

# Tone Identification

Dept. of Electronics and Communication Engineering

**Presented By:**

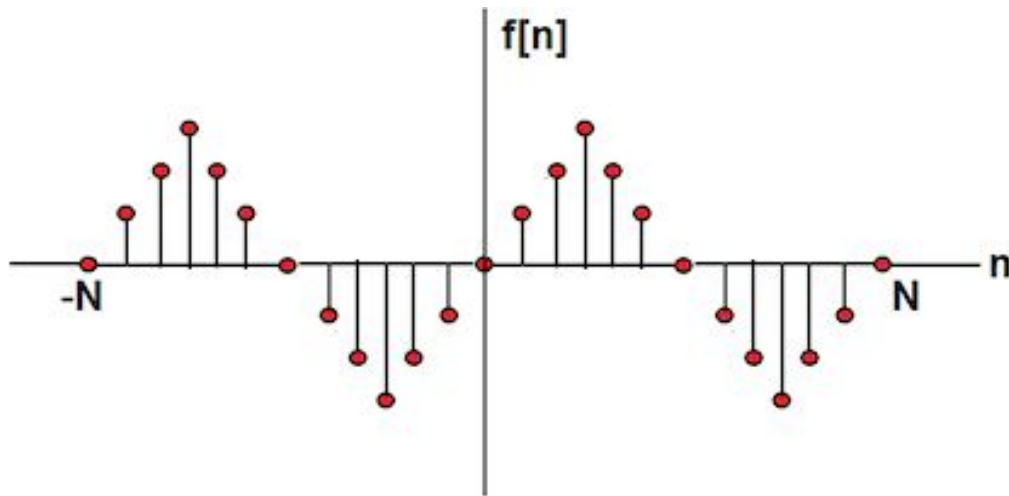
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# Presentation Outline

- Problem Definition
- Prior Work
- Solution
- Simulation and Result
- Implementation
- Conclusion



# Problem Definition

- Tone stands for musical or vocal sound with reference to its properties.
- Tone identification is a process to identify the tones.
- If several audio signals is given, our aim is to find out that from the given audio signal, which audio matches with our test audio signals.
- Its mainly used in applications such as security related applications for verification purpose and in pattern recognition systems.
- Project Deliverable: From a given set of digit audio clips (1-5), we've to verify the matching tone by providing a digit audio clip. (any)

