Modular Audio Recognition Framework and Text-Independent Speaker Identification

The MARF Development Group

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0.1 Intro

What is MARF

MARF stands for **M**odular **A**udio **R**ecognition **F**ramework.

Purpose

Our main goal was to build a general framework to allow developers in the audio-recognition industry (be it speech, voice, sound, etc.) to choose and apply various methods, contrast and compare them, and use them in their applications. As a proof of concept, a user's frontend application for Text-Independent (TI) Speaker Identification has been built on top of the framework (the `SpeakerIdentApp` program).

Project Source and Location

All our code from project's inception has always been an open-source project. All project releases, including our December 8, 2002 demo version, as well as the most current one are always accessible via `http://marf.sourceforge.net`. We have complete API documentation as well as this report and all the sources avilable to download on this page.

Why Java?

We have chosen to implement our project using the Java programming language. This choice is justified by the binary portability of the Java applications as well as facilitates memory management and other issues, so we could concentrate more on algorithms. Java is very suitable for this kind of framework model and good OO principles.

0.2 MARF Architecture

Before we begin, you should understand the basic **MARF** system architecture. Understanding how the parts of **MARF** interact will make the next sections somewhat clearer. This document peresents rough architecture of the **MARF** system, including the layout of the physical directory structure, and Java packages.

Let's take a look at the general **MARF** structure in figure 1. **MARF** is the central "server" and configuration placeholder which core method - the core pipeline - a typical papttern recognition process. The figure presents basic abstract modules of the architecture. When a developer needs to add or use a module, they derive from these generic modules,

Now the core pipeline sequence diagram from application till the end result is presented on figure 2. It includes all major participants as well as basic operations. The participants are the modules responsible for a typical general pattern recognition pipeline.

Consequently, the framework has the mentioned basic modules, as well as some additional entities to manage storage and serialization of the input/output data.

Application Point of View

An application, using the framework, has to choose the concrete configuration and submodules for preprocessing, feature extraction, and classification. There is an API the application may use defined by each module or it can use them through MARF.

There are two phases in MARF's usage by an app:

- Training
- Recognition

Training is performed on a virgin MARF installation to get some data in. Recognition is actual identification of a sample against previously stored patterns during training.

Physical Layout

The following is the basic structure so far:

```
marf.*

MARF.java - The MARF Server
            Supports Training and Recognition mode
            and keeps all the configuration settings

marf.Preprocessing.* - The Preprocessing Package
```

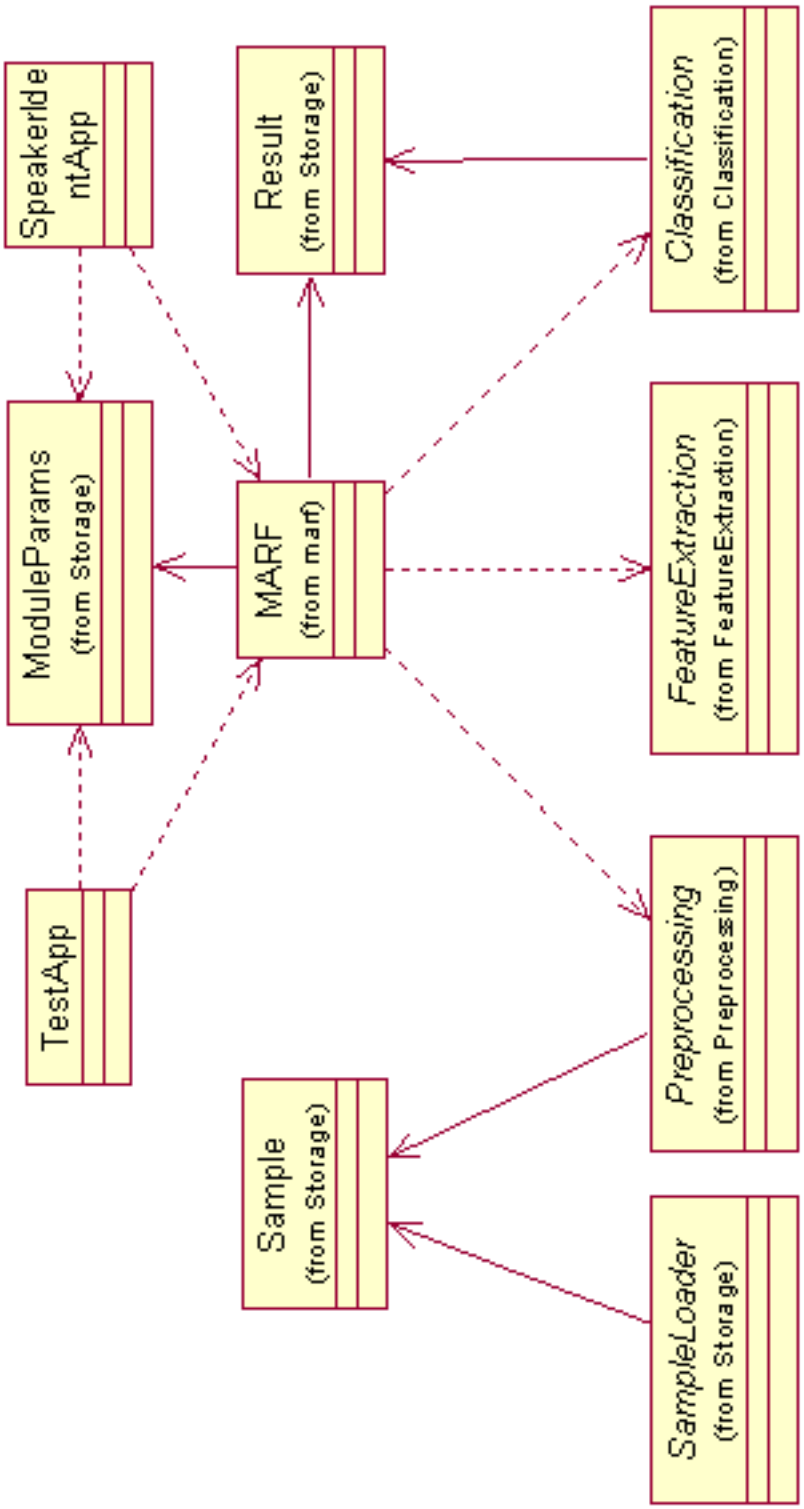

Figure 1: Overall Architecture

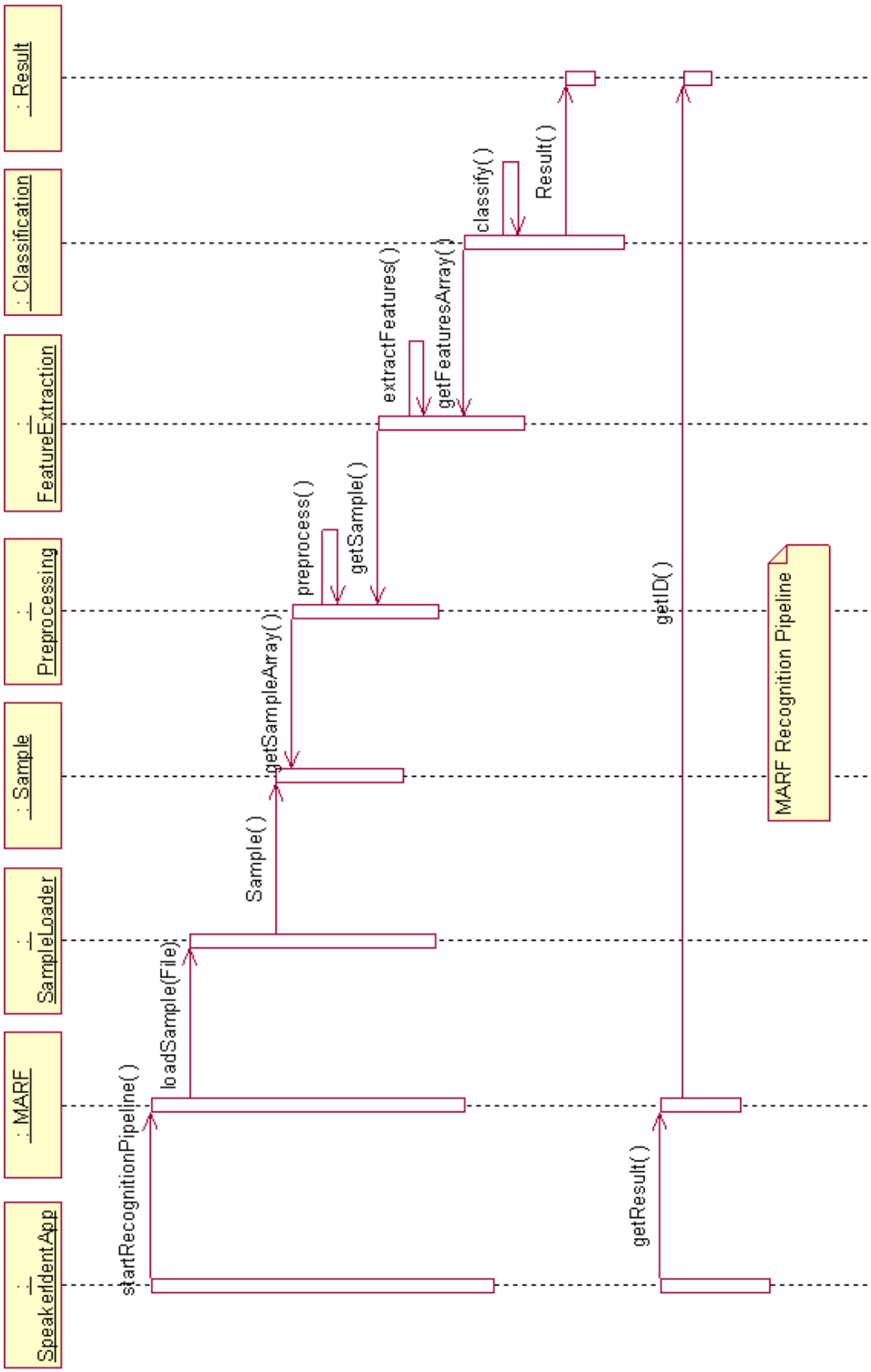

Figure 2: The Core Pipeline

```
/marf/Preprocessing/
   Preprocessing.java - Abstract Preprocessing Module, has to be subclassed
   /BandpassFilter/*.java  - Bandpass Filter as implementation of Preprocessing
   /Endpoint/*.java   - Endpoint Filter as implementation of Preprocessing
   /Dummy/*.java
   /FFTFilter/
       FFTFilter.java
       LowPassFilter.java
       HighPassFilter.java
   /HighFrequencyBoost/*.java

marf.FeatureExtraction.* - The Feature Extraction Package

/marf/FeatureExtraction/
FeatureExtraction.java
    /FFT/*.java        - FFT implementation of Preprocessing
    /LPC/LPC.java
    /Cepstral/*.java
    /Segmentation/*.java
    /F0/*.java

marf.Classification.* - The Classification Package

/marf/Classification/
    Classification.java
    /NeuralNetwork/NeuralNetwork.java
    /Stochastic/*.java
    /Markov/*.java
    /Distance/*.java
    /EuclideanDistance/*.java
    /ChebyshevDistance/*.java

marf.Storage.* - The Physical Storage Management Interface

/marf/Storage/
    Sample.java
    ModuleParams.java
    TrainingSet.java
    Result.java
    StorageManager.java - Interface to be implemented by the above modules
```

```
    SampleLoader.java - Should know how to load different sample format
    /Loaders/*.*      - WAV, MP3, ULAW, etc

marf.Stats.* - The Statistics Module (totally optional, I'm unclear about it yet)

/marf/Stats/
    StatsCollector.java - Time took, noise removed, patterns stored, modules avail....

marf.gui.* - Spectrogram and WaveGrapher
```

Current Limitations

Our current pipeline is maybe somewhat too rigid. That is, there's no way to specify more than one preprocessing or feature extraction module to process the same sample in one pass, for example. (In the case of preproessing one filter may be used along with normalization together, or just normalization by itself).

Also, it assumes that the whole sample is loaded before doing anything with it, instead of sending parts of the sample a bit at a time. Perhaps this simplifies things, but it won't allow us to deal with large samples at the moment. However, it's not a problem for our project and application since memory is cheap and samples are not too big. Additionally, we have streaming support already in the WAVLoader and some modules support it; but the final convertion to streaming did not happen in this deliverable.

MARF provides only limited support for inter-module dependency. It is possible to pass module-specii arguments, but problems like number of parameters missmatch between feature extraction and classification, and so on are not tracked.

0.3 Methodology

This section presents what methods and algorithms were implemented and used in this project. We overview storage issues first, then preprocessing methods followed by feature extraction, and ended by classification.

Storage

Figure 3 prensents basic Storage modules and their API.

DB Storage

We store secific speakers in a comma-speparated (CSV) file, `speakes.txt` within the application.

It has following format:

<id:int>,<name: string>,<training-samples:list>,<testing-samples:list>

Sample lists are defined as follows:

<*-sample-list> := filename1.wav|filename2.wav|...

