**Project report**

FOURIER TRANSFORM OF SPEECH SIGNAL

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Code of Project:

% Record your voice for 60 seconds.

recObj = audiorecorder(1000,8,1);

disp('Start speaking.')

recordblocking(recObj, 60);

disp('End of Recording.');

fs = 1000;

fs1 = 50;

% Store data in double-precision array.

y = getaudiodata(recObj);

% Plot the waveform.

figure;

plot(y);

xlabel('Samples (n)');

ylabel('Amplitude ');

title('Plot of Speech signal');

len = length(y);

% fs1 because we have to sample for 20ms

temp = round(len\*fs1/fs);

temp1 = len\*fs1/fs;

% preventing temp to go out of limit

if temp>temp1

temp = temp-1;

end

% Intializing the signal

y2 = zeros(1,temp);

% Taking the samples at the interval of 20ms

for k = 1:temp

y2(k) = y(((k-1)\*fs/fs1)+1);

end

% Number of samples in 1 sec = fs1;

y3 = vec2mat(y2(:),fs1);

Y = zeros(size(y3));

for k = 1:size(y3,1)

Y(k,:) = fft(y3(k,:),size(y3,2));

end

Y = abs(Y);

Y1 = Y';

%figure;

%surf(z);

figure;

imagesc(Y1);

xlabel('Time (sec)');

ylabel('Frequency (Hz)');

title('Image plot of speech signal Transform');

caxis([min(Y(:)) max(Y(:))]);

colorbar;

figure;

surf(Y1);

caxis([min(Y(:)) max(Y(:))]);

colorbar;

xlabel('Time (sec)');

ylabel('Frequency (Hz)');

zlabel('amplitude');

title('Surface plot of speech signal Transform');

* First, we have taken a speech signal of 1 min duration and then sampled the signal with the sampling frequency of 1khz.
* Then we have down sampled the signal. As we have to down sample the signal with the sampling frequency of 50 Hz, so we have multiplied the length of sampled signal with the down sampling frequency and divided it by original sampling frequency () .
* Then we have created a matrix of down sampled signal with an interval of 1 sec (in one row) .
* Then we have obtained the Fourier transform of the matrix row wise.
* Then we obtained the transpose of transformed matrix and then plotted the image plot and surface plot.

Results:





