Speech Recognition System

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***Abstract*— Speech recognition is the way of capturing the spoken words using a gadget and converting them into signals. This system is used in places like smart assistants, evolving search engines, voice identification, speech to text writer applications. In the current world, there is always a need to confirm and recognize the voice of individuals automatically. For every individual securing the personal details from theft is national priority. Cross-correlation measures the closeness amongst x and moved duplicates of y as a component of the slack. Using correlation in MATLAB, the graphs for comparison between the test and sample audio files is derived. The speech recognition can be implemented based on signals graphs of two voice samples**

I. INTRODUCTION

Speech recognition is a system on the statement or command of human speech to identify and understand and react accordingly. It is based on the voice of user as the research object, we program machines to identify and understand human spoken language through speech signal processing and pattern recognition. Speech recognition is a software feature and involves a wide range. It has a very close relationship with acoustics, phonetics, linguistics, pattern recognition theory and neurobiology discipline. With the rapid development of computer hardware and software, information technology and online security, speech recognition technology is gradually becoming a key technology in the computer information processing technology. Products to develop speech recognition technology is also widely used in voice-activated telephone exchange query information networks, medical services, banking services, security, industrial control every aspect of society and people's lives. Many experts believe that speech recognition is one of the 2000 - 2010 IT field best scientific and technological developments.

II. OBJECTIVE

A. Implementation of the system

This system uses the technique of correlation, using which an amplitude graph of the voice sample of the user is taken.This sample is tested with the voice of the user whenever he/she wants access to the system.

B. Fault tolerance

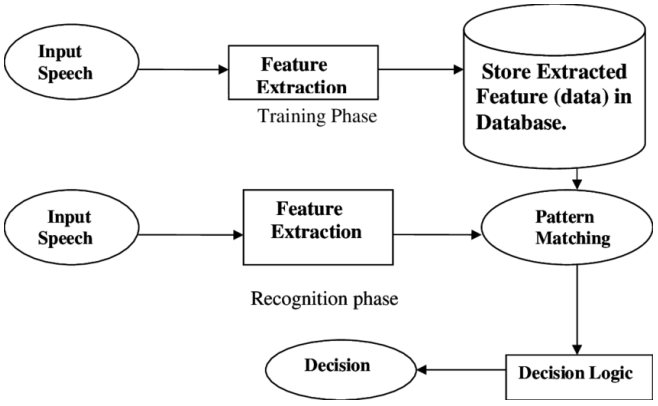
The system should be reliable, it should show consistent results regardless of the number of use.

C. *Accuracy*

The system should be accurate enough to prevent any data breach or privacy while giving the user space for human error.

III. DESIGN

In MATLAB, cross-correlation is a technique to measure similarity of two series as a function of the displacement of one relative to the other. It is commonly used for searching a long signal. The cross-correlation is similar in nature to the convolution of two functions.This feature is useful in our project because we compare two audio inputs to find similarities between them. The structural pattern is given below for our project.



IV. IMPLEMENTATION

A. Voice training:

In this we take the samples voices of the users(for 5 seconds). Then store the data in local memory and make a graph of its pitch. Later we extract the features for correlation. A multiple number of samples are taken and given a unique id.

Pseudo code:

clr

create a recorder object

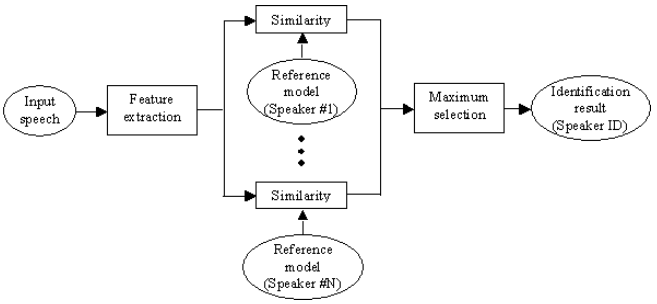
record voice for 5 seconds

store audio data

feature extraction

save user data

upload it to database



B. Voice testing:

In this we take the audio which we want to compare. After taking the audio input we extract the features from it.The feature which we extract is the pitch of it.Now we compare the pitch with the pitch of all sample voices which are stored in the database. The sample voice which has the closest pitch to the input audio pitch is the required one. The corresponding id of the sample voice id then displayed on the output screen.

Pseudo code:

clr

create a recorder object

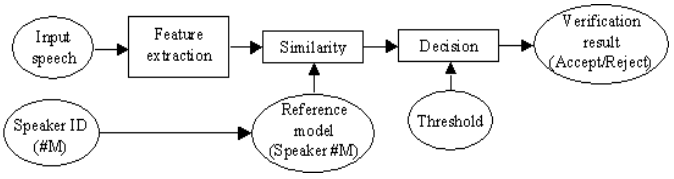
record voice for 5 seconds

store audio data

feature extraction

formulating the data

output



C. Voice feature:

In this we extract the features of the audio samples.The feature which we extract is pitch of the voice. The pitch of any voice is uniqe.So by using FFT we find the pitch and then store that in the database.There will a unique user number to each of audio input and store those in database.

Pseudo code:

compare pitch of input

insert data

compare plotted data

define a max limit

find the similarity

RESULT & ANALYSIS

With the successful completion of this project we will be able to recognise a given audio .
Pros:
– Accurate recognition with space for human error
– Quick results regardless of multiple inputs

Cons:
– Not user friendly
– Not compatible with mobile application due to MATLAB platform

Modules	PLAN START	PLAN DURATION	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE	PERIODS 1 2 3 4 5 6 7
Audio input program	1	1	1	1	100%	
Speech identification program	2	2	2	2	100%	
Speech recognition program	4	2	4	2	100%	
Prototype testing and debugging	6	1	6	2	100%	

Gantt chart

CONCLUSION

The nature of a speech recognition systems are evaluated by two elements: its accuracy and speed.By the end of the project we will be able to implement a reliable and accurate system for speech recognition for multiple users. Using MATLAB, the graphs for comparison between the test and sample audio files is derived.Therefore speech recognition is used in almost every security project.

INDIVIDUAL CONTRIBUTION

1. Kotla Karthik reddy (181IT123) - Extracting the features from the sample voice,testing voice and comparing their features.
2. Mithas Kumar (181IT227) - Storing the audio inputs in extracted features in the database.
3. Hrithik Arya (181IT218) - taking the audio inputs.

LITERATURE SURVEY

[1] Automatic Speech recognition - Douglas O'Shaughnessy(IEEE),2015

[2] Overview of the Speech Recognition Technology- Jianliang Meng, Junwei Zhang , Haoquan Zhao (IEEE),2012.

[3] Research on Speech Recognition Technology and Its Application - Youhao Yu (IEEE) , 2012

.In paper [1],the paper has covered the automated part of the system.

In paper [2], focus in on the surface of the system.

In paper [3], It is mostly based on the application of the system.