**SOUND FEATURES USED IN MACHINE LEARNING**

There are four audio feature sets are available for evaluation and differentiation of audio classes as feature sets include Mel-frequency spectral coefficients, low level signal properties, and new sets based on perceptual models as well as temporary behavior of features is also important for voice detection classification.

For features extraction first stage is of analysis of incoming waveform and feature extraction from it for last decade variety of signal features are proposed and most of them are low-level signal features which include parameters such as the zero crossing rate, the signal bandwidth, signal energy and the spectral centroid usually the average and variance of these signal properties are included in set,

Secondly, Sound features Most of the people are using MFCC features because they are best till now and anything can’t take over them as they are so correlated know as Mel-scale frequency Cepstral coefficient (MFCC for short) they take human perception sensitivity with respect to frequencies into consideration.

Both of the low level and mfcc have been used for general audio classification and show result so accurate around 95% in simple audio classification problems but is decreased gradually as audio and amount of increases in this case MFCC features performed better than Low level signals and showed result around 80% - 94%. [1]

There are many other features GMM’s, ANN, and SVM’s which are used in machine learning algorithm used for voice detection.

**CALCULATING MFCC:**

The Mel scale relates input frequency to the actual tone frequency here is the formula of converting frequency to Mel scale is:

M (f) = 1125 ln (1 + f / 700)

Vey next steps is applied to each frame where we extract 12 MFCC coefficients is extracted and each set is denoted by Si (n) (I is the signal frame)

Now, calculating discrete Fourier transform [2]





**REFRENCES:**

**[1 <https://www.researchgate.net/publication/250008991_Features_for_Audio_Classification>**

**[2]** **http://practicalcryptography.com/miscellaneous/machine-learning/guide-mel-frequency-cepstral-coefficients-mfccs/**