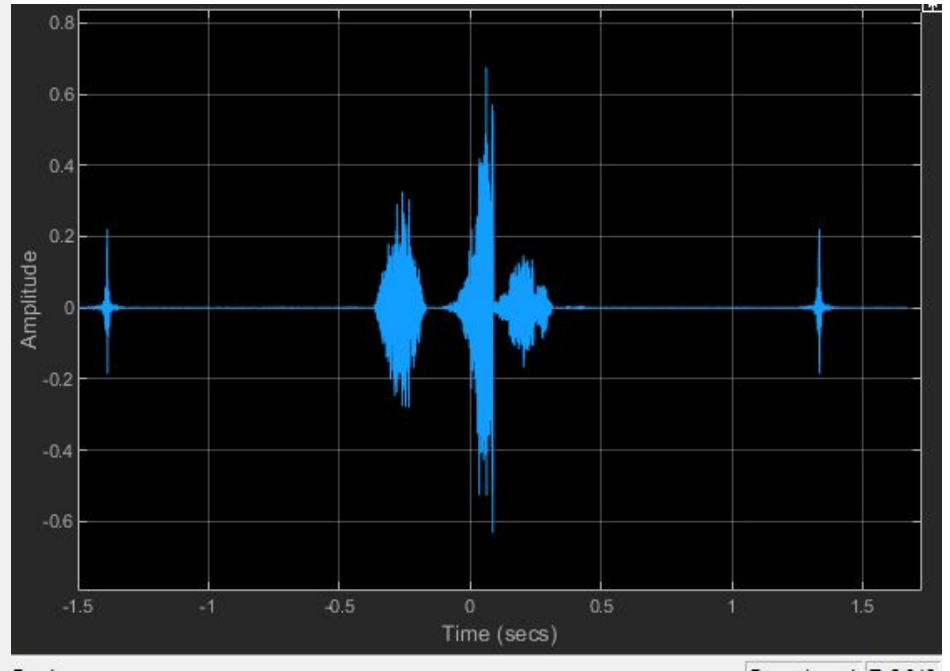
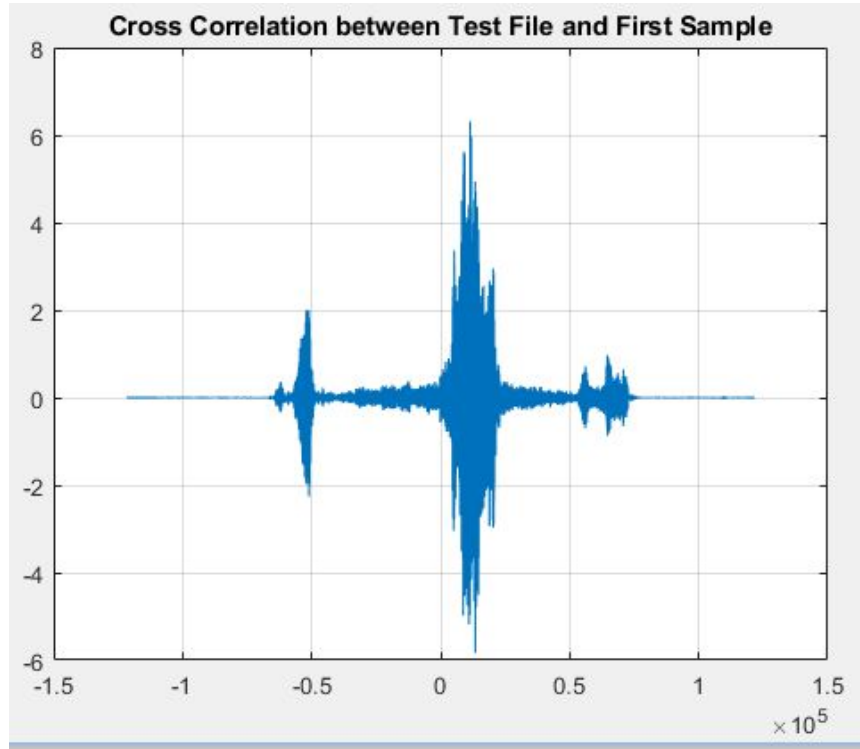
# Associated Literature

- ***We came up with some solutions:***
  1. Using Fourier Transform approach to detect specific frequencies in audio file.
  2. Using Statistical Model like Hidden Markov Model (HMM) and Neural Network Architecture for tone identification.
  3. Using Cross Correlation technique.