Storing Features, Training, and Classification Data

We defined a standard `StorageManager` inteface for the modules to use. That's part of the `StorageManager` interface which each module will override because each a module has to know how to serialize itself, but the application, using MARF, should not care. Thus, this `StorageManager` is a base class with abstact methods `dump()` and `restore()`. And these functions would generalize the model's storing, in the sense that they are somehow "read" and "written".

We have to store data we used for training for later use in the classification process. For this we dump FFT and LPC feature vectors directly from the `TrainingSet`/`TrainingSample` class pair, which store feature vectors for training models.

In the Neural Network we use XML. The only reason XML and text files have been suggested is to allow us to easily modify values in a text editor and verify the data visually.

In neural-net classification, we are using one net for all speakers. We had thought that one net for each speaker would be ideal, but then we'll lose too much discrimination power. But doing this means that the NNet will need complete re-training for each new training utterance (or group thereof).

We have a training/testing script that lists the location of all the wave files to be trained along with the identification of the speaker - `testing.sh`. All resulting vectors (and associated speakers) are appended to the `training.set` file. Then the model is re-trained on whatever data needed and new models are dumped.

In the stochastic models, if we had them, the complete set of utterances will be needed for the speaker to which the new utterance(s) are being added, for mean and variance calculations. This implies that all data needs storing.

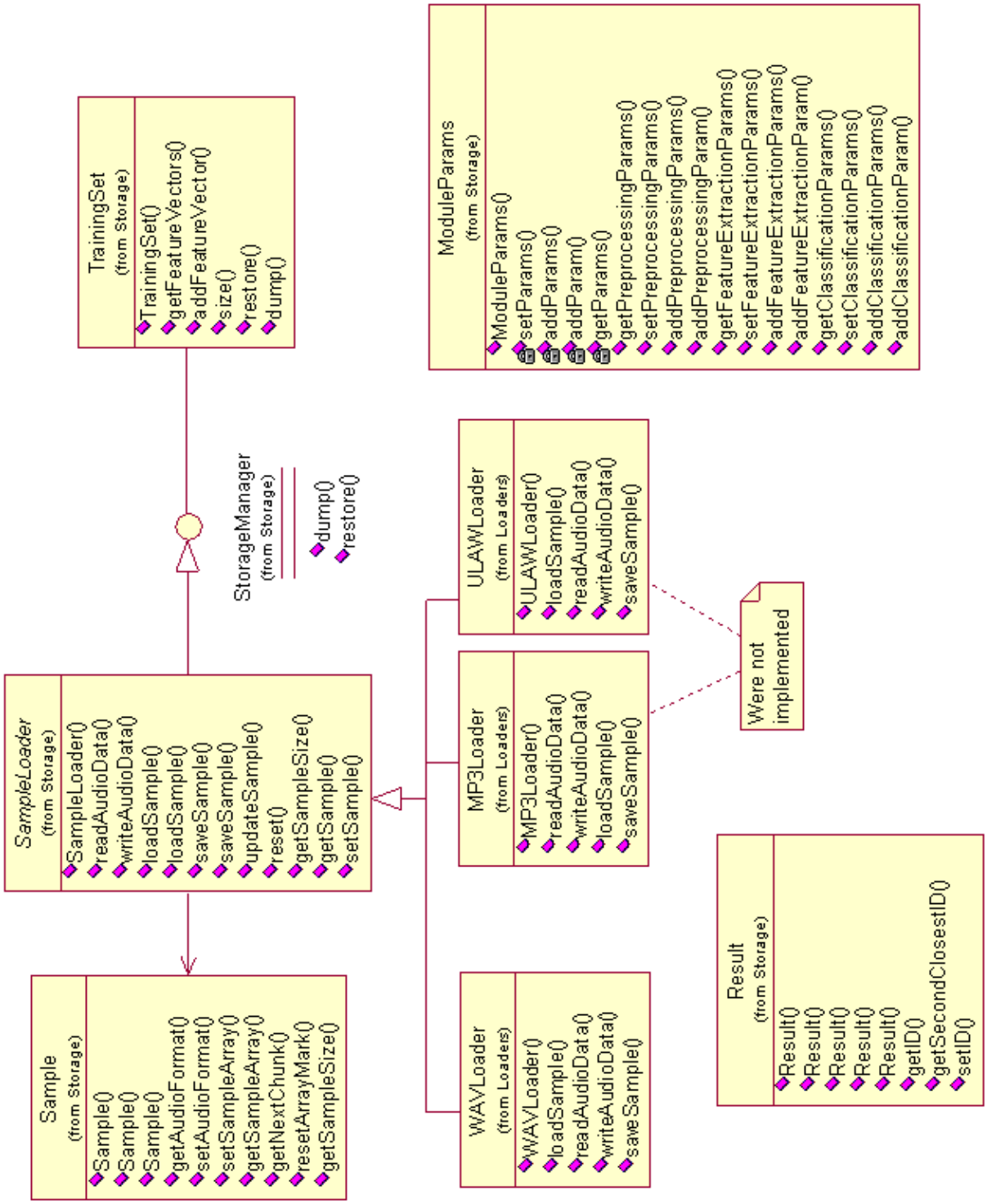

Figure 3: Storage

File Location

We decided to keep all the data and intermediate files in the same directory or subdirectories of that of the application.

`training.set` - represents testing sets data used in training for both LPC and FFT, text.

`speakers.txt.stats` - binary statistics file

`nn.xml` - XML file representing a trained Neural Net for all the speakers in the database.

`training-samples/` - directory with WAV files for training

`testing-samples/` - directory with WAV files for testing

Sample and Feature Sizes

Wave files are read and outputted as an array of data points that represents the waveform of the signal.

Different methods will have different feature vector sizes. It depends on what kind of precision one desires. In the case of FFT, a 1024 FFT will result in 1024 "features", being an array of "doubles" corresponding to the frequency range.

[1] said about using 3 ms for phoneme analysis and something like one second for general voice analysis. At 8KHz, 1024 samples represents 128ms, this might be a good compromise.

Parameter Passing

A generic `ModuleParams` container class has been created to for an application to be able to pass module-specific parametes when specifying model files, training data, amount of LPC coefficients, FFT window size, logging/stats files, etc.

Result

When classification is over, its result should be stored somehow for further retrieval by the application. We have defined the `Result` object to carry out this task. It contains ID of the subject identified as well as some additional statistics (such as second closest speaker and distances from other speakes, etc.)

Sample Format

The sample format used for our samples was the following:

- Audio Format: PCM signed (WAV)
- Sample Rate: 8000Hrz
- Audio Sample Size: 16-bit
- Channels: 1 (mono)
- Duration: from 7 to 20 seconds

All training and testing samples were recorded through an external sound recording program (**MS Sound Recorder**) using a standard microphone. Each sample was saved as a WAV file with the above properties and stored in the appropriate folders where they would be loaded from within the main application. The PCM audio format (which stands for Pulse Code Modulation) refers to the digital encoding of the audio sample contained in the file and is the format used for WAV files. In a PCM encoding, an analog signal is represented as a sequence of amplitude values. The range of the amplitude value is given by the audio sample size which represents the number of bits that a PCM value consists of. In our case, the audio sample size is 16-bit which means that that a PCM value can range from 0 to 65536. Since we are using PCM-signed format, this gives an amplitude range between -32768 and 32768. That is, the amplitude values of each recorded sample can vary within this range. Also, this sample size gives a greater range and thus provides better accurancy in representing an audio signal then using a sample size of 8-bit which limited to a range of (-128, 128). Therefore, a 16-bit audio sample size was used for our experiments in order to provide the best possible results. The sampling rate refers to the number of amplitude values taken per second during audio digitization. According to the Nyquist theorem, this rate must be at least twice the maximum rate (frequency) of the analog signal that we wish to digitize ([3]). Otherwise, the signal cannot be properly regenerated in digitized form. Since we are using an 8 kHz sampling rate, this means that actual analog frequency of each sample is limited to 4kHz. However, this limitation does not pose a hindrance since the difference in sound quality is negligable ([1]). The number of channels refers to the output of the sound (1 for mono and 2 for stereo - left and right speakers). For our experiment, a single channel format was used to avoid complexity during the sample loading process.

Sample Loading Process

To read audio information from a saved voice sample, a special sample loading component had to be implemented in order to load a sample into an internal data structure for further processing. For this, certain sound libraries (`javax.sound.sampled`) were provided from the Java programming language which enabled us to stream the audio data from the sample file. However once the data was captured, it had to be converted into readable amplitude values since the library routines only provide PCM values of the sample. This required the need to implement special routines to convert raw PCM values to actual amplitude values (see `SampleLoader` class in Storage).

The following pseudo-code represents the algorithm used to convert the PCM values into real amplitude values ([7]):

```
function readAmplitudeValues(Double Array : audioData)
{
    Integer: MSB, LSB,
             index=0;

    Byte Array: AudioBuffer[audioData.lenth * 2];

    read audio data from Audio stream into AudioBuffer;

    while (not reached the end of stream OR index not equal to audioData.length)
    {
        if (Audio data representation is BigEndian)
        {
            /* First byte is MSB (high order) */
            MSB = (int) audioBuffer[2*index];
            /* Second byte is LSB (low order) */
            LSB = (int) audioBuffer[2*index+1];
        }
        else
        {
            //Vice -versa...
            LSB = (int) audioBuffer[2*index];
            MSB = (int) audioBuffer[2*index+1];
        }

        //Merge high-order and low-order byte to form a 16-bit double value.
        //Values are devided by maximum range
        audioData[index] = (double) (merge of MSB and LSB) / 32768;
    }
}
```

This function reads PCM values from a sample stream into a byte array that has twice the length of audioData; the array which will hold the converted amplitude values (since sample size is 16-bit). Once the PCM vaues are read into audioBuffer, the high and low order bytes that make up the amplitude value are extracted according to the type of representation defined in the sample's audio format. If the data representation is 'big endian', the high order byte of each PCM value is located at every even-numbered position in audioBuffer. That is, the high order byte of the first PCM value is found at position 0, 2 for the second value, 4 for the third and so forth. Similarly, the low order byte of each PCM value is located

at every odd-numbered position (1,3,5,etc.). In other words, if the data representation is 'big endian', the bytes of each PCM code are read from left to right in the audioBuffer. If the data representation is not 'big endian', then high and low order bytes are inversed. That is, the high order byte for the first PCM value in the array will be at position 1 and the low order byte will be at position 0 (read right to left). Once the high and low order bytes are properly extracted, the two bytes can be merged to form a 16-bit double value. This value is then scaled down (divide by 32768) to represent an amplitude within a unit range (- 1,1).The resulting value is stored into the audioData array which will be passed to the calling routine once all the available audio data is entered into the array. An additional routine was also required to write audio data from an array into wave file. This routine involved the inverse of reading audio data from a sample file stream. More specifically, the amplitude values inside an array are converted back to PCM codes and are stored inside an an array of bytes (used to create new audio stream). The following illustrates how this works:

```
public void writePCMValues(Double Array: audioData)
{
    Integer: word = 0,
             index = 0;

    Byte Array: audioBytes[(number of ampl. values in audioData) * 2];

    while (index not equal  (number of ampl. values in audioData * 2))
    {
        word = (int) (audioData[index] * 32768);
        extract high order byte and place it in appropriate position in audioBytes;
        extract low order byte and place it in appropriate position in audioBytes;
    }

    create new audio stream from audioBytes;
}
```

0.4 Preprocessing

This section outlines the preprocessing mechanisms considered and implemented in MARF.

We present you with the API and structure on figure 4, followed by the description of the methods.

Normalization

Since not all voices will be recorded at exactly the same level, it is important to normalize the amplitude of each sample in order to ensure that features will be comparable. Audio normalization is analogous to image normalization. Since all samples are to be loaded as floating point values in the range [-1.0,1.0], it should be ensured that every sample actually does cover this entire range.

The procedure is relatively simple: Find the maximum amplitude in the sample, and then scale the sample by dividing each point by this maximum.

`FFT` Filter

The FFT filter is used to modify the frequency domain of the input sample in order to better measure the distinct frequencies we are interested in. Two filters are useful to speech analysis: high frequency boost, and low-pass filter.

Speech tends to fall off at a rate of 6 dB per octave, and therefore the high frequencies can be boosted to introduce more precision in their analysis. Speech, afterall, is still characteristic of the speaker at high frequencies, even though they have a lower amplitude. Ideally this boost should be performed via compression, which automatically boosts the quieter sounds while maintaining the amplitude of the louder sounds. However, we have simply done this using a positive value for the filter's frequency response. The low pass filter is used as a simplified noise reducer, simply cutting off all frequencies above a certain point. The human voice does not generate sounds all the way up to 4000Hz, which is the maximum frequency of our test samples, and therefore since this range will only be filled with noise, it may be better just to cut it out.

Essentially the FFT filter is an implementation of the Overlap-Add method of FIR filter design. The process is a simple way to perform fast convolution, by converting the input to the frequency domain, manipulating the frequencies according to the desired frequency response, and then using an Inverse-FFT to convert back to the time domain.

