**Male Female Voice Recognition**

This is a project which I made using MATLAB. As the title suggests it is a simple application which detects the gender of the person.

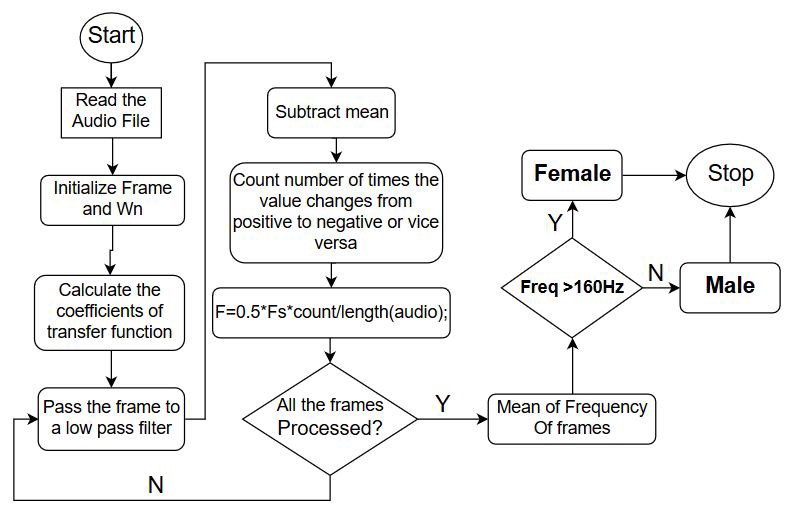
**Prior Information Utilized:-**

● Fundamental frequency of a typical male ranges somewhere from 85 Hz to 180 Hz.

● Fundamental frequency of a typical female ranges somewhere from 155 Hz to 255 Hz.

Thus we set the threshold frequency to be 160Hz i.e. if the calculated frequency of the audio is more than 160Hz then it is Female voice and if less then it is Male voice.

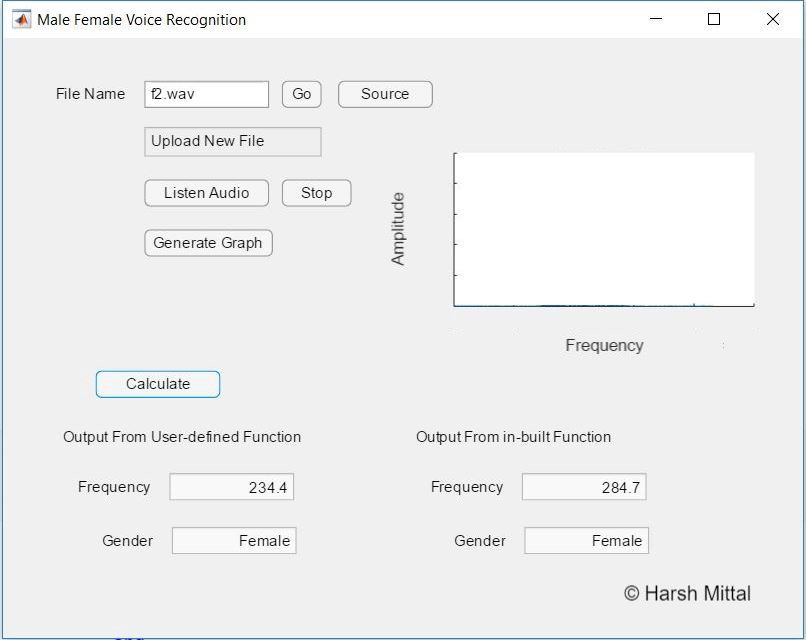
**Methodology :-**



Workflow

In the above workflow each frame is passed through a low pass filter so that only voice signal remains and rest is discarded. This help in increasing the accuracy. For each frame mean is subtracted from all the values and then zero-crossing method is used to find the frequency. At the end the mean frequency of all the frames is compared with threshold frequency to identify the gender.

**GUI Application:-**



App

*Source button* — Used to select the source file. By default it is set to take in only .wav files(can be changed either in source file)

*Go button* — After the selection from source button to finally select the file name shown in box, press this button

Another way is directly writing the address of that file and pressing *Go button*.