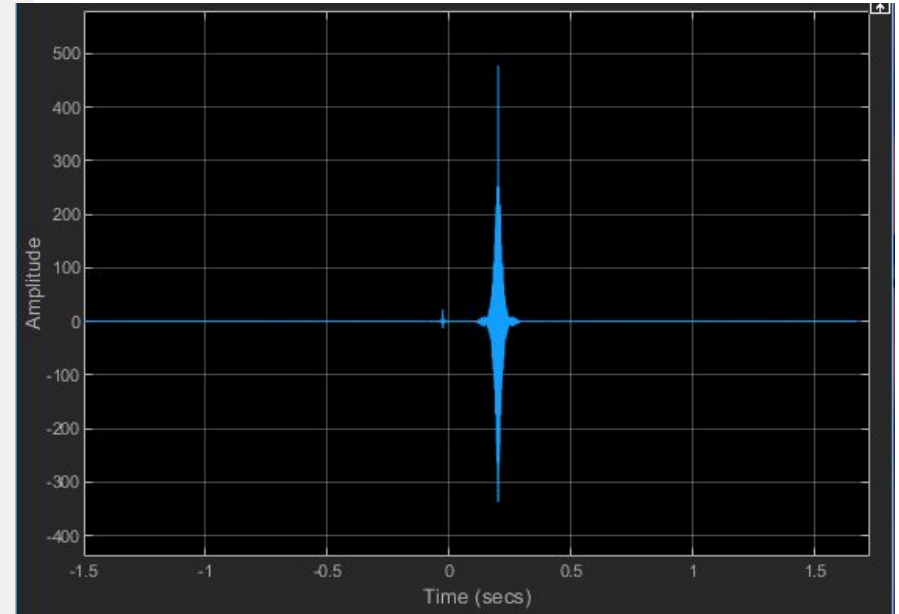
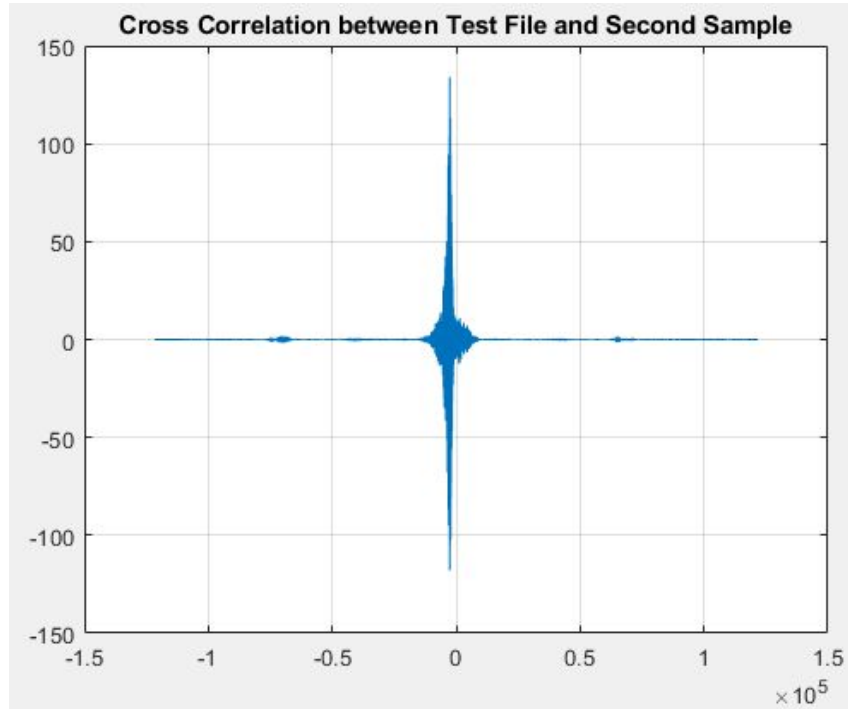
# Solution: Cross Correlation Technique

1. We have used cross-correlation function to complete our task.
2. Cross-correlation functions gives the similarity between two signals i.e input audio signal and test audio signal.
3. Formulae of cross correlation: 
$$R_{xy} = \sum_{n=0}^{N-1} x(n)y(n-k)$$
4. `xcorr()` is the in-built MATLAB function used for finding cross correlation between two signals.