The code applies the square root of the hamming window to the input windows (which are overlapped by half-windows), applies the FFT, multiplies the results by the desired frequency response, applies the Inverse-FFT, and applies the square root of the hamming window again, to produce an undistorted output.

Another similar filter could be used for noise reduction, subtracting the noise characteristics from the frequency response instead of multiplying, thereby remove the room noise from the input sample.

Low-Pass Filter

Low-pass filter has been realized on top of the FFT Filter, by setting up frequency response to zero for frequencies past certain threshold chosen heuristically based on the window size where to cut off. We filtered out all the frequencies past 2853 Hz.

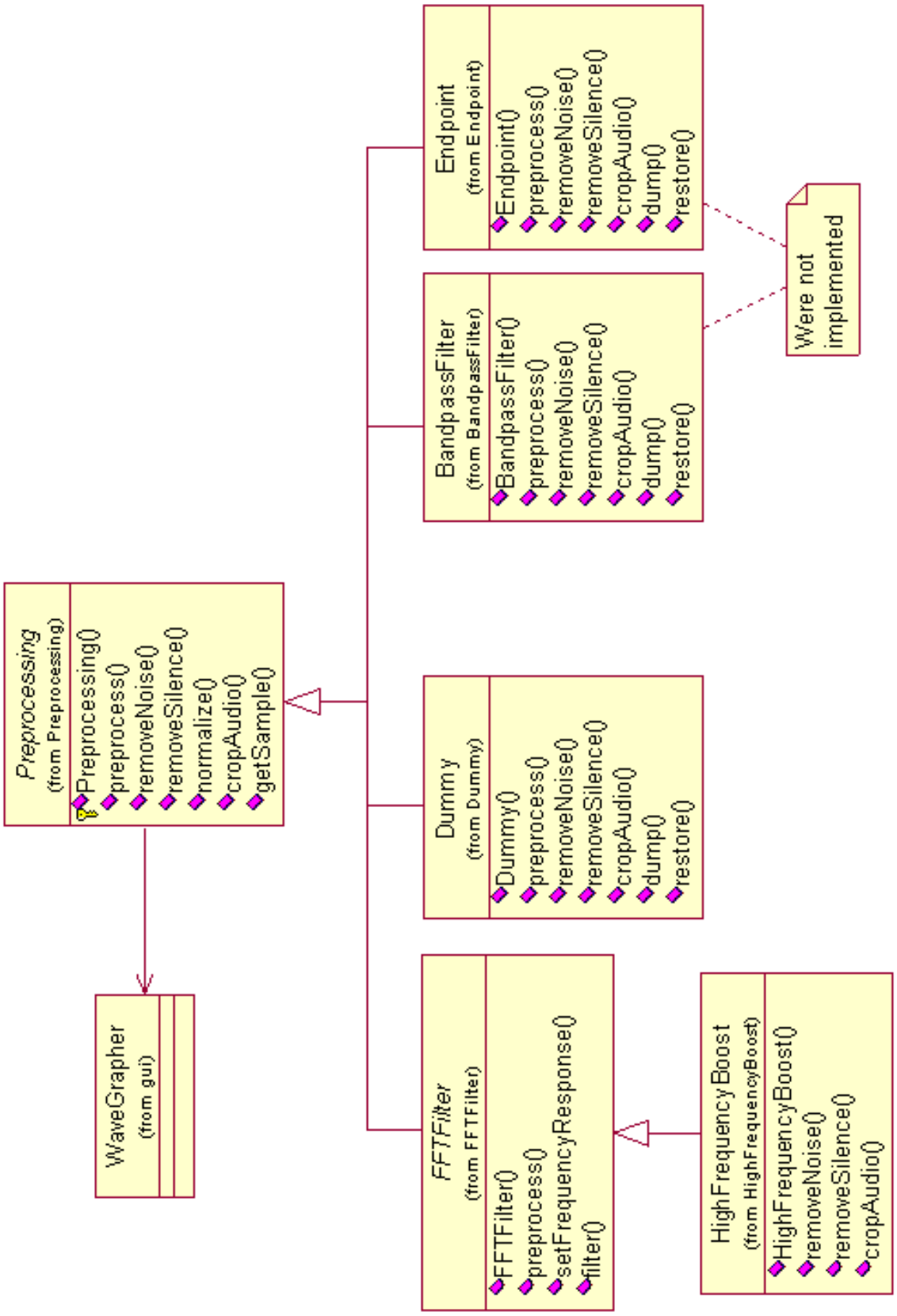

Figure 4: Preprocessing

Appendix B presents FFT graphs of the non-filtered and low-pass filtered graphs.

High-Pass Filter

As lowpass filter, high-pass filter has been realized on top of the FFT Filter, in fact, it is the opposing to lowpass filter, and filters out frequencies before 2853 Hz. What would be very useful to do is to test it along with high-frequency boost, but we've never managed to do so.

High Frequency Boost

This filter was also implemented on top of the FFT filter to boost the high-end frequencies. The frequencies boosted after approx. 1000 Hz by a factor of $5 * \pi$, heuristically determined, and then re-normalized.

Noise Removal

Any vocal sample taken in a less-than-perfect environment will experience a certain amount of room noise. Since background noise exhibits a certain frequency characteristic, if the noise is loud enough it may inhibit good recognition of a voice when the voice is later tested in a different environment. Therefore, it is necessary to remove as much environmental interference as possible.

To remove room noise, it is first necessary to get a sample of the room noise by itself. This sample, usually at least 30 seconds long, should provide the general frequency characteristics of the noise when subjected to FFT analysis. Using a technique similar to overlap-add FFT filtering, room noise can then be removed from the vocal sample by simply subtracting the noise's frequency characteristics from the vocal sample in question.

That is, if $S(x)$ is the sample, $N(x)$ is the noise, and $V(x)$ is the voice, all in the frequency domain, then

$$S(x) = N(x) + V(x)$$

Therefore, it should be possible to isolate the voice:

$$V(x) = S(x) - N(x)$$

Unfortunately, time has not permitted us to implement this in practice.

0.5 Feature Extraction

This section outlines feature extraction methods of our project.

First we present you with the API and structure, followed by the description of the methods.

The Hamming Window

In many DSP techniques, it is necessary to consider a smaller portion of the entire speech sample rather than attempting to process the entire sample at once. The technique of cutting a sample into smaller pieces to be considered individually is called "windowing". The simplest kind of window to use is the "rectangle", which is simply an unmodified cut from the larger sample. Unfortunately, rectangular windows can introduce errors, because near the edges of the window there will potentially be a sudden drop from a high amplitude to nothing, which can produce false *pops* and *clicks* in the analysis.

A better way to window the sample is to slowly fade out toward the edges, by multiplying the points in the window by a "window function". If we take successive windows side by side, with the edges faded out, we will distort our analysis because the sample has been modified by the window function. To avoid this, it is necessary to overlap the windows so that all points in the sample will be considered equally. Ideally, to avoid all distortion, the overlapped window functions should add up to a constant. This is exactly what the Hamming window does. It is defined as:

$x = 0.54 - 0.46 * \cos((2 * \pi * n)/(l - 1))$

where x is the new sample amplitude, n is the index into the window, and l is the total length of the window.

FFT

The Fast Fourier Transform (FFT) algorithm is used both for feature extraction and as the basis for the filter algorithm used in preprocessing. Although a complete discussion of the FFT algorithm is beyond the scope of this document, a short description of the implementation will be provided here.

Essentially the FFT is an optimised version of the Discrete Fourier Transform. It takes a window of size 2^k and returns a complex array of coefficients for the corresponding frequency curve. For feature extraction, only the magnitudes of the complex values are used, while the FFT filter operates directly on the complex results.

The implementation involves two steps: First, shuffling the input positions by a binary reversion process, and then combining the results via a "butterfly" decimation in time to produce the final frequency coefficients. The first step corresponds to breaking down the time-domain sample of size n into n frequency-domain samples of size 1. The second step re-combines the n samples of size 1 into 1 n-sized frequency-domain sample.

The code used in MARF has been translated from the C code provided in the book, "Numeric Recipes in C".

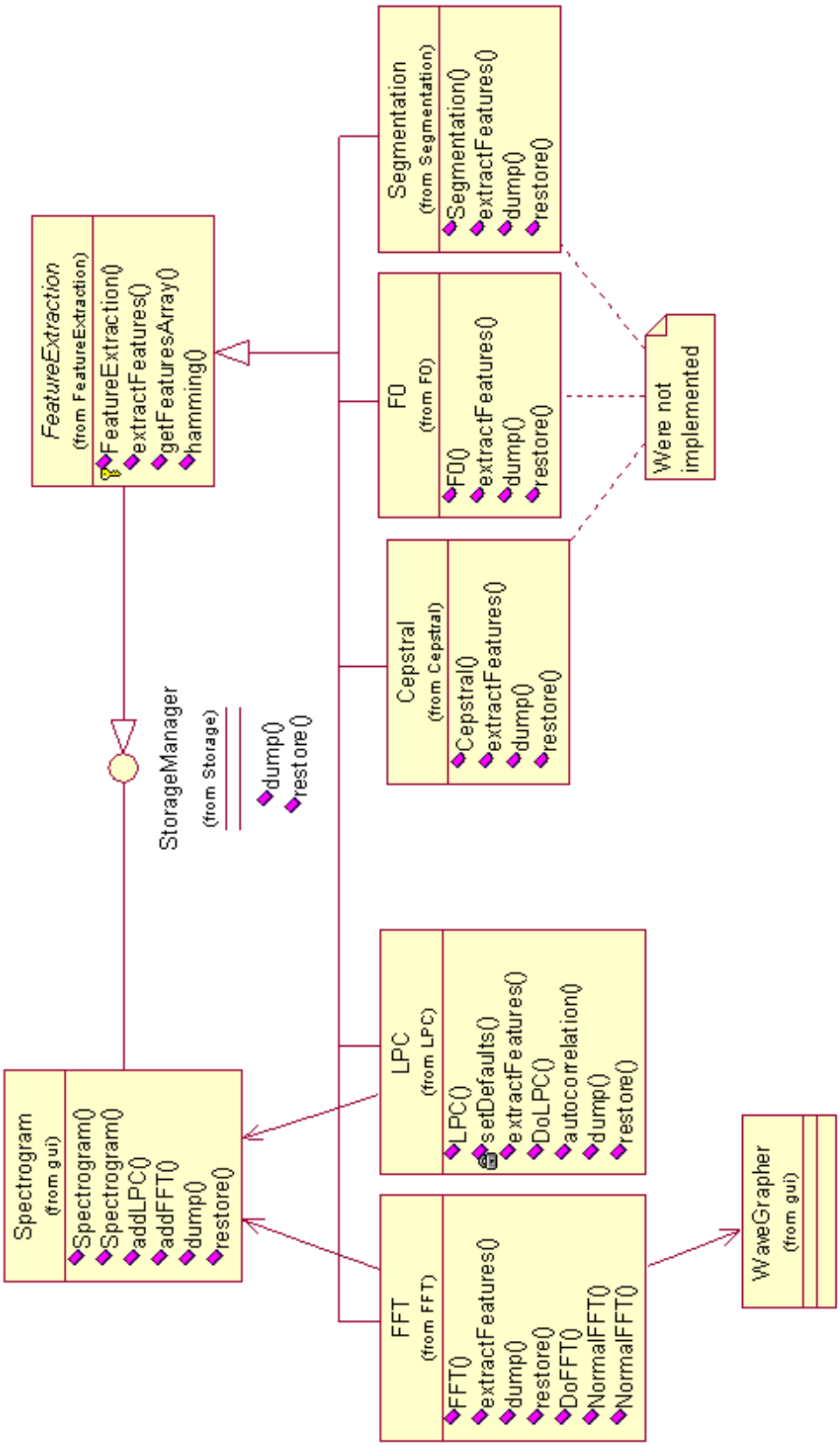

Figure 5: Feature Extraction

FFT Feature Extraction

The frequency-domain view of a window of a time-domain sample gives us the frequency characteristics of that window. In feature identification, the frequency characteristics of a voice can be considered as a list of "features" for that voice. If we combine all windows of a vocal sample by taking the average between them, we can get the average frequency characteristics of the sample. Subsequently, if we average the frequency characteristics for samples from the same speaker, we are essentially finding the center of the cluster for the speaker's samples. Once all speakers have their cluster centers recorded in the training set, the speaker of an input sample should be identifiable by comparing its frequency analysis with each cluster center by some classification method.

Since we are dealing with speech, greater accuracy should be attainable by comparing corresponding phonemes with each other. That is, "th" in "the" should bear greater similarity to "th" in "this" than will "the" and "this" when compared as a whole.

The only characteristic of the FFT to worry about is the window used as input. Using a normal rectangular window can result in glitches in the frequency analysis because a sudden cutoff of a high frequency may distort the results. Therefore it is necessary to apply a Hamming window to the input sample, and to overlap the windows by half. Since the Hamming window adds up to a constant when overlapped, no distortion is introduced.

