

# Progress Presentation-I

e-Yantra Summer Internship-2016  
Speech Spoofing and Verification

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Fayyaz

IIT Bombay

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# Overview of Project

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## Overview of Project

### Overview of Task

### Workflow

### Task Accomplished

### Task Accomplished

### Task Accomplished

### Noise Removal System

### Challenges Faced

### Future Plans

### End

- Project Name : Speech Spoofing and Verification
- Objectives
  - Speaker Verification
  - Speech-to-text
  - Speech Spoofing (Synthetic Speech)
- Deliverables
  - Automatic Speaker Identification Verification
  - Sythetic Speech Generation
  - Commented code, report and documentation

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### ■ Tasks with number of days

Noise Removal System	4 days
Speaker Verification	6 days
Speech-to-text	10 days
Spoofing	5 days
Tutorials/documentation	5 days

# Workflow

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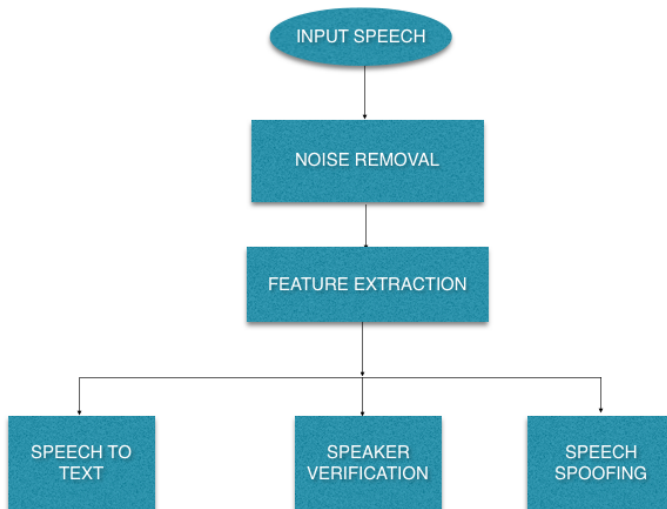
## Task Accomplished

## Noise Removal System

## Challenges Faced

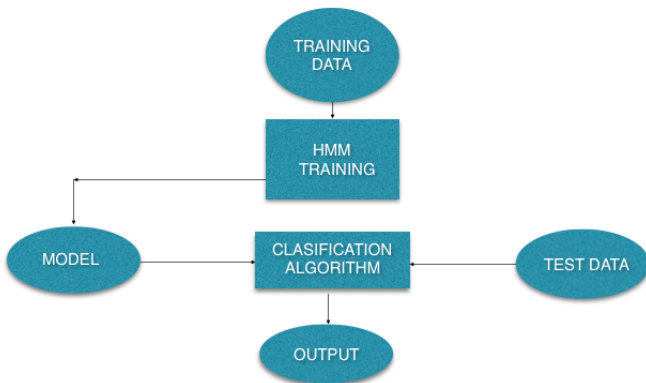
## Future Plans

## End



# Task Accomplished

## ■ Speaker Verification



# Task Accomplished

## ■ Feature Extraction (MFCC)

```
[[ 3.77385697 -5.89369946 7.04465064 ..., -12.81877383 -4.65681823
-6.5038935 ]
[ 3.7217386 -5.93164806 7.33103565 ..., -14.93194733 -6.23467327
-5.0188428 ]
[ 3.77110168 -5.70684071 5.00591631 ..., -17.54040711 -3.71221312
-6.63654072]
...,
[ 9.44742628 -12.37171557 -13.24178788 ..., 1.06830221 -11.59955751
0.58845658]
[ 9.47678172 -12.277035 -18.55693794 ..., 8.95034626 -18.88850111
5.73116554]
[ 9.21593398 -8.70583215 -22.90907994 ..., 7.00177289 -27.75439066
9.28820201]]
number of rows: 819
number of columns: 13

Process finished with exit code 0
```

Figure: mfcc output matrix

# Task Accomplished

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Noise Removal  
System

Challenges Faced

Future Plans

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- Vector Quantization
  - Used K-Means Algorithm
- Classifier Program
  - Forward Algorithm of HMM
- Training Algorithm
  - Used the hmmlearn library
  - Forward - Backward Algorithm

# Noise Removal System

## ■ Spectral Subtraction Method

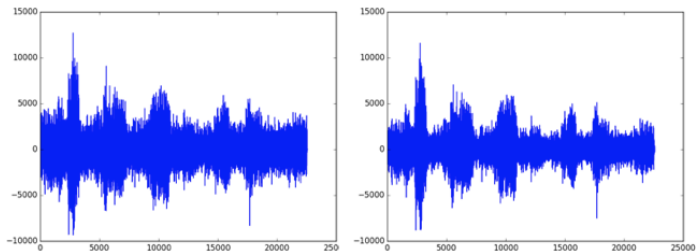


Figure: Input & Output Waveform



# Challenges Faced

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## Noise Removal System

## Challenges Faced

## Future Plans

## End

- Making Noise Removal System work for various SNRs
- Deciding HMM Parameters
- Implementing HMM Algorithms

# Future Plans

- Using LSTM recurrent neural network for speech-to-text conversion using mfcc features

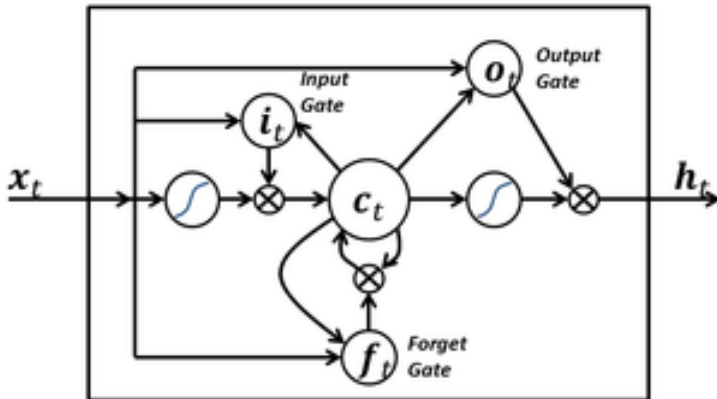


Figure: LSTM Block

- Evaluation Program for Speaker Recognition

# End

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## Thank You !