

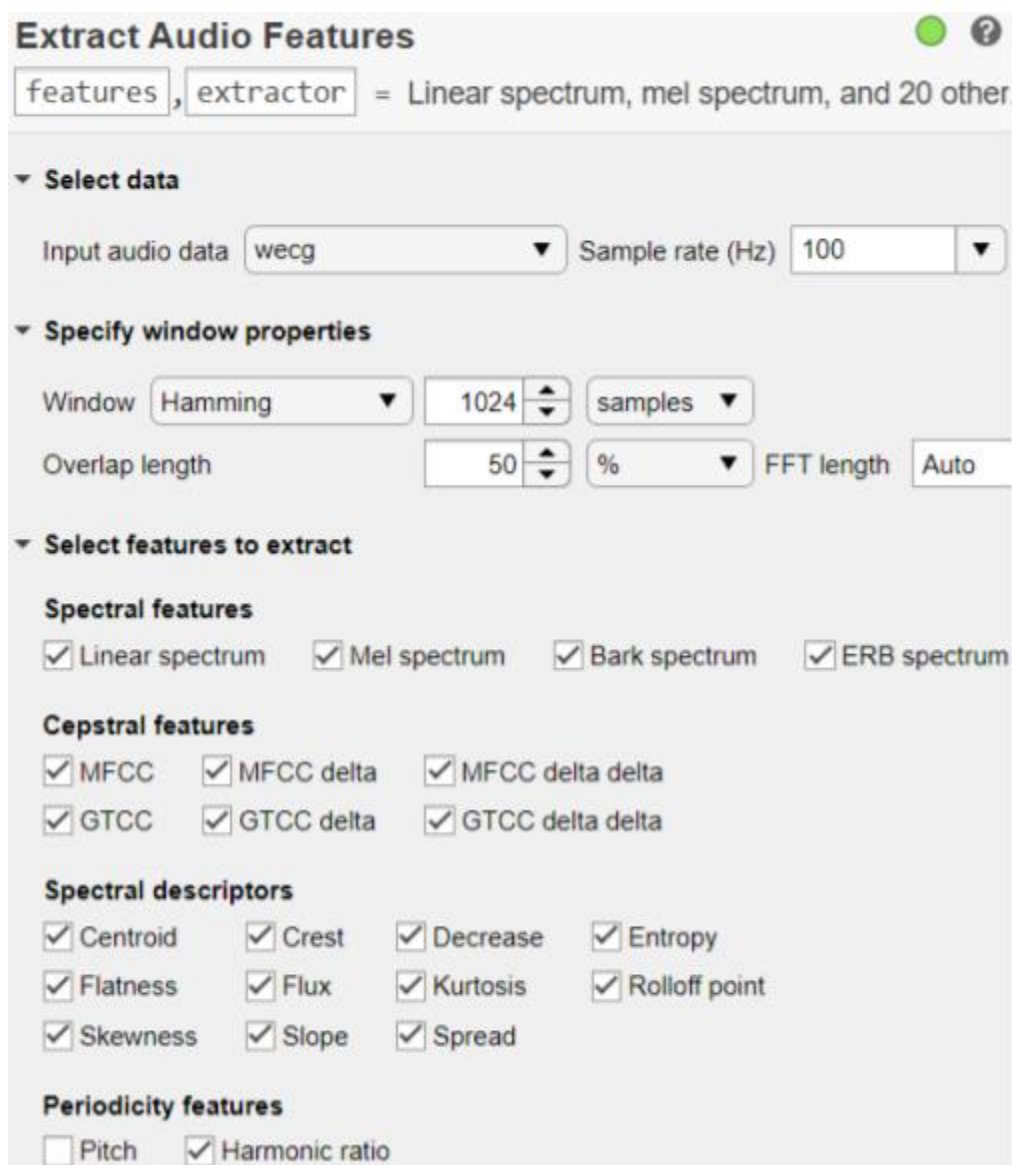
LAB EXERCISE: 14 - Extracting audio features using heart sound dataset

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INPUT CODE:

```
load wecg;  
[a,d]=haart(wecg);
```

INPUT FOR EXTRACTING AUDIO FEATURES:



The screenshot shows the 'Extract Audio Features' GUI window. At the top, it displays 'features' and 'extractor' with a description: '= Linear spectrum, mel spectrum, and 20 other'. Below this, there are three main sections: 'Select data', 'Specify window properties', and 'Select features to extract'.

- Select data:** 'Input audio data' is set to 'wecg' and 'Sample rate (Hz)' is set to '100'.
- Specify window properties:** 'Window' is set to 'Hamming', 'FFT length' is '1024' samples, 'Overlap length' is '50%', and 'FFT length' is set to 'Auto'.
- Select features to extract:** This section is divided into four categories:
 - Spectral features:** All four options are checked: Linear spectrum, Mel spectrum, Bark spectrum, and ERB spectrum.
 - Cepstral features:** All six options are checked: MFCC, MFCC delta, MFCC delta delta, GTCC, GTCC delta, and GTCC delta delta.
 - Spectral descriptors:** All seven options are checked: Centroid, Crest, Decrease, Entropy, Flatness, Flux, Kurtosis, Rolloff point, Skewness, Slope, and Spread.
 - Periodicity features:** 'Pitch' is unchecked, and 'Harmonic ratio' is checked.

OUTPUT:

```
% Create and set up an audioFeatureExtractor object
fs7 = 100;
extractor = audioFeatureExtractor("SampleRate",fs7, ...
    "linearSpectrum",true,"melSpectrum",true, ...
    "barkSpectrum",true,"erbSpectrum",true, ...
    "mfcc",true,"mfccDelta",true, ...
    "mfccDeltaDelta",true,"gtcc",true, ...
    "gtccDelta",true,"gtccDeltaDelta",true, ...
    "spectralCentroid",true,"spectralCrest",true, ...
    "spectralDecrease",true,"spectralEntropy",true, ...
    "spectralFlatness",true,"spectralFlux",true, ...
    "spectralKurtosis",true,"spectralRolloffPoint",true, ...
    "spectralSkewness",true,"spectralSlope",true, ...
    "spectralSpread",true,"harmonicRatio",true);
% Extract features from audio data
features = extract(extractor,wecg);
% Display output summary
info(extractor)
% Clear temporary variables
clear fs7
```

Output column mapping

```
linearSpectrum: 1:513
    melSpectrum: 514:545
    barkSpectrum: 546:577
    erbSpectrum: 578:579
        mfcc: 580:592
        mfccDelta: 593:605
mfccDeltaDelta: 606:618
        gtcc: 619:631
        gtccDelta: 632:644
gtccDeltaDelta: 645:657
spectralCentroid: 658
    spectralCrest: 659
spectralDecrease: 660
    spectralEntropy: 661
spectralFlatness: 662
    spectralFlux: 663
spectralKurtosis: 664
spectralRolloffPoint: 665
spectralSkewness: 666
    spectralSlope: 667
spectralSpread: 668
    harmonicRatio: 669
```