When comparing phonemes, a window size of about 2 or 3 ms is appropriate, but when comparing whole words, a window size of about 20 ms is more likely to be useful. A larger window size produces a higher resolution in the frequency analysis.

Linear Predictive Coding (LPC)

This section presents implementation of the LPC Classification module.

One method of feature extraction used in the MARF project was Linear Predictive Coding (LPC) analysis. It evaluates windowed sections of input speech waveforms and determines a set of coefficients approximating the amplitude vs. frequency function. This approximation aims to replicate the results of the Fast Fourier Transform yet only store a limited amount of information: that which is most valuable to the analysis of speech.

Theory

The LPC method is based on the formation of a spectral shaping filter, $H(z)$, that, when applied to a input excitation source, $U(z)$, yields a speech sample similar to the initial signal. The excitation source, $U(z)$, is assumed to be a flat spectrum leaving all the useful information in $H(z)$. The model of shaping filter used in most LPC implementation is called an "all-pole" model, and is as follows:

$H(z) = G/(1 - \sum_{k=1}^{p}(a_k * z^{-k}))$

Where p is the number of poles used. A pole is a root of the denominator in the Laplace transform of the input-to-output representation of the speech signal.

The coefficients a_k are the final representation if the speech waveform. To obtain these coefficients, the least-square autocorrelation method was used. This method requires the use of the autocorrelation of a signal defined as:

$R(k) = \sum_{m=k}^{n-1}(x(n) * x(n-k))$

where $x(n)$ is the windowed input signal.

In the LPC analysis, the error in the approximation is used to derive the algorithm. The error at time n can be expressed in the following manner: $e(n) = s(n) - \sum k = 1^p(a_k * s(n-k))$. Thusly, the complete squared error of the spectral shaping filter $H(z)$ is:

$E = \sum_{n=-\infty}^{\infty}(x(n) - \sum_{k=1}^{p}(a_k * x(n-k)))$

To minimize the error, the partial derivative $\delta E/\delta a_k$ is taken for each k=1..p, which yields p linear equations of the form:

$\sum_{n=-\infty}^{\infty}(x(n-i) * x(n)) = \sum_{k=1}^{p}(a_k * \sum_{n=-\infty}^{\infty}(x(n-i) * x(n-k))$

For i=1..p. Which, using the autocorrelation function, is:

$\sum k = 1^p(a_k * R(i-k)) = R(i)$

Solving these as a set of linear equations and observing that the matrix of autocorrelation values is a Toeplitz matrix yields the following recursive algorithm for determining the LPC coefficients:

$k_m = (R(m) - \sum_{k=1}^{m-1}(a_{m-1}(k)R(m-k)))/E_{m-1}$

$a_m(m) = k_m$

$a_m(k) = a_{m-1}(k) - k_m * a_m(m-k)$ for 1 ¡= k ¡= m-1,

$E_m = (1 - k_m^2) * E_{m-1}$.

This is the algorithm implemented in the MARF LPC module.

Usage for Feature Extraction

The LPC coefficients were evaluated at each windowed iteration, yielding a vector of coefficient of size p. These coefficients were averaged across the whole signal to give a mean coefficient vector representing the utterance. Thus a p sized vector was used for training and testing. The value of p chosen was based on tests given speed vs. accuracy. A p value of 20 was observed to be accurate and computationally feasible

0.6 Classification

This section outlines classification methods of our project.

First we present you with the API and structure, followed by the description of the methods.

Chebyshev Distance

Chebyshev distance was used along with Euclidean distance measurement technique for comparison. Chebyshev distance is esentially a city-block distance. Here's its mathematical representation:

$$d(x, y) = \sum_{k=1}^{n}(|x_k - y_k|)$$

where x and y are feature vectors of the same length n.

Euclidean Distance

The Euclidean Distance classifier uses a euclidean distance equation to find the distance between two feature vectors.

If $A = (x_1, x_2)$ and $B = (y_1, y_2)$ are two 2-dimensional vectors, then the distance between A and B can be defined as the square root of the sum of the squares of their differences:

$$d(x, y) = \sqrt{(x_1 - y_1)^2 + (x_2 - y_2)^2}$$

This equation can be generalized to n-dimensional vectors by simply adding terms under the square root.

$$d(x, y) = \sqrt{(x_n - y_n)^2 + (x_{n-1} - y_{n-1})^2 + ... + (x_1 - y_1)^2}$$

A cluster is chosen based on smallest distance to the feature vector in question.

Artificial Neural Networks

This section presents implementation of the Neural Network Classification module.

One method of classification used is an Artificial Neural Network. Such a network is meant to represent the neuronal organization in organisms. It's use as a classification method lies is in the training of the network to output a certain value given a particular input.

Theory

A neuron consists of a set of inputs with associated weights, a threshold, an activation function ($f(x)$) and an output value. The output value will propagate to further neurons (as input values) in the case where the neuron is not part of the "output" layer of the network. The relation of the inputs to the activation function is as follows:

$output \longleftarrow f(in)$

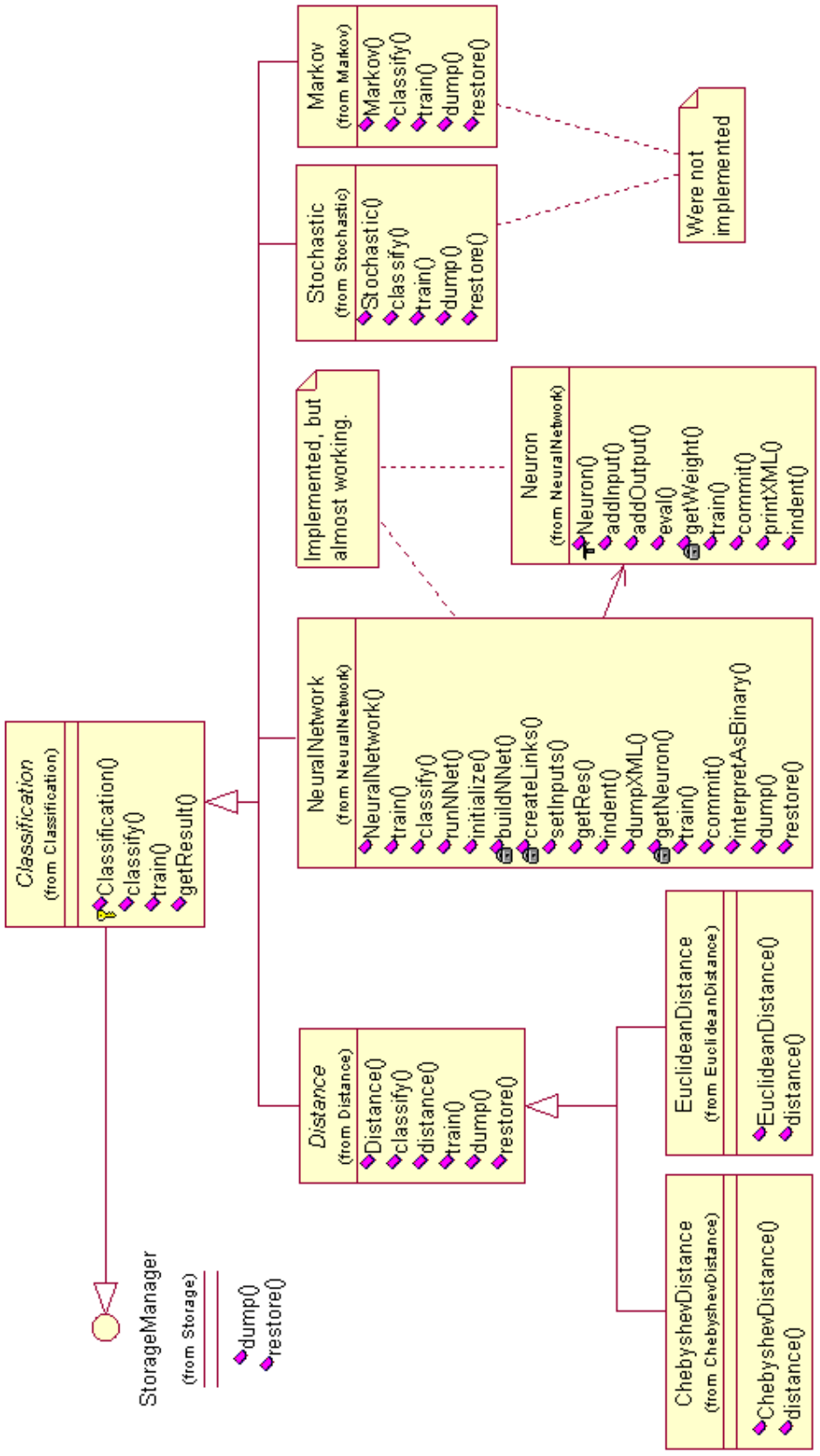

Figure 6: Classification

where $in = \sum_{I=0}^{n}(w_(i) * a_i) - t$, "vector" a is the input activations, "vector" w is the associated weights and t is the threshold of the network. The following activation function was used:

$sigmoid(x; c) = 1/(1 + e^(- cx))$

where c is a constant. The advantage of this function is that it is differentiable over the region -inf..inf and has derivative:

$d(sigmoid(x; c))/dx = c * sigmoid(x; c)(1 - sigmoid(x; c))$

The structure of the network used was a Feed-Forward Neural Network. This implies that the neurons are organized in sets, representing layers, and that a neuron in layer j, has inputs from layer j-1 and output to layer j+1 only. This structure facilitates the evaluation and the training of a network. For instance, in the evaluation of a network on an input vector I, the output of neuron in the first layer is calculated, followed by the second layer, and so on.

Training

Training in a Feed-Forward Neural Network is done through the an algorithm called Back-Propagation Learning. It is based on the error of the final result of the network. The error the propagated backward throughout the network, based on the amount the neuron contributed to the error. It is defined as follows:

$w_{i,j} \longleftarrow \beta w_{i,j} + \alpha * a_j * \Delta_i$

where

$\Delta_i = Err_i * df/dx(in_i)$ for neuron i in the output layer

and

$\Delta_i = df/dt(in_i) * \sum_{j=0}^{n}(\Delta_j)$ for neurons in other layers

The parameters α and β are used to avoid local minima in the training optimization process. They weight the combination of the old weight with the addition of the new change. Usual values for these are determined experimentally.

The Back-Propagation training method was used in conjunction with epoch training. Given a set of training input vectors Tr, the Back-Propagation training is done on each run. However, the new weight vectors for each neuron, "vector" w', are stored and not used. After all the inputs in Tr have been trained, the new weights are committed and a set of test input vectors Te, are run, and a mean error is calculated. This mean error determines whether to continue epoch training or not.

Usage as a Classifier

As a classifier, a Neural Network is used to map feature vectors to speaker identifiers. The neurons in the input layer correspond to each feature in the feature vector. The output of the network is the binary interpretation of the output layer. Therefore the Neural Network has an input layer of size m, where m is the size of all feature vectors and the output layer has size $ceil(log_{2(n)})$, where n is the maximum speaker identifier.

A network of this structure is trained with the set of input vectors corresponding to the set of training samples for each speaker. The network is epoch trained to optimize the results. This fully trained network is then used for classification in the recognition process.

0.7 Sample Data and Experementation

Sample Data

The following people have contirbuted their voice samples for our project (with first four being ourselves).

ID	Name	Training Samples	Testing Samples
1	Serge	14	1
2	Ian	14	1
3	Steve	13	3
4	Jimmy	14	1
5	Dr. Suen	2	1
6	Margarita Mokhova	14	1
7	Alexei Mokhov	14	1
9	Graham Sinclair	12	2
10	Jihed Halimi	2	1
11	Madhumita Banerjee	3	1
13	Irina Dymova	3	1
14	Aihua Wu	14	1
15	Nick	9	1
16	Michelle Khalife	14	1
17	Shabana	7	1

We want to thank them once again for helping us out.

We have both female and male speakers, with age ranging from a college student to an university professor.

Comparison Setup

The main idea was to compare combinations (in MARF: *configurations*) of different methods and variations within them in terms of recogniton rate performance. That means that having several preprocessing modules, several feature extraction modules, and several classification modules, we can (and did) try all their possible combinations.

That includes:

1. Preprocessing: No-filtering (just normalization), low-pass, high-pass, and high-frequency boost filters.
2. Feature Extraction: FFT/LPC comparaison
3. Clasification: Distance classifiers, such as Chebyshev and Eculidean distances, as well as Neural Network (which was half-functional, unfortunately.)

For this purpose we have written a `SpeakerIdentApp`, a command-line application for TI speaked identification. We ran it for every possible configureation with the following script, namely `testing.sh`:

```
if($1 == '--retrain') then
    echo "Training..."

    foreach prep (-norm -boost -low -high)
        foreach feat (-fft -lpc)
            java SpeakerIdentApp --train training-samples $prep $feat $spectrogram $debug
        end
    end

endif

echo "Testing..."

foreach file (testing-samples/*.wav)
    foreach prep (-norm -boost -low -high)
        foreach feat (-fft -lpc)
            foreach class (-eucl -cheb)

                echo "=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-="
                echo "DOING FILE:"
                echo $file
                echo "============================================="

                java SpeakerIdentApp --ident $file $prep $feat $class $spectrogram $debug

                echo "---------------------------------------------"
            end
        end
    end
end

echo "Stats:"

java SpeakerIdentApp --stats

echo "Testing Done"
```

See the results section for results analysis.

