# Project Report

# Numerical Analysis

## Submitted to:

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# ➢ SPEECH RECOGINITION SYSTEM

## Chapter 1:

### 1.1:

### Background:

From past few years, our society is facing a lot of problems regarding security system. Different fields are providing different solutions to tackle this issue. Almost all of them are strong enough like finger print security system, pin configuration system, face recognition system and voice recognition system.

In all of these systems, it is a common event that required character like finger print, face, voice, pin is registered and after that on each start we provide required character.

In phone password, tablets, computers, laptops and other machine to receive, recognize, read and understand human languages. This system is so efficient that it listens to a natural language and gave required output. This system enable our personal hand device to scan out uttered words. In a cell phone to enhance the security system we first register a specific word like “wave” and on each unlock the screen shows a mike, when we speak a word that was registered and it synchronizes the signal with registered signal. If the signals match then phone will be unlocked. This system is commonly used in security since 1970s. Its scope is so vast. In any type of security systems we are using this technique. We are implementing this because it is a hot topic in the world of security which is totally depending on science now a days.

### 1.2:

### Problem Statement:

- Implementation of speech recognition system.
- Using “correlation algorithm” for better implementation of our system
- Using some built in functions, some frequency and pitch resemblance.

# Chapter 2:

## 2.1:

## Literature Survey:

From around 1000A.D, the first attempt for voice recognition system was performed. Sir Pope Sylvester invented a device that magically answer yes or no. although details of his discovery were not discovered.

Bell laboratories in the 1950s designed official example for the modern voice recognition system. This system was known as "Audrey". This system was able to recognize 9 digits spoke by a single voice. Originally, the creation of a functional voice recognition system was pursued so that secretaries would have less of a burden while taking dictation. So, while "Audrey" was an important first step, it did little to assist in transcription or dictation. The next real advancement took 12 years to develop.

In 1962, at World's Fair, IBM made a device known as "Shoebox". This was able to recognize 16 words and can differentiate them very perfectly. Till this position, speech recognition system was a major point of interest. The earlier systems were set up to recognize and process bits of sound ('phonemes'). This system used special clues recognize and differentiate the 16 selected words. System tries to match the sound to the most closed clue in the program. At that time, this was a major edition to the field of technology regarding voice.

Ability in distinguishing in the speakers was not the only advancement but in the late 1970s and early 1980s more efforts were performed to enhance the system so that it can be used in the various security systems easily.

Number of scientists are still working to improve the speech recognition system. They are moving towards linguistics approach. Scientist are working on a system as well in which if we pronounce incorrect word it rectify the person semantic and tonal rules.

In the present era, speech recognition system is spreading as we have in iPhone, Android, Voice message through internet etc. Now a days this system has become a field of major interest even people are working to make such kinds of robots through artificial intelligence that recognizes the voice perfectly and perform the tasks.

# Chapter 3:

## 3.1:

### Algorithm:

Algorithm we are using to make this project in matlab is correlation algorithm. Correlation coefficient compares strength and direction of a relationship between 2 variables. Correlation coefficient ranges in 0 to 1. If there is no relation between the values correlation coefficient is 0 or very low. In short, Correlation coefficient varies directly to predicted data.

Correlation is normally used in signal processing, to compare 2 signals and need to find the similarities in them. This method is the dot product of 2 signals. This algorithm has many uses in different fields. This is used to find and synchronize two signals and to match the pattern of this signal. In our project we are using correlation to find similarity between our stored signals and the testing signal.

In numerical analysis and scientific computing using matlab, the term correlation is used between entries of random vectors A and B. Correlation of a random vector is considered between the entries of itself. If each of *A* and *B* is a scalar random variable which is realized repeatedly in temporal sequence, then the correlations of the various temporal instances of *A* are known as autocorrelation of *A*, and the cross-correlations of *A* with *B* across time are temporal cross-correlations.

Precautions must be applied, using correlation algorithm in nonlinear systems. In certain circumstances, which depend on the properties of the input, cross correlation between the input and output of a system with nonlinear dynamics can be completely blind to certain nonlinear effects. Problem arises because some moments automatically become zero and suggest that in sense of statistical dependence there is a little correlation, but in fact 2 signals are related in nonlinear behaviour.

A well-known function is used that is correlation function that explains a static correlation between random variables on temporal distance between 2 defined variables. Correlation function defines random variables representing the same quantities at different points. This is sometimes referred as autocorrelation function that is consisting of autocorrelations. Correlation function of random variables in random quantity are sometimes known as cross correlation function.

