

# Report On

## Voice Clone Maker

Submitted in partial fulfillment of the requirements of the Course project in  
Semester VII of fourth year Artificial Intelligence and Data Science

by  
Vivek Prajapati (Roll No. 22)  
Prathmesh Shinde (Roll No. 27)  
Hirenkumar Vyas (Roll No. 32)

Supervisor  
Dr. Tatwadarshi P. N.



**University of Mumbai**

**Vidyavardhini's College of Engineering & Technology**

**Department of Artificial Intelligence and Data Science**



**(2023-24)**

**Vidyavardhini's College of Engineering & Technology**  
**Department of Artificial Intelligence and Data Science**

**CERTIFICATE**

This is to certify that the project entitled “Voice Clone Maker” is a bonafide work of “Vivek Prajapati (Roll No. 22), Prathmesh Shinde (Roll No. 27), Hirenkumar Vyas (Roll No. 32)” submitted to the University of Mumbai in partial fulfillment of the requirement for the Course project in Semester VII of fourth year Artificial Intelligence and Data Science engineering.

**Supervisor**

Dr. Tatwadarshi P. N.

Dr. Tatwadarshi P. N.  
Head of Department

## Table of Contents

Chapter No		Title	Page No.
<b>1</b>		<b>Introduction</b>	
	1.1	Introduction	1
	1.2	Problem Statement	1
	1.3	Objective	1
<b>2</b>		<b>Proposed System</b>	
	2.1	Introduction	2
	2.2	Architecture/Framework	2
	2.3	Algorithm and Process Design	3
	2.4	Details of Hardware and Software	3
	2.5	Experiments and Results	4
	2.6	Conclusion	4
		<b>References</b>	5

## **Chapter 1: Introduction**

### **1.1 Introduction**

Deep learning models have become increasingly popular in computational machine learning, such as Text-to-speech (TTS). Deep models that create more natural-sounding speech than the conventional concatenative methods began emerging in 2016. Research has focused on making these models more effective, sound more natural, or training them in an end-to-end fashion. Inference on GPU has come from being hundreds of times slower than real-time on a mobile CPU. She et al. (2017) showed near-human naturalness as to the quality of the speech produced. Low-dimensional embedding is derived from a speaker encoder model which takes reference speech as input. This approach is more data-efficient than training a separate TTS model for each speaker, as well as faster and less computationally expensive orders of magnitude. There is a broad disparity between the length of reference speech necessary to clone a voice among the various methods, ranging from half an hour per speaker to just a few seconds.

### **1.2 Problem Statement & Objectives**

The resulting framework must be able to operate in a zero-shot setting, that is, for speakers unseenduring training.

It should incorporate a speaker's voice with only a few minutes of reference speech.

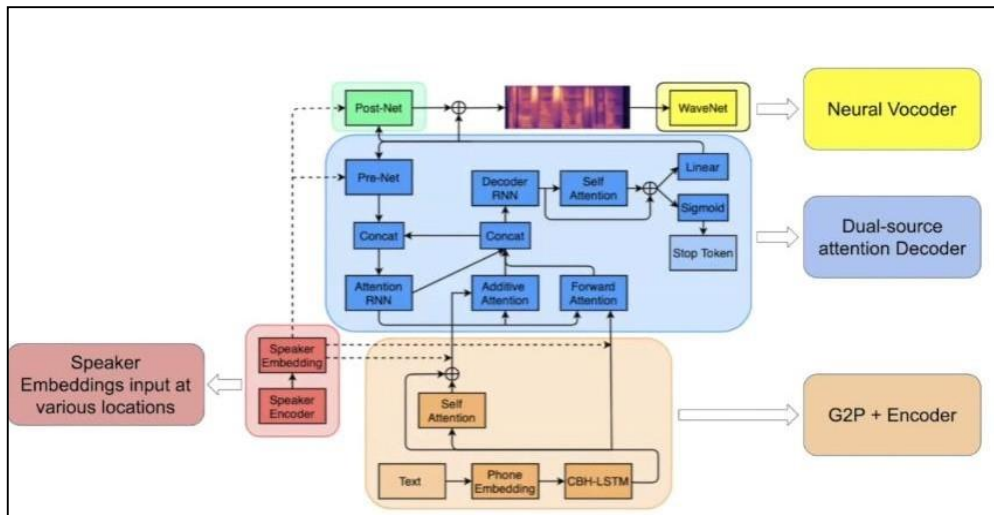
In addition, we integrate a model based on the framework to make it run in real-time, i.e. to generate speech in a time shorter or equal to the duration of the produced speech.