What Else Could Be Done

There is a lot more that we realistically could do, but ran out of time.

Combination of Feature Extraction Methods

For example, assuming we use a combination of LPC coefficients and F0 estimation, we could compare the results of different combinations of these, and discuss them in the conclusion of our report. Same with the Neural Nets (modifying number of layer and number or neurons, etc).

We could also do a 1024 FFT analysis and compare it against a 128 FFT analysis. (That is, the size of the resulting vector would be 1024 or 128) With LPC, one can specify the number of coefficients you want, the more you have the more precise the analysis will be.

Entire Recognition Path

`LPC` module is used to generate a mean vector of LPC coefficients for the utterance. F0 is used to find the average fundamental frequency of the utterance. The results are concatenated to form the output vector, in a particular order. The classifier would take into account the weighting of the features: Neural Network would do so implicitly if it benefits the speaker matching, and stochastic can be modifed to give more weight to the F0 or vice versa, depending on what we see best (ie: the W matrix in the Mahanabolis distance).

More Methods

Note: F0, Endpointing, Stochastic, and other methods have never made to our project deliverable.

0.8 Experementation Results

Before we get to numbers, few notes and observations first:

1. We've got more samples since the demo. The obvious: by increasing the number of samples our results got better; with few exceptions, however. This can be explained by the diversity of the recording equipment, a lot less than uniform number of samples per speaker, and absence of noise and silence removal. All the samples were recorded in not the same environments. The results then start averaging after awhile.
2. Another observation we made from our output, is that when the speaker is guessed incorrectly, quite often the second guess is correct, so we included this in our results as if we were "guessing" right from the second attempt.
3. FUN. Interesting note, that we also tried to take some samples of music bands, and feed it to to our application along with the speakers, and application's performance didn't suffer, yet even improved because the samples were treated in the same manner. The groups were not mentioned in the table, so we name them here: Van Halen [8:1] and Red Hot Chili Peppers [10:1]

See Appendix D for the complete application run.

Configuration Explained

Configuration parameters were exracted from the command line which SpeakerIdentApp was invoked with. They mean the following:

Preprocessing:

- `-norm` - use only normalization in preprocessing.
- `-boost` - indicates to use High Frequency Boost (along with normalization)
- `-high` - indicates to use High-Pass filter (along with normalization)
- `-low` - indicates to use Low-Pass filter (along with normalization)

Feature Extraction:

- `-fft` - indicates to use FFT
- `-lpc` - indicates to use LPC

Classification:

- `-eucl` - Euclidean distance
- `-cheb` - Chebyshev distance

There is also -nn switch for Neural Network, but the Neural Network never made it through. Bugs.

Here are our ultimate results for all configurations we can have and samples we've got.

Run #	Guess	Configuration	GOOD	BAD	Recogniton Rate,%
1	**1st**	**-norm -fft -eucl**	**14**	**6**	**70.0**
	2nd	-norm -fft -eucl	18	2	90.0
2	1st	-high -lpc -cheb	12	8	60.0
	2nd	-high -lpc -cheb	14	6	70.0
3	**1st**	**-low -fft -eucl**	**14**	**6**	**70.0**
	2nd	-low -fft -eucl	17	3	85.0
4	**1st**	**-boost -fft -cheb**	**14**	**6**	**70.0**
	2nd	-boost -fft -cheb	15	5	75.0
5	1st	-norm -lpc -cheb	13	7	65.0
	2nd	-norm -lpc -cheb	15	5	75.0
6	**1st**	**-high -fft -eucl**	**14**	**6**	**70.0**
	2nd	-high -fft -eucl	18	2	90.0
7	1st	-low -lpc -eucl	11	9	55.00000000000001
	2nd	-low -lpc -eucl	13	7	65.0
8	1st	-boost -lpc -cheb	13	7	65.0
	2nd	-boost -lpc -cheb	15	5	75.0
9	1st	-high -lpc -eucl	11	9	55.00000000000001
	2nd	-high -lpc -eucl	14	6	70.0
10	1ST	-NORM -FFT -CHEB	**16**	**4**	**80.0**
	2nd	-norm -fft -cheb	17	3	85.0
11	1st	-boost -fft -eucl	13	7	65.0
	2nd	-boost -fft -eucl	16	4	80.0
12	1st	-low -fft -cheb	12	8	60.0
	2nd	-low -fft -cheb	14	6	70.0
13	1st	-norm -lpc -eucl	13	7	65.0
	2nd	-norm -lpc -eucl	15	5	75.0
14	**1st**	**-high -fft -cheb**	**14**	**6**	**70.0**
	2nd	-high -fft -cheb	18	2	90.0
15	1st	-boost -lpc -eucl	13	7	65.0
	2nd	-boost -lpc -eucl	15	5	75.0
16	1st	-low -lpc -cheb	13	7	65.0
	2nd	-low -lpc -cheb	15	5	75.0

Looks like our bests results are with -norm -fft -eucl, -high -fft -eucl and -high -fft -cheb, with the top resul, run 10, being 80%.

0.9 Conclusions

So, our best configuration yielded 80% correctness of our work when identifying subjects. Having a total of 15 speakers (well, and two music bands) that means 13-14 subjects identified correctly out of 17 per run.

The main reasons the recognition rate could be that low is due to ununiform sample taking, lack of good preprocessing techniques, such as noise/silence removal, and lack of sophisticated classification modules, such as working Neural Network and Stochastic models.

Even though for commercial and University-level research standards 80% recognition rate is considered to be very low as opposed to a required minimum of 95%-97% and above, we think it is still reasonably well for a one-semester school project. That still involved a substantial amount of research and findings considering our workload and lack of experience in the area.

We would like to thank Dr. Suen and Mr. Sadri for the course and help provided.

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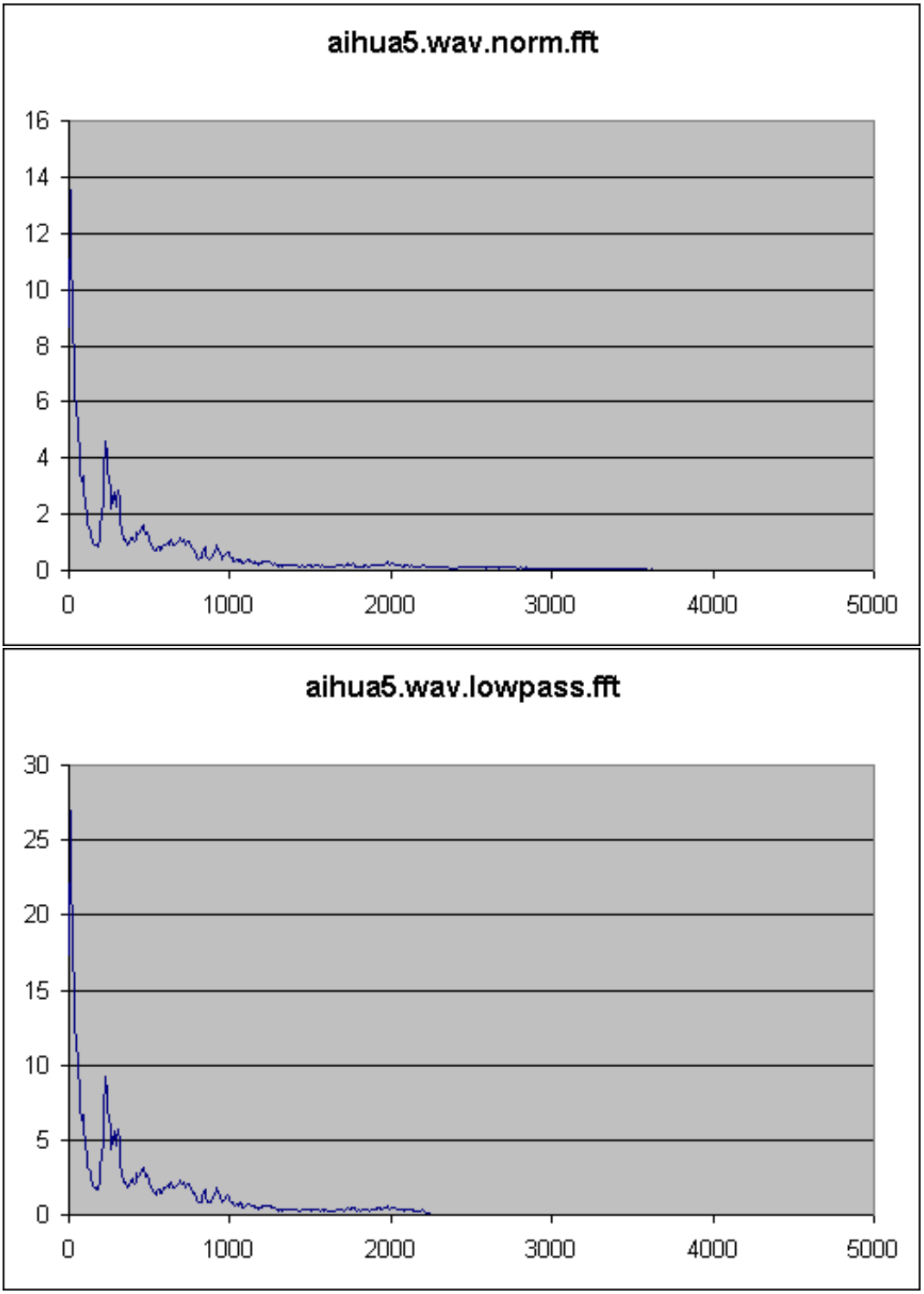
APPENDIX A - Spectrogram Examples