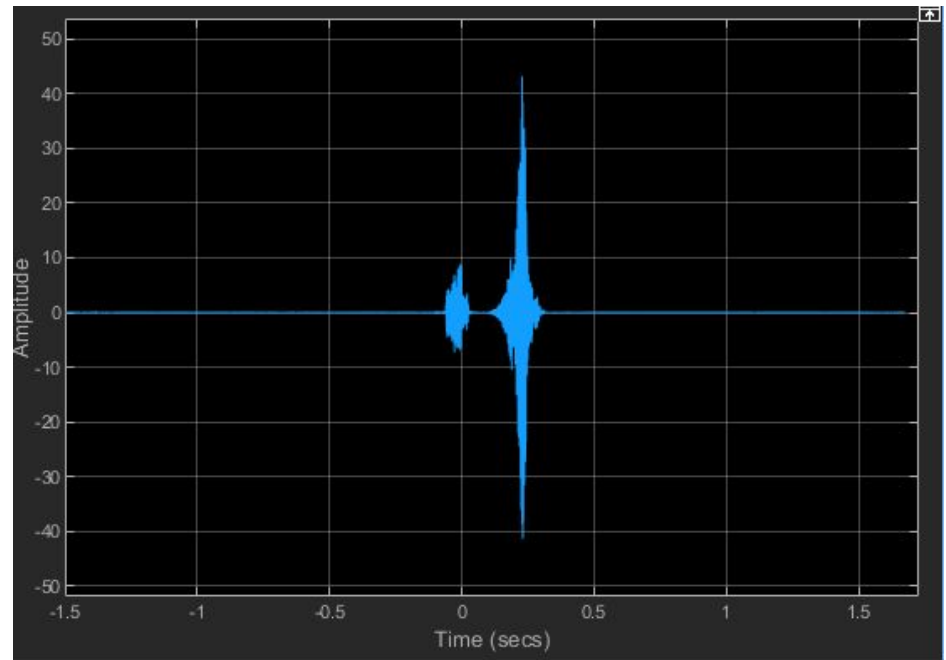
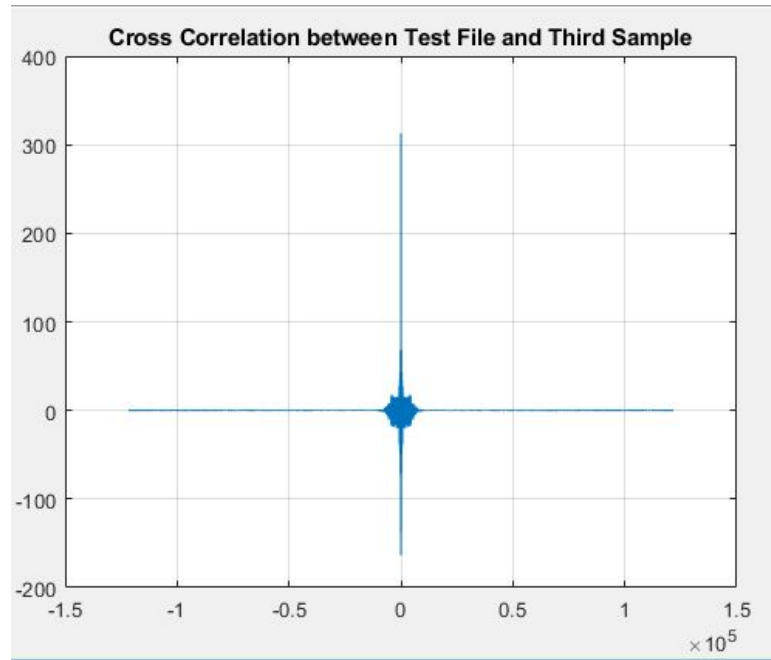
# Simulation and Results:



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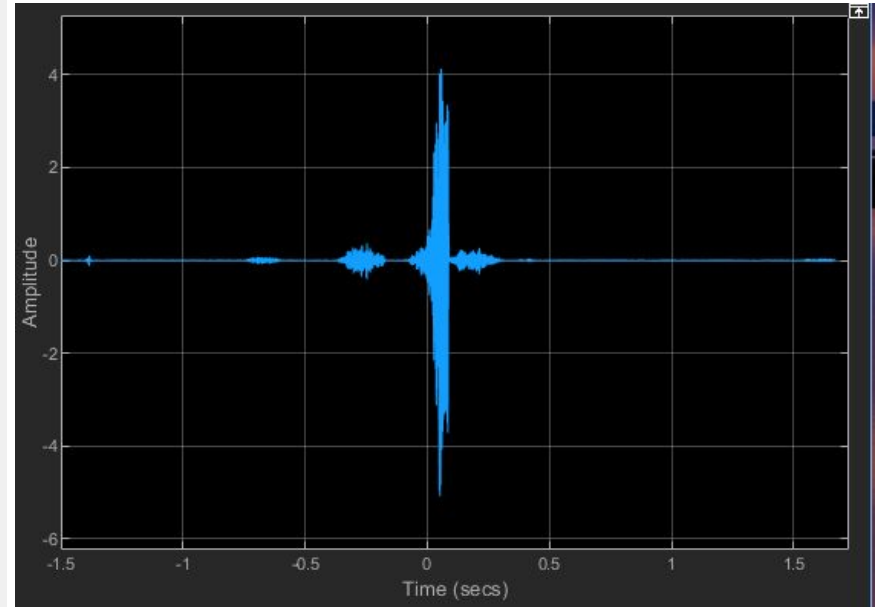
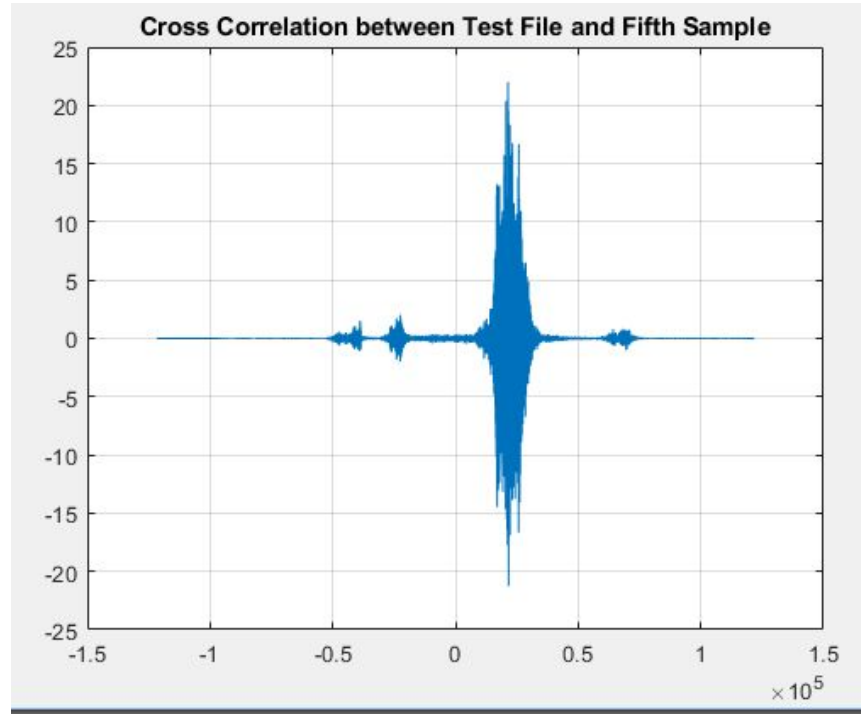


