	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	YES
27		NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
17	Q	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
21	U	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
9	I	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	YES
3	C	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
11	K	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	YES
27		NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	B	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES
18	R	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	YES
15	O	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	YES
23	W	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN
14	N	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	YES	NaN	NaN	NaN	NaN	NaN	NaN	YES
27		NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

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