Figure 7: ian15_wav.png

Figure 8: graham13_wav.png

APPENDIX B - FFT Results Before and After Low-Pass Filter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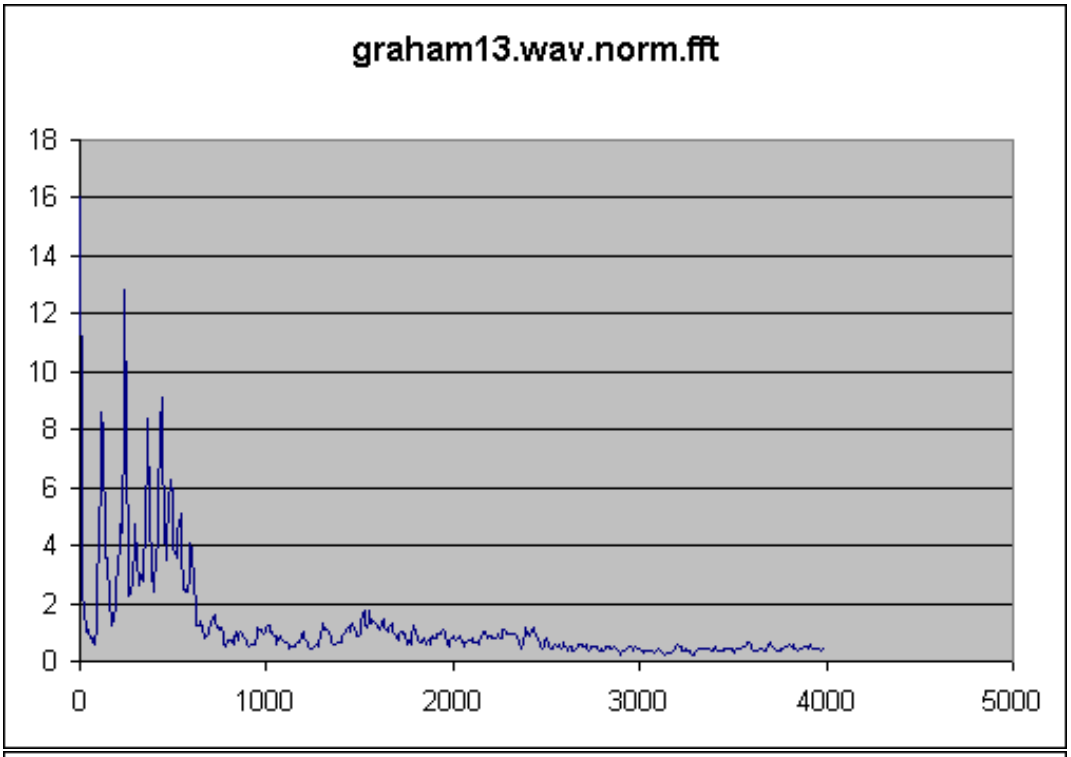
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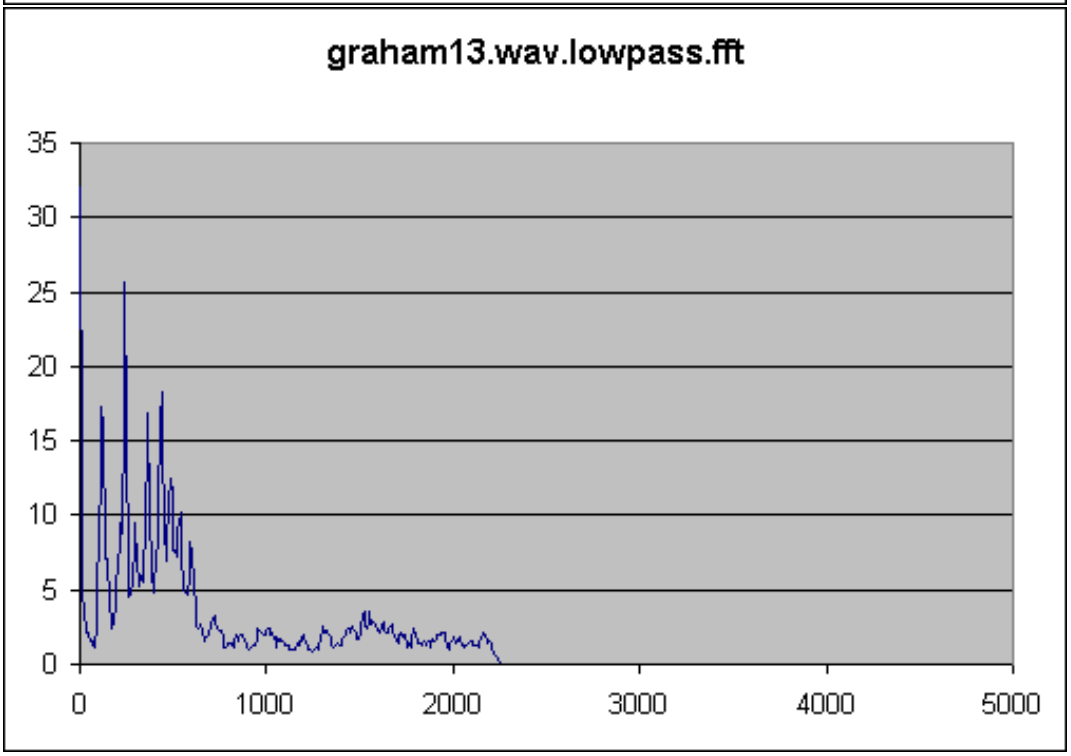
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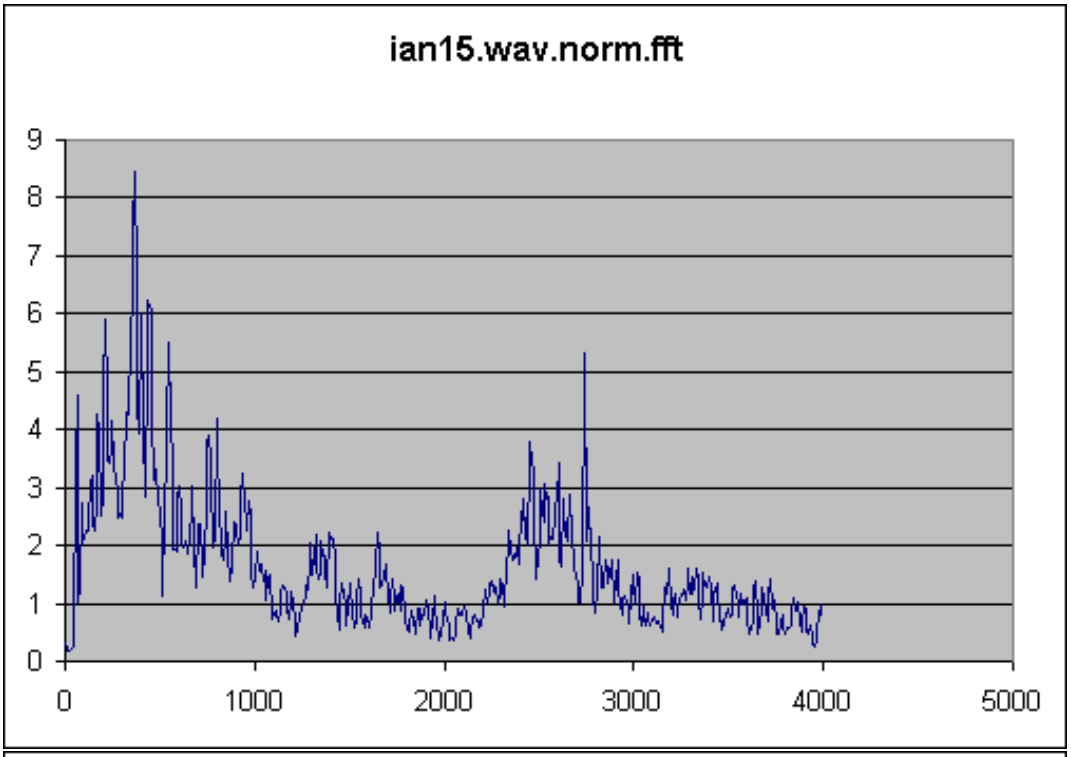
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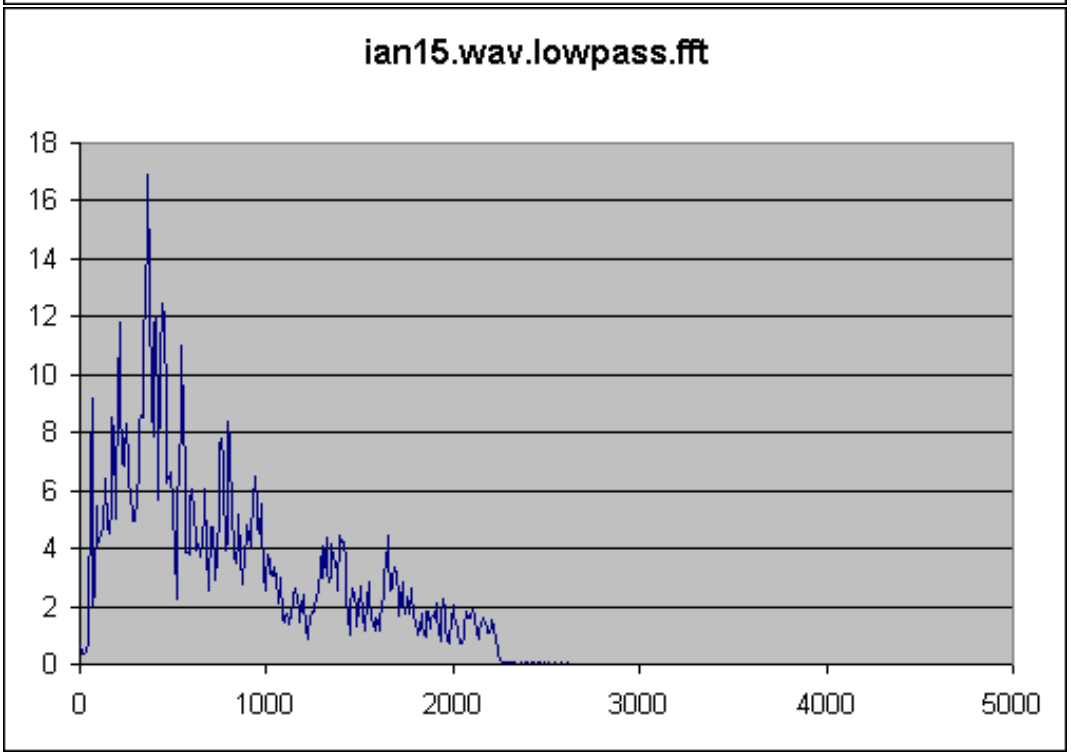
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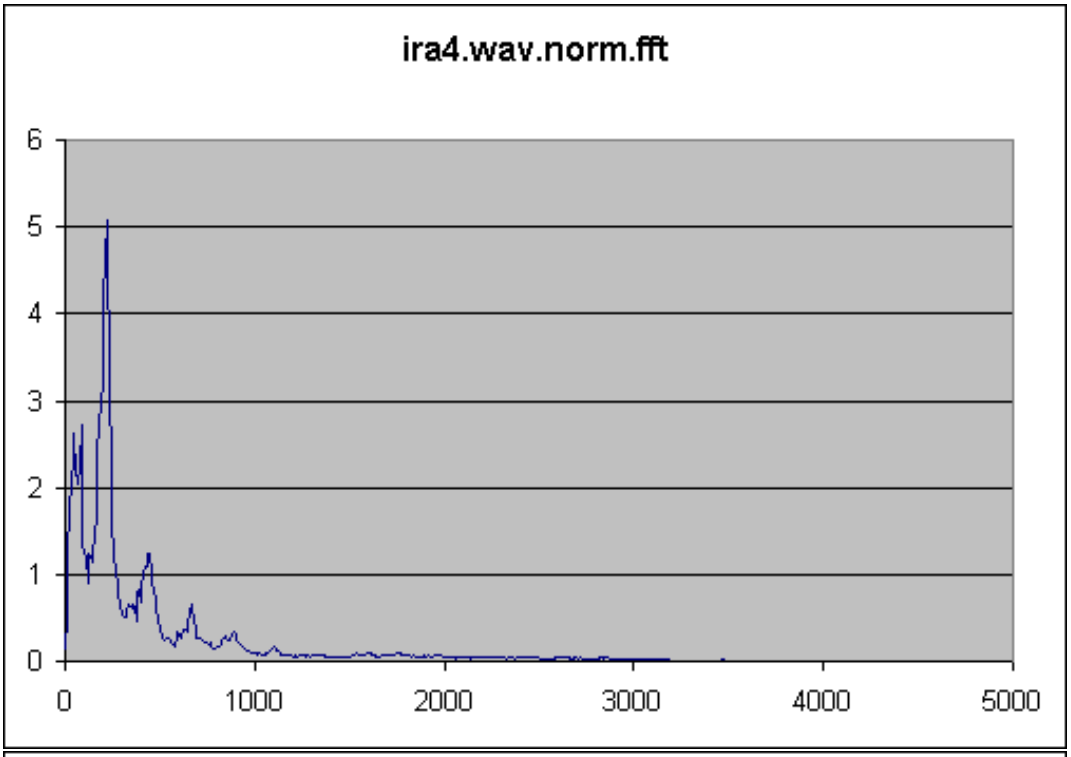
