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%
%Create_Spectrogram.m - create a spectrogram plot from a .wav file
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fname = 'NorthernMockingbird'; %From http://www.mbr-pwrc.usgs.gov/id/songwav.html

[data, fs, nbits] = wavread(fname);

dt = 1/fs; %Time interval between samples;
nsamples = length(data);

window_length = 512;
noverlap = window_length/2;
nfft = window_length/2;

%Pre-process the data
data = detrend(data); %Remove any DC bias
data = data/max(abs(data)); %Normalize

%Plotting parameters
fontweight='bold';
fontsize=14;

%Create and label the spectrogram
subplot(2,1,1);

[y,f,t,p] = spectrogram(data,window_length,noverlap,nfft,fs, 'yaxis');
surf(t,f,10*log10(abs(p)), 'EdgeColor', 'none');

axis xy; axis tight; colormap(jet); view(0,90);
xlabel('Time (sec)', 'FontWeight',fontweight, 'FontSize',fontsize);
ylabel('Frequency (Hz)', 'FontWeight',fontweight, 'FontSize',fontsize);
title('Spectrogram', 'FontWeight',fontweight, 'FontSize',18);

subplot(2,1,2);
time = dt*(0:[nsamples-1]);
plot(time,data);
xlabel('Time (sec)', 'FontWeight',fontweight, 'FontSize',fontsize);
ylabel('Normalized Volts', 'FontWeight',fontweight, 'FontSize',fontsize);
title('Time Series - Northern Mockingbird Song', 'FontWeight',fontweight, 'FontSize',
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fontsize);
xlim( [0 8] );
grid on;
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