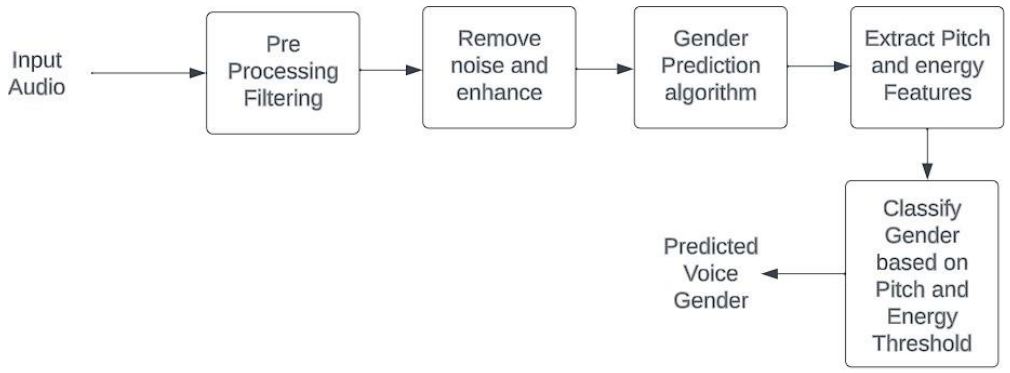
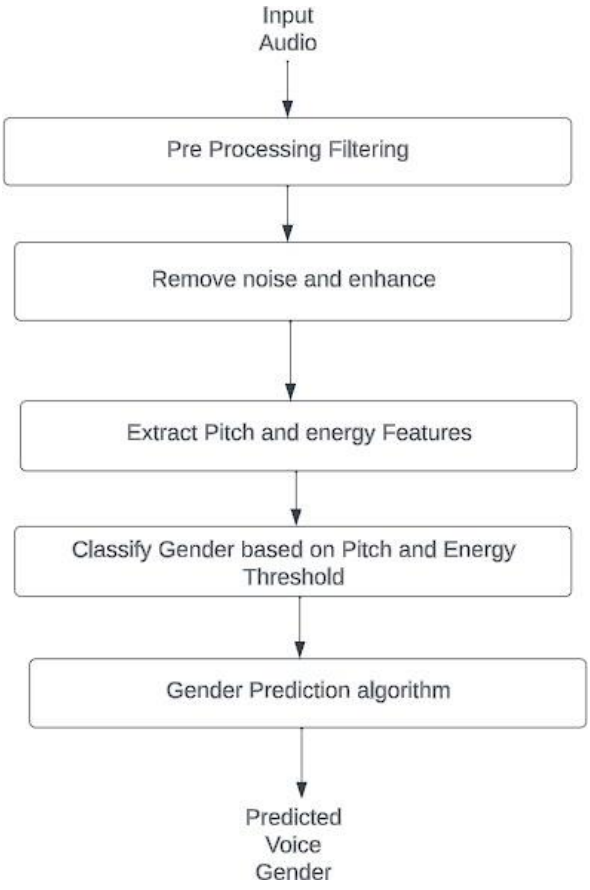
Gender Recognition from Audio