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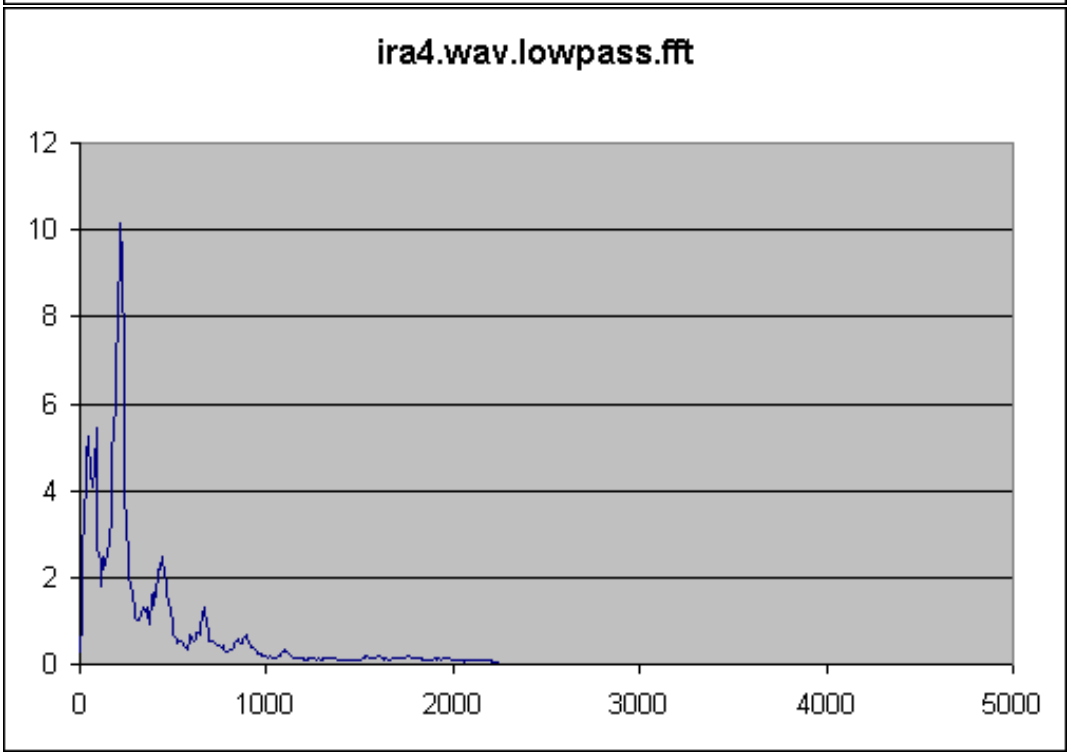
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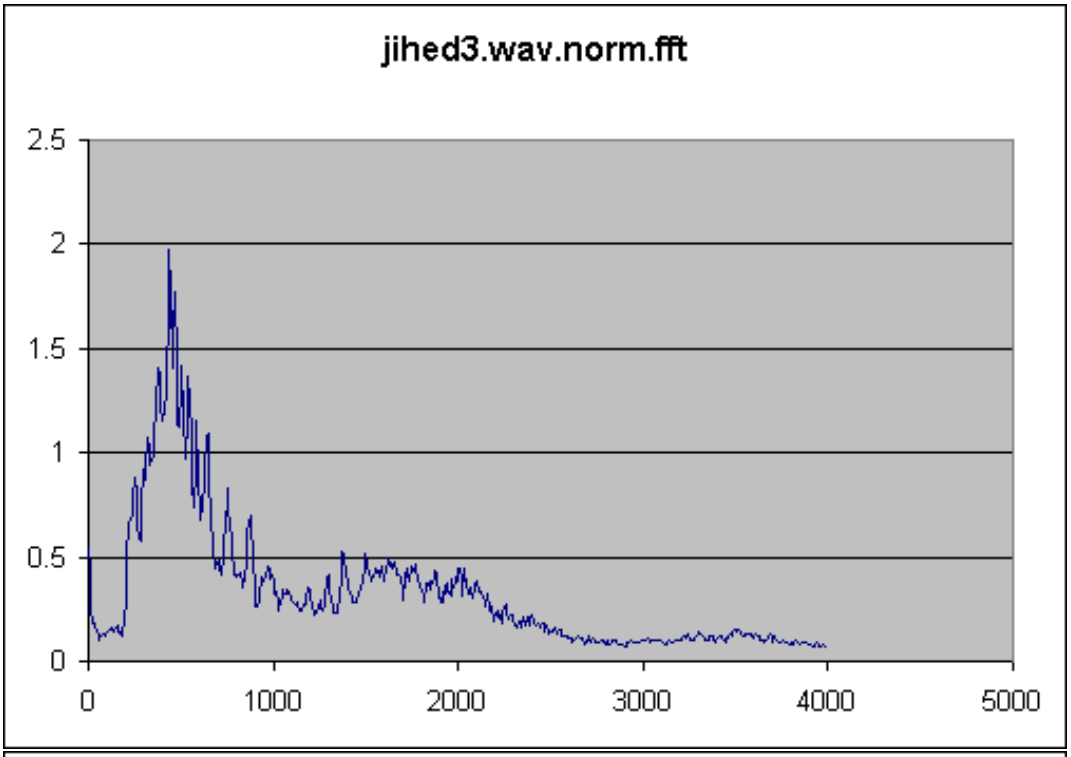
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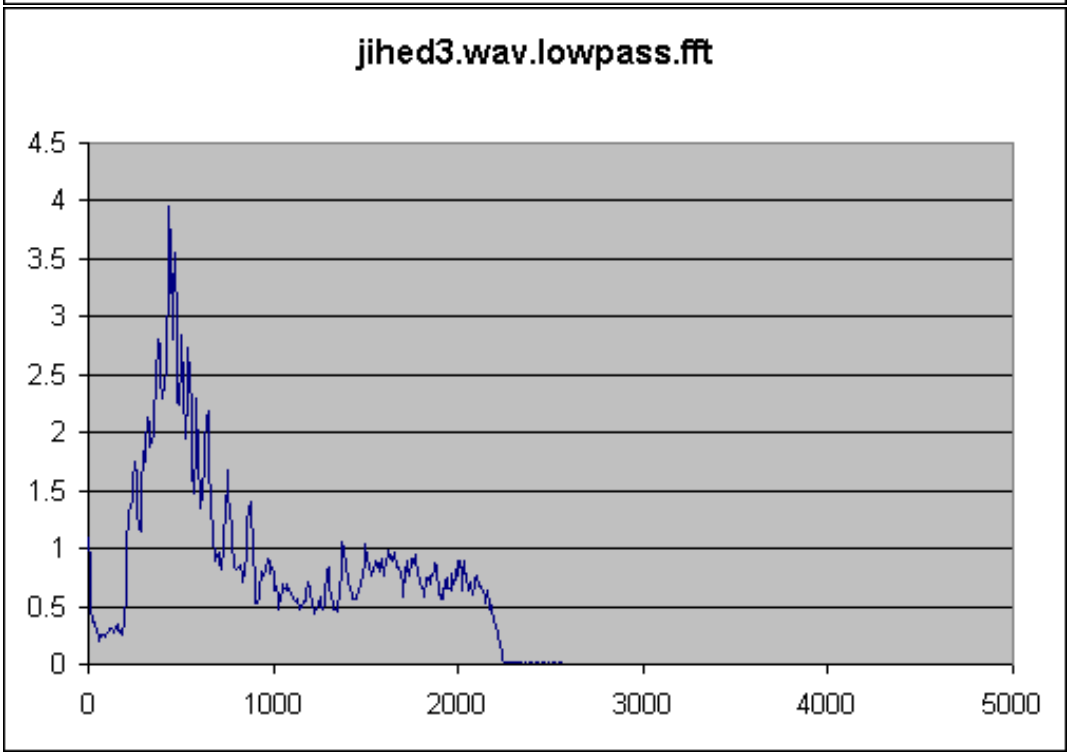
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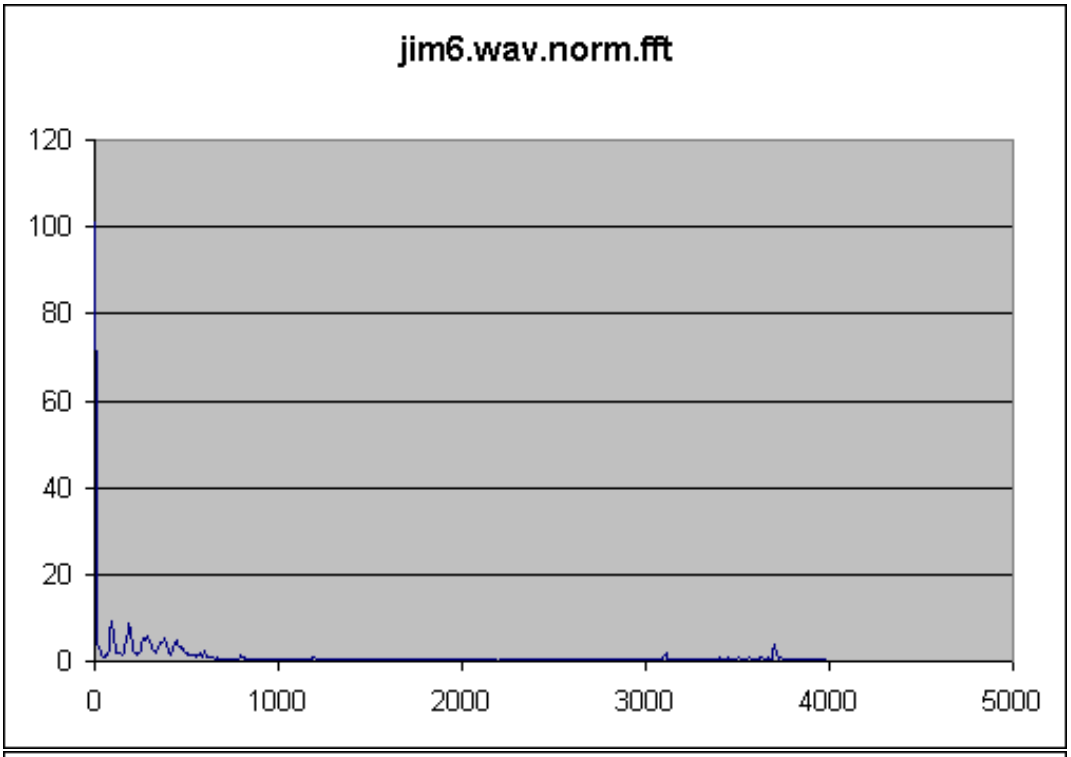
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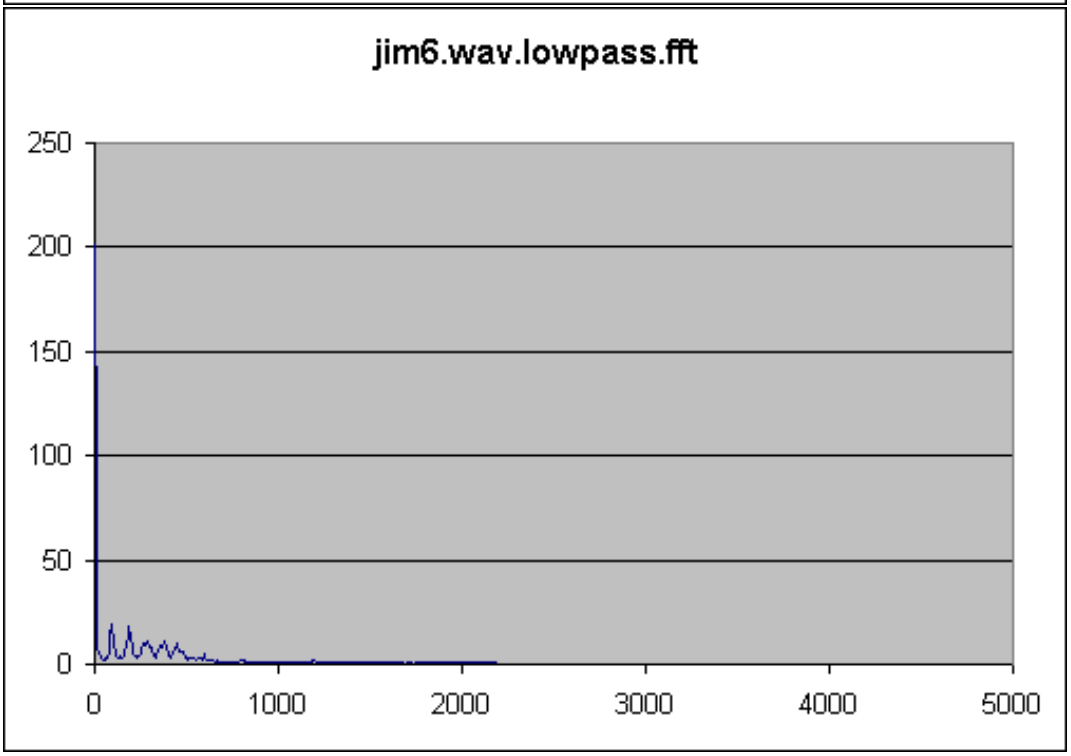
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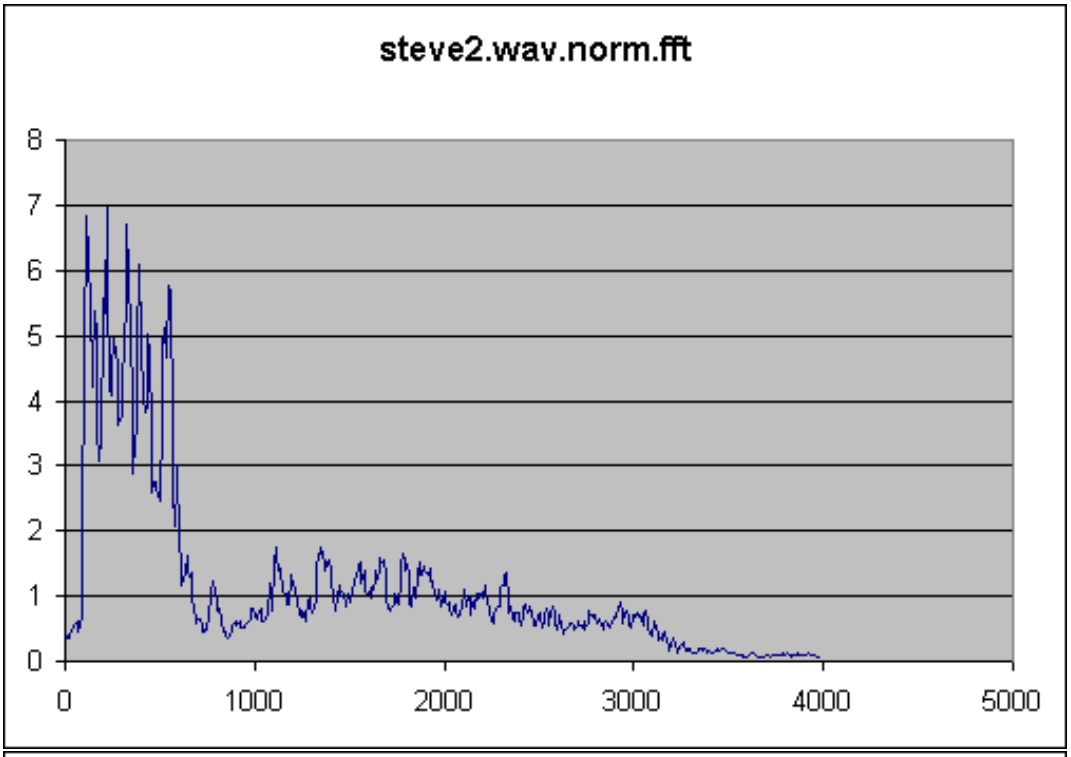