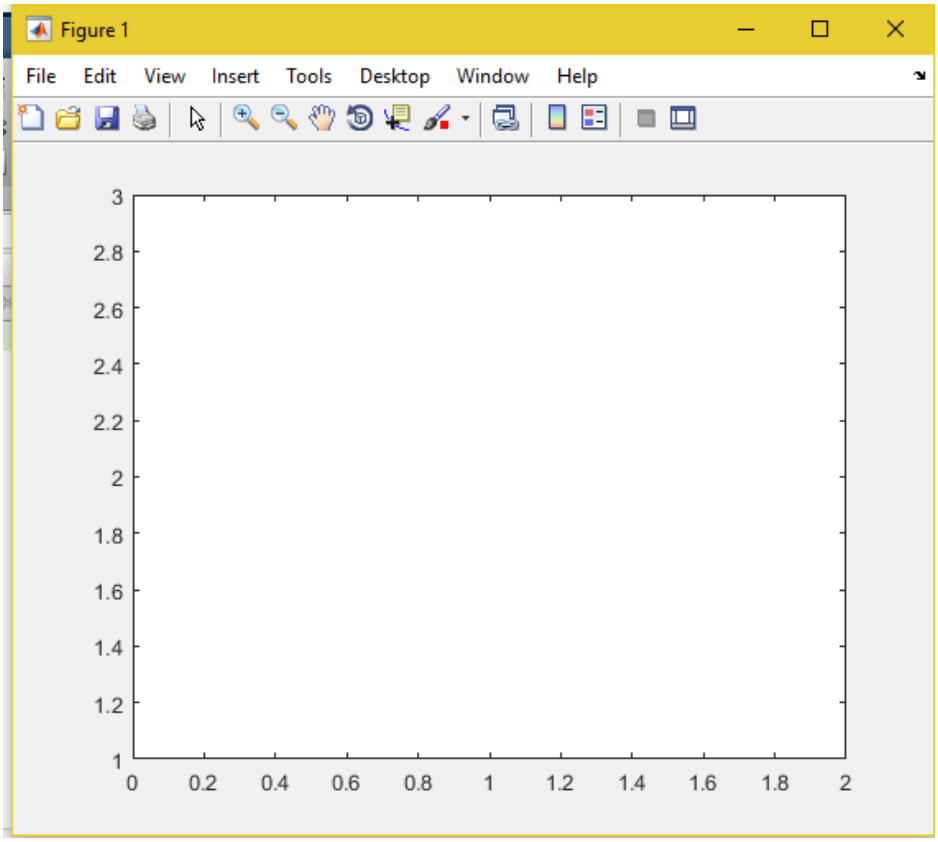
This algorithm is a useful indicator of dependencies of a function of distance, time, and space. This is used to access distance in two points as we are using in our project that compared two signals if distance in them is zero than two signals synchronize and output will be generated.

# Chapter 4:

## 4.1:

### Graphical User Interface:

We are using graphs as our graphical user interface. In this graph GUI we see the relation between two voices either it would be a linear graph in case of same voice or a scattered graph in case of a different voice.




# Chapter 5:

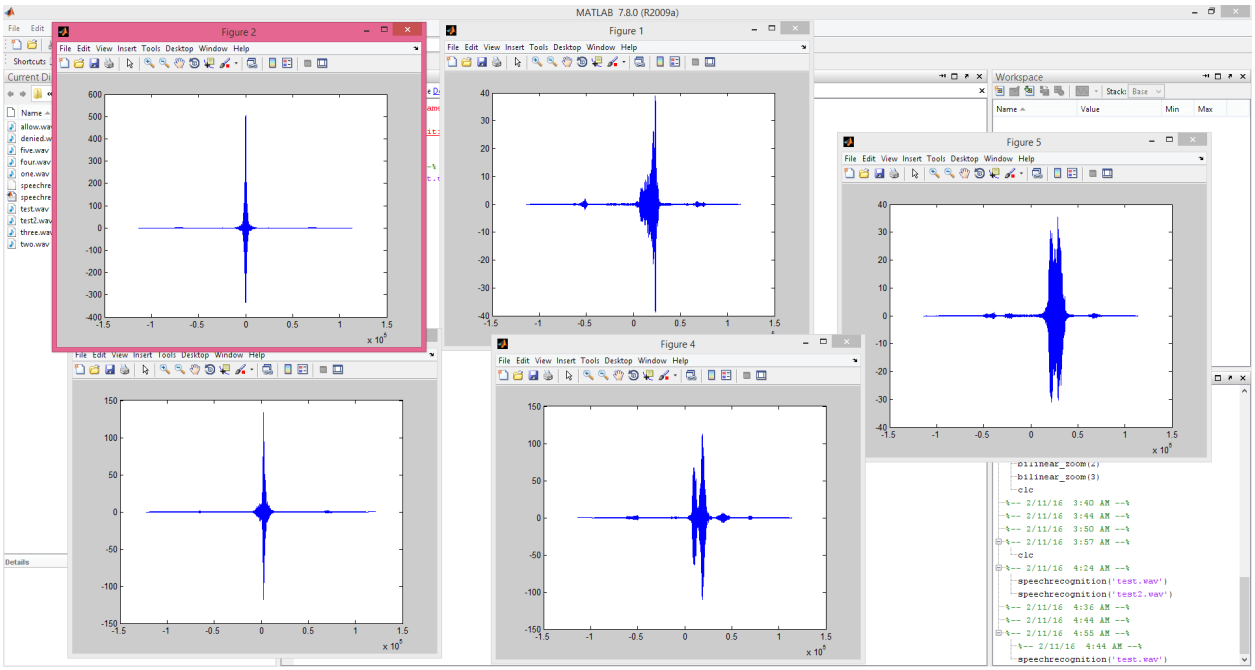
## 5.1:

### Results:

When this program in matlab will be executed we will see a graph on screen in which a wave of a particular frequency will be visible. Frequency of our voice, that

is already added in code, will be matched to the frequency of graph if both will be matched then code will show us required output.

Graph will be like as in figures:




# Chapter 6:

## 6.1:

### Future Directions:

- We are very thankful and pay regards to the improve condition of voice recognition systems.
- Cloud based processing, many larger speech recognition systems no longer struggle with accents.
- Brain transplant that improved to hear more and better words.

- Apple Car play is available in 4 languages.
- Siri is available in at least 25 languages.
- Sound systems are developed that recognizes the emotions that a person sounds sad, happy, proud, depressed. Tell Siri that we love her, she does not say that I love you too. But it is a hope that till 2030 she says that I love you or you should not say this to me.
- Number of tasks are still continue to improve speech recognition systems. Main goal of all these tasks are to help human to save his personal data as each person has a different voice like a unique fingerprint.

- We have already begun to nudge our way deeper into a world where we are more and more dependent on our technology.

# Chapter 7:

## 7.1:

## References: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