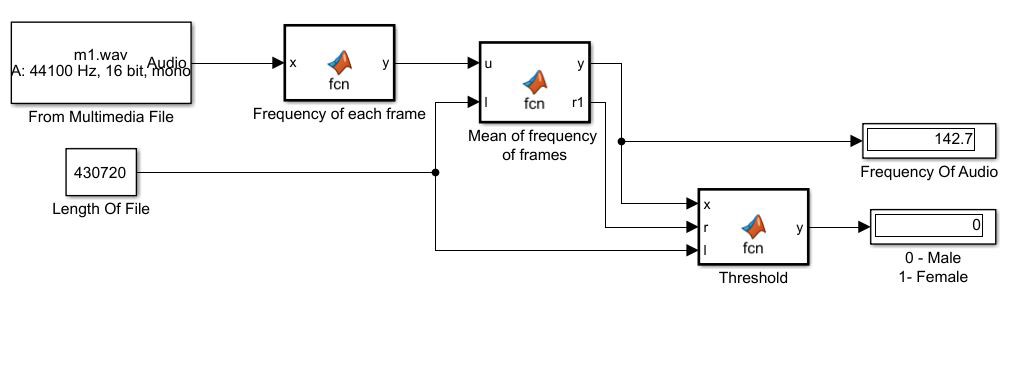
In the Message box where in the “Upload New File” is shown provides step by step procedure and errors made by the user while selecting the file and processing it further.

*Generate Graph* — Generates the FFT graph of that audio file.

**Calculate** button — This button calculate the frequency using the algo proposed and using the inbuilt algo. Also it tells the gender.

Note- Even though the frequency do not match, the gender predicted is almost same in all the test cases.

**Simulink:-**



Simulink Model

Using the *From Multimedia File* block the sample audio is taken as input with 3500 samples per audio channel. This is passed to the next block where frequency of each frame is calculated. Following is the code for that function.

function y = fcn(x)  
Fs=44100;  
coder.extrinsic('butter'); % To include butter function in simulink  
coder.extrinsic('filter'); % To include filter function in simulink  
[b0,a0]=butter(2,325/(Fs/2));  
xin = abs(x);  
xin=filter(b0,a0,xin);  
xin = xin-mean(xin);  
x2=zeros(length(xin),1);  
x2(1:length(x)-1)=xin(2:length(x));  
zc=length(find((xin>0 & x2<0) | (xin<0 & x2>0)));  
y = 0.5\*Fs\*zc/length(x);

In the next block *Persistent* is used in order to save previous result in order to use next time. This is essential for the caculation of mean frequency.

Code:-

function [y,r1] = fcn(u,l)  
persistent i  
persistent r  
if isempty(i)  
 i = 0;  
end  
if isempty(r)  
 r = 0;  
end  
j=l/3500;  
i= (u/j)+i;  
r=r+1;  
r1=r;  
y = i;

In the final block values are compared with the threshold values.

function y = fcn(x,r,l)  
y=5;  
if r>l/3500  
 if x>160  
 y=1;  
 else  
 y=0;  
 end  
end  
end

As final result frequency is displayed also

0 - Male  
1 - Female

**Result**

● This technique can identify correct answer almost in 6 out of 10 test cases.

● Frequency identified is almost correct but since there is an overlap between the fundamental frequency of male and female, it is not able to accurately identify the gender.

**Future Scope:-**

Use Machine Learning to classify different voices and then generate more accurate results.

<https://github.com/harshmittal2210/Male-Female-Voice-Recognition>

<https://github.com/Shubzedm007/Male-Female-Voice-Recognition>

<https://studentnet.cs.manchester.ac.uk/resources/library/thesis_abstracts/MSc13/FullText/Sheikh-HassamUllah-fulltext.pdf>

<http://nebula.wsimg.com/7526a5d56b59c614ec8cf6233d2b5e2a?AccessKeyId=DFB1BA3CED7E7997D5B1&disposition=0&alloworigin=1>