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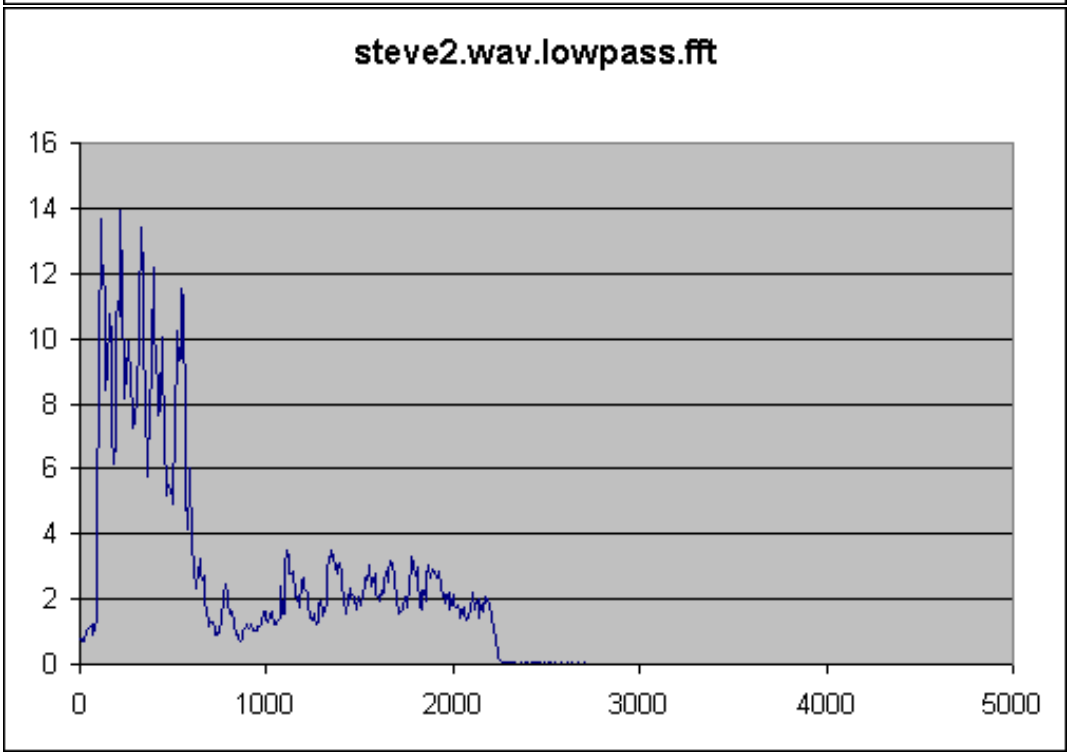
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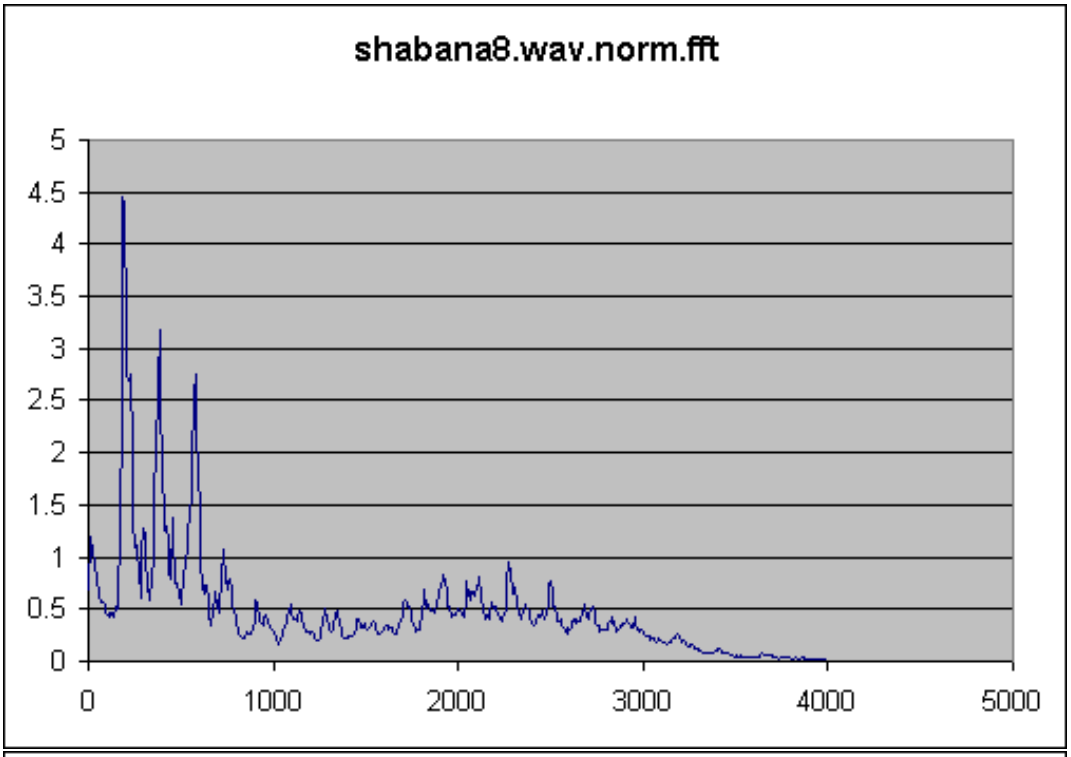
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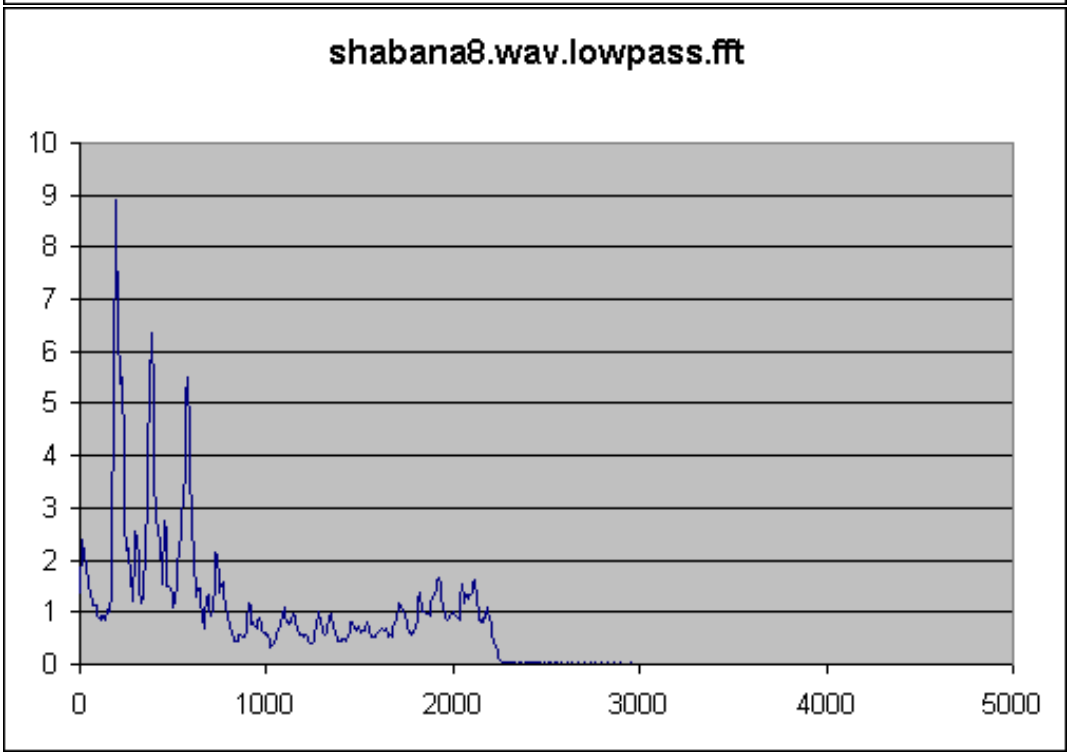
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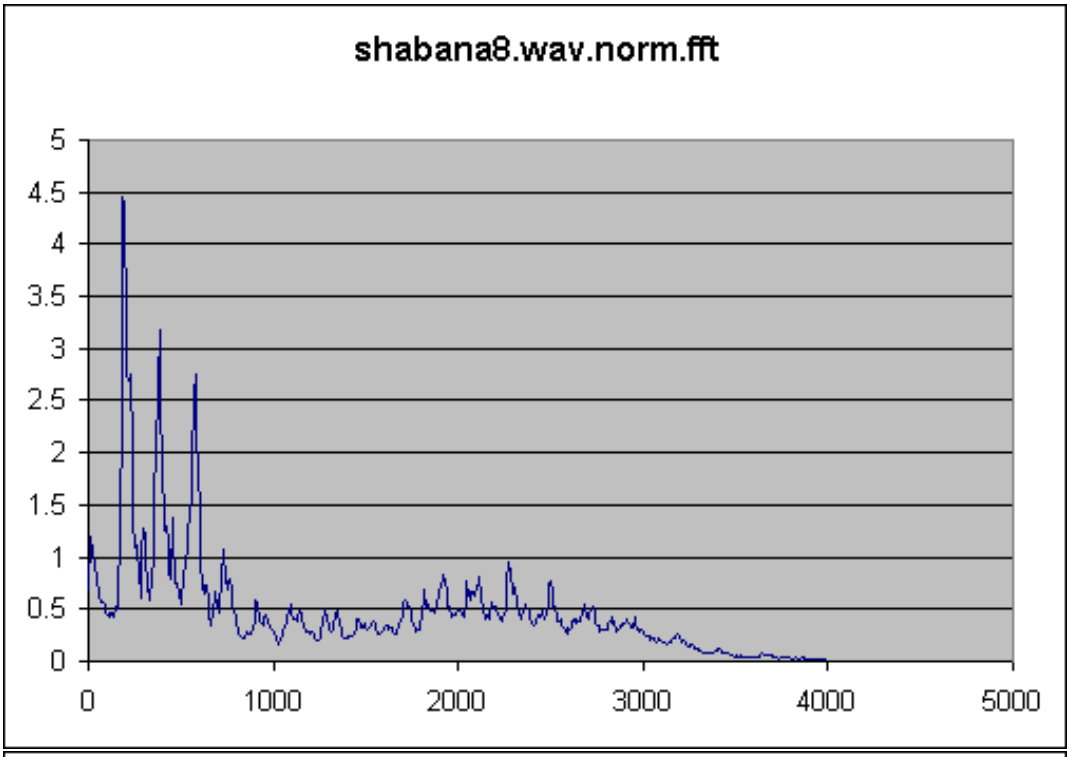
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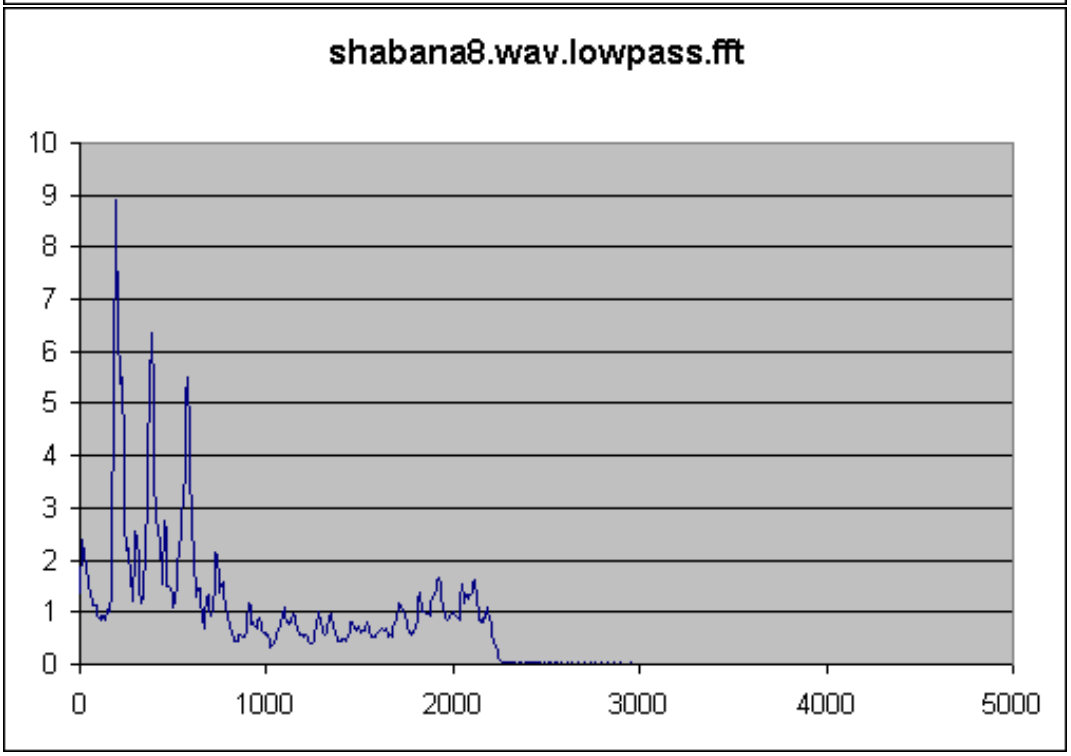
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