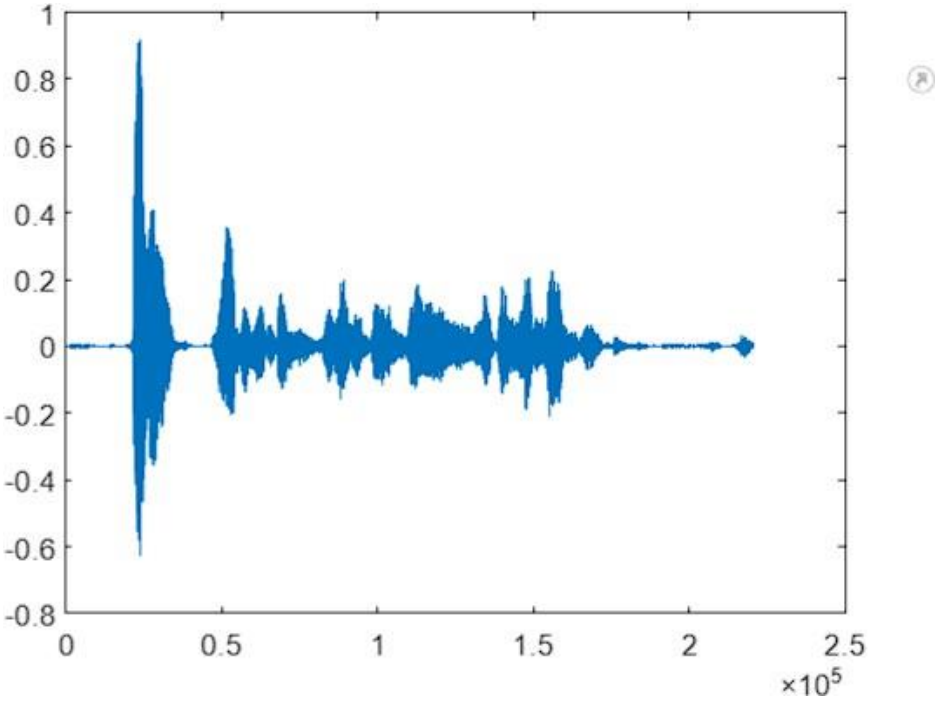
Problem Statement:-	Gender Recognition From Audio
Objective:-	Design and implement an algorithm to predict the gender of an individual based on features extracted from pre-recorded audio data. The features include pitch and energy, and the algorithm uses predefined thresholds for classification.
Proposed Solution:-	We have Implement an algorithm which will predict the Gender of a person from its Voice. This all is done using MATLAB.
Block Diagram:-	 **Fig:- Gender Recognition from Voice**

	Steps:- ***Audio Recording:*** Utilize an audio recording device to capture a password or spoken input from individuals. ***Pre-processing and Filtering:*** Remove noise and enhance the quality of the recorded audio data to ensure accurate feature extraction. ***Feature Extraction:*** Extract two key features from the audio data ***Pitch:*** The fundamental frequency of the voice. ***Energy:*** The overall energy of the audio signal. ***Gender Classification:*** Set predefined thresholds for pitch and energy to distinguish between male and female voices. Classify the gender based on whether the extracted features meet the established thresholds. ***Results Display:*** Display the predicted gender based on the classification results
Flow Chart:-	

Experimentation And Result Analysis:-

```
% Gender Recognition from Pre-recorded Audio using Pitch and Energy
Thresholds


% Step 1: Record Audio Password and filter the noise
recorder = audiorecorder(44100, 16, 1); % Adjust settings as needed
disp('Recording...Ref_Audio');
recordblocking(recorder, 2); % Record for 5 seconds (adjust as
needed)
disp('Recording finished.');
fs=44100;


% Get the recorded audio
audioData = getaudiodata(recorder);


% Replace 'your_audio_file.wav' with the path to your audio file
%audioFile = 'MSample.mp3';


% Read the audio file
%[audioData, fs] = audioread(audioFile);
% Play the audio
sound(audioData, 44100);
plot(audioData)


% Extract pitch and energy as features
fundamentalFrequency = pitch(audioData, fs)
energy = sum(audioData.^2)


% Set thresholds for gender classification (you may need to adjust
these)
pitchThreshold =260; % Adjust based on your data
energyThreshold = 3; % Adjust based on your data


% Classify the voice as male or female
if all(mean(fundamentalFrequency) < pitchThreshold) &&
all(mean(energy) > energyThreshold)
    disp('Predicted gender: Male');
else
    disp('Predicted gender: FeMale');
end
```

```
fundamentalFrequency = 495×1
    386.8421
    386.8421
    383.4783
    383.4783
    386.8421
    383.4783
    383.4783
    386.8421
    383.4783
    367.5000
       ⋮

energy = 454.8834
Predicted gender: Male
```



Efficiency of Male Voice Prediction:- 81.1%

Efficiency of Female voice Prediction:- 72.5%

Conclusion:	Pitch and energy are chosen as the features for gender classification. The mean pitch and the total energy of the audio signal are computed. Gender Classification: Gender classification is performed based on simple thresholding of pitch and energy values. If the mean pitch is below a certain threshold and the mean energy is above another threshold, the gender is predicted as male; otherwise, it is predicted as female. If the gender classification results are not satisfactory, consider exploring more advanced signal processing techniques or machine learning models for better accuracy.