## Chapter 2: Proposed System

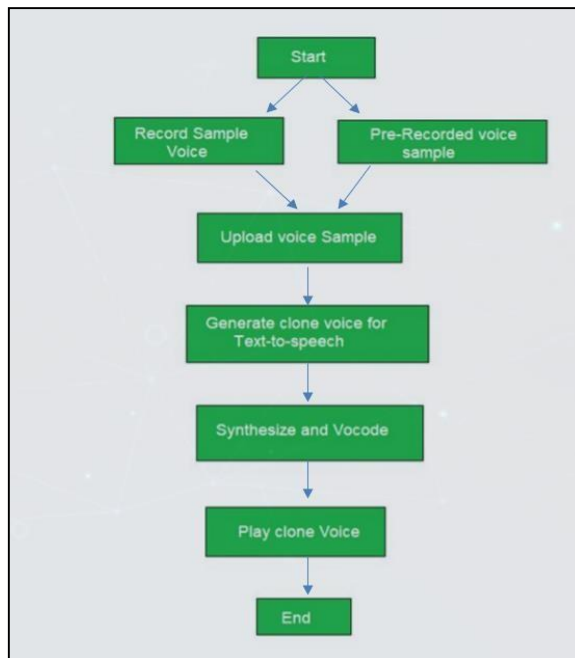
### 2.1 Introduction

It describes a new technique (often called Speech Vector to TTS, or SV2TTS) for taking a few seconds of a sample voice, and then generating completely new audio samples in that same style of voice. The SV2TTS model is composed of three parts, each trained individually. This allows each part to be trained on independent data, reducing the need to obtain high quality, multispeaker data. The individual components are: a) Speaker Encoder b) Synthesizer c) Wavenet vocoder.

