clc;

clear all;

close all;

path='C:\Users\mkpvi\Desktop\vit\set\Matlab\test';

obj=dir(path);

sr=8000; %sampling freq

n=256;

filename=fullfile(path,obj(3).name);

[audioIn,fs]=audioread(filename);

signal=sampleconv(audioIn,fs,sr);

figure

plot(signal)

title('speech signal');

xlabel('Number of samples');

ylabel('Pitch');

audioIn = filter ([1 -.95], 1, signal);

figure

plot(audioIn)

title('Filter');

xlabel('Number of samples');

ylabel('Pitch');

for k = 1 : size(audioIn,2)

frames{k} = buffer(audioIn(:,k),n,128);

end

figure

plot(frames{k})

title('Framed Signal');

xlabel('Samples');

ylabel('Amplitude');

window=0.42 - 0.5\*cos(2.0\*pi\*(1:n)'/(n+1))+0.08\*cos(4.0\*pi\*(1:n)'/(n+1)); %blackman

windowed\_frames=frames{k}.\*window;

figure

plot(windowed\_frames)

title('BlackMann Window');

xlabel('Samples');

ylabel('Amplitude');

fftx=fft(windowed\_frames);

fftx=abs(fftx);

figure

plot(fftx)

title('Fourier transform of the signal');

m = melfb(20, n, fs);

figure;

plot(linspace(0, (16000/2), 129), melfb(20, n, 8000)')

title('Mel-spaced filterbank'), xlabel('Frequency (Hz)');

n2 = 1 + floor(n / 2);

z = m \* abs(fftx(1:n2, :)).^2;

Feature = dct(log(z));

figure;

plot(Feature)

title('Extracted MFCC FEATURE COEFFICIENTS')

[felpc,variance]=lpc(windowed\_frames,8);

feature{1} = felpc;

figure

plot(feature{1})

title('LPC Coefficients');

feature{2} = spectralCentroid(audioIn,fs, ...

'Window',blackman(round(0.032\*fs)), ...

'OverlapLength',round(0.016\*fs));

figure

plot(feature{2})

title('Spectral Centroid');

feature{3} = spectralFlatness(audioIn,fs, ...

'Window',blackman(round(0.032\*fs)), ...

'OverlapLength',round(0.016\*fs));

figure

plot(feature{3})

title('Spectral Flatness');

% feature{4,x-2} = mfcc(fftx,sr,"LogEnergy","Ignore");

feature{5} = formant\_frequency(felpc,sr);

figure

plot(feature{5})

title('Formant Frequencies');

%

feature{6} = sum(abs(diff(windowed\_frames>0)))/length(windowed\_frames);

figure

plot(feature{6})

title('Zero Crossing Rate');