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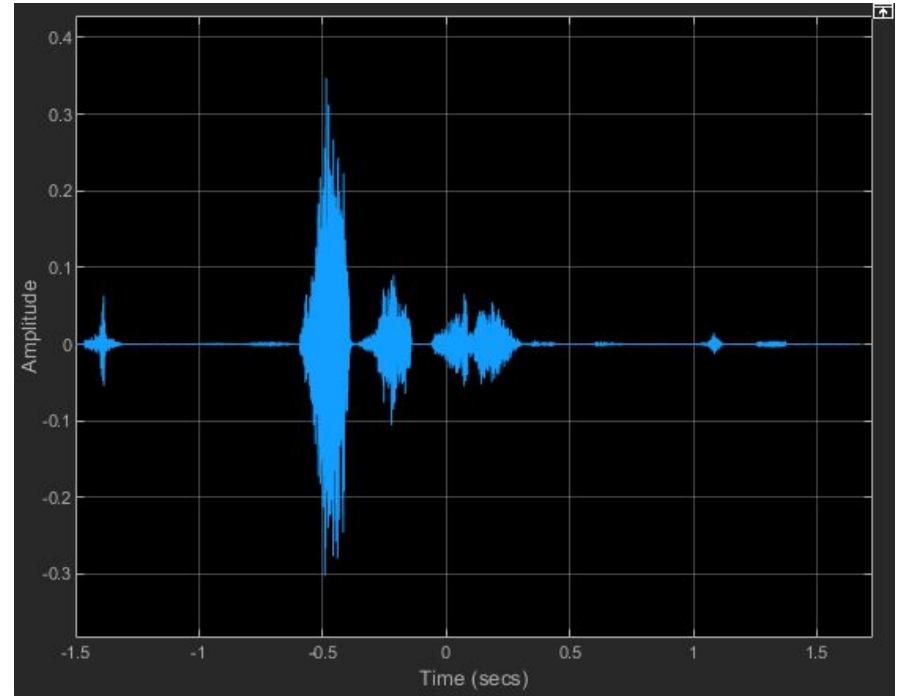
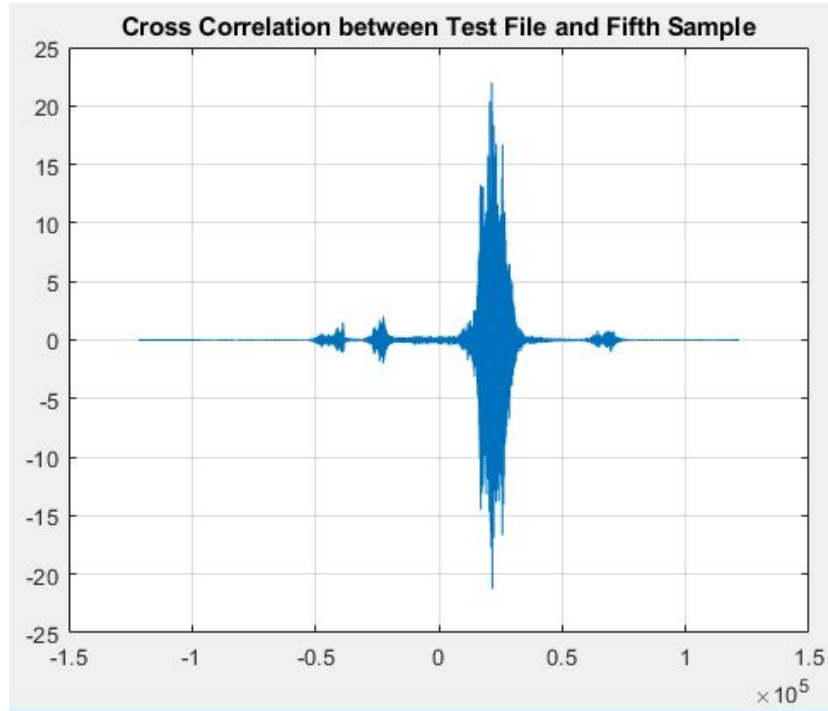




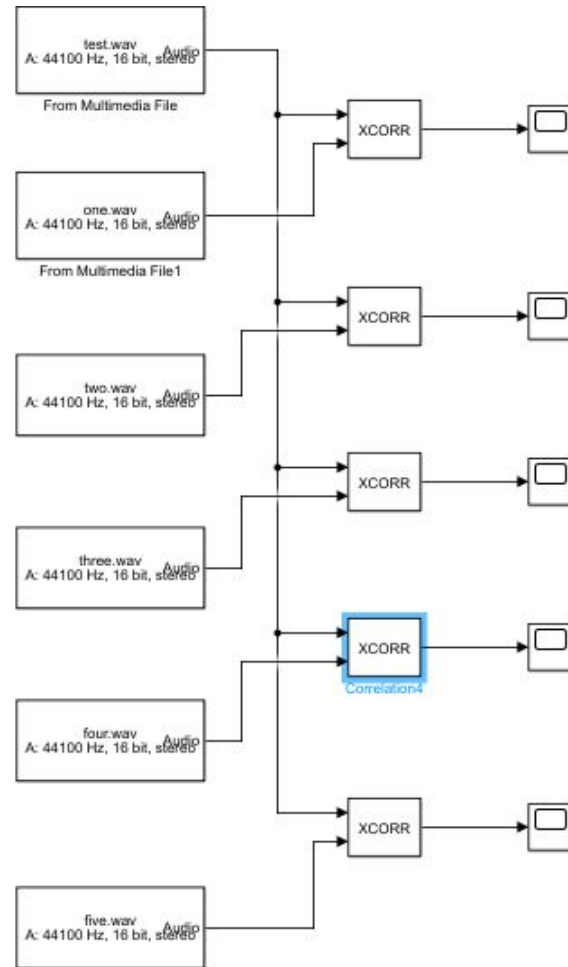
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# Simulation and Results:



# Simulink Model



# Conclusion

- We were successfully able to find the solution to our problem using MATLAB script and Simulink model.
- This problem have a wide applications in real life.

# Thank You!