### 2.2. Architecture/ Framework/Block diagram



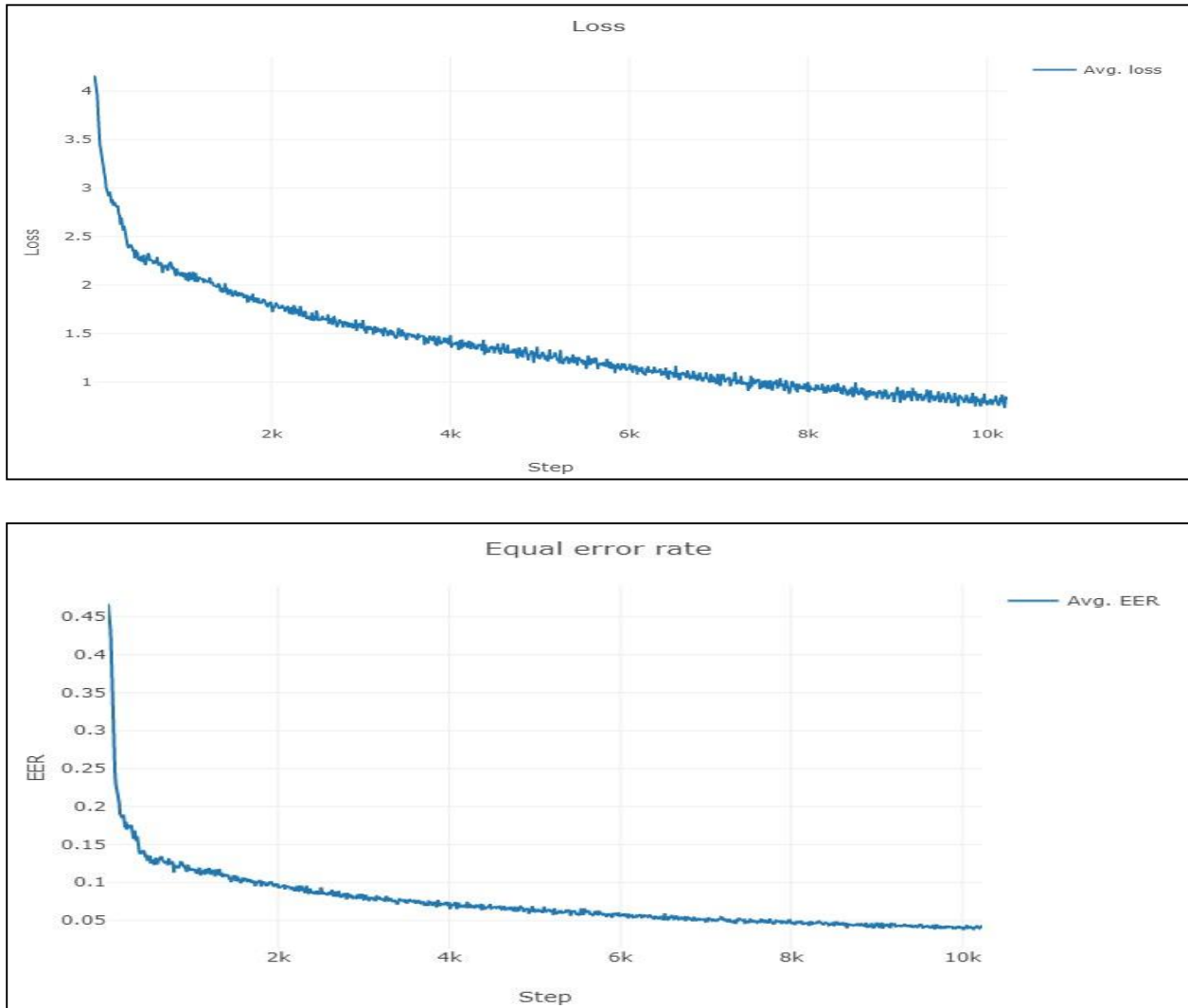
### 2.3. Algorithm and Process Design



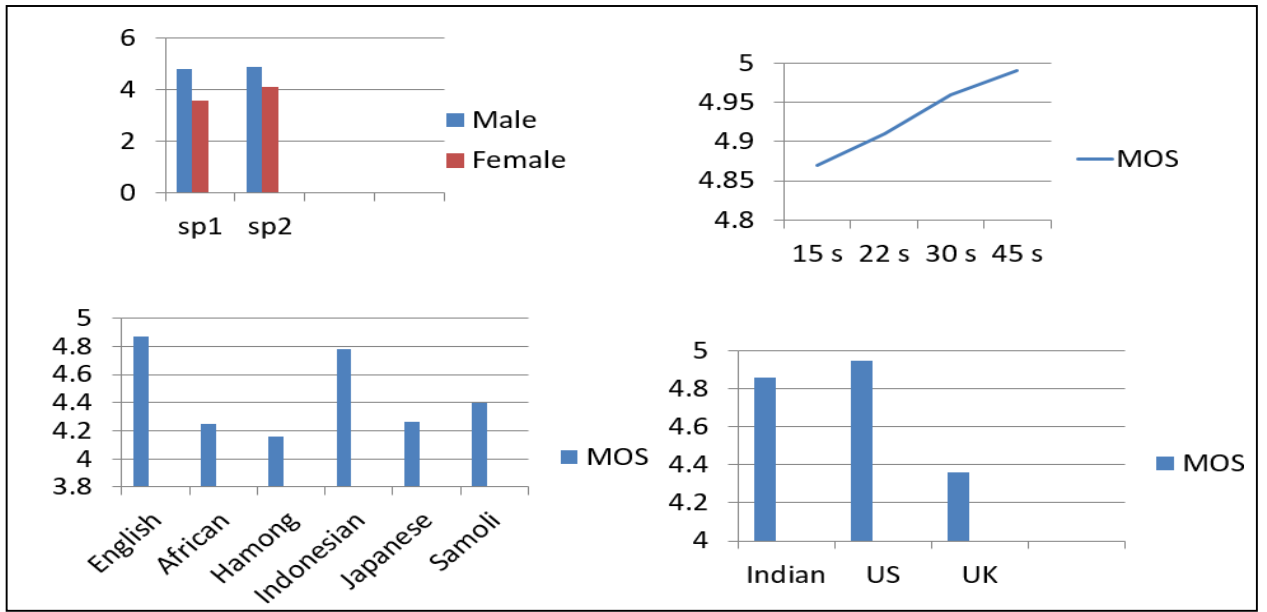
## 2.4. Details of Hardware & Software

- Python 3.6 or 3.7 or 3.8
- Librosa == 0.8.1
- Matplotlib ==3.3.3
- Numpy ==1.19.3
- Tensorflow ==1.5.0

## 2.5. Experiment and Results for Validation and Verification



**Fig 1. Loss and Equal Error Rate of 150 speakers while training till 10k iterations**



**Fig 2. Mean Opinion Sore (MOS) Analysis of outputs**

## 2.6 Conclusion

- Model performed better provided with more utterance per speaker.
- Accent of output of cloned voice is dependent on the accent present in dataset.
- Cloning of voice is independent of language.

## References

- [1] Ye Jia, Yu Zhang, Ron Weiss, Quan Wang, Jonathan Shen, Fei Ren, zhifeng Chen, PatrickNguyen, Ruoming Pang, Ignacio Lopez Moreno, Yonghui Wu.. Transfer Learning from Speaker Verification to Multispeaker Text-To-Speech Synthesis... Part of Advances in Neural Information Processing Systems 31 (NeurIPS 2018).
- [2] Aaron van den Oord, Sander Dieleman, Heiga Zen, Karen Simonyan, Oriol Vinyals, AlexGraves, Nal Kalchbrenner, Andrew Senior, Koray Kavukcuoglu. WaveNet: A Generative Model for Raw Audio. . arXiv preprint arXiv:1609.03499, 2016.
- [3] Fisher Yu, Vladlen Koltun, Multi-Scale Context Aggregation by Dilated Convolutions, Published as a conference paper at ICLR 2016
- [4] Georg Heigold, Ignacio Moreno, Samy Bengio, Noam Shazeer, End-to-End Text- Dependent Speaker Verification, submitted to ICASSP 2016