

Digital Signal Processing Lab

Experiment 6

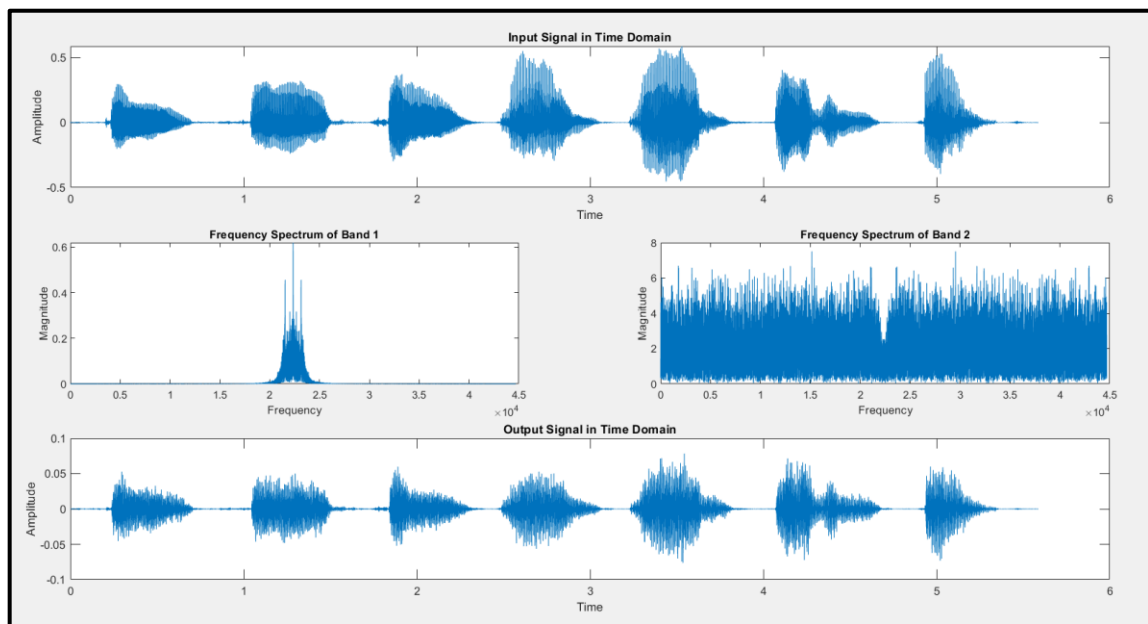
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Aim:

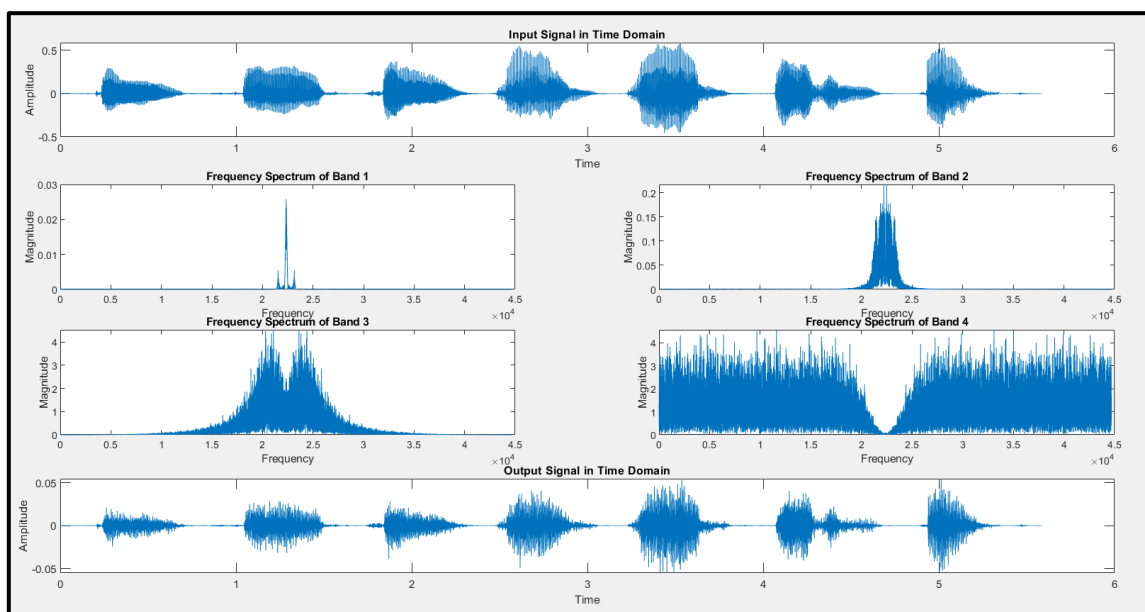
Speech Recognition with Primarily Temporal Cues

Plots:

For 2 Bands



For 4 Bands



Code:

```
clc
clear all
close all

order = 4;
[y,Fs] = audioread("./Samples/B1_M1.wav");

subplot(4,1,1);
t = 0:1/Fs:(length(y)-1)/Fs;
plot(t,y);
xlabel("Time");ylabel("Amplitude");
title("Input Signal in Time Domain");

norm = Fs/2;
N = 4;
Fc = 160;
[B_1, A_1] = butter(order*2, Fc/norm);
noise = rand(size(y));
output = zeros(size(y));

bands = logspace(log10(1), log10(Fs/2-1), N+1);
for i = 1:N
    [B, A] = butter(order/2, [bands(i)/norm, bands(i+1)/norm]);
    Y = filter(B,A,y);
    Y_e = Y.*(Y>0);
    Y_el = filter(B_1, A_1, Y_e);
    n = filter(B,A,noise);
    subplot(4,2,2+i);
    plot(abs(fftshift(abs(fft(n.*Y_el)))));
    xlabel("Frequency");ylabel("Magnitude");
    title("Frequency Spectrum of Band " + num2str(i));
    output = output + n.*Y_el;
end

subplot(4,1,4);
plot(t,output);
xlabel("Time");ylabel("Amplitude");
title('Output Signal in Time Domain');

out_file = "answer_" + num2str(N) + ".wav";
audiowrite(out_file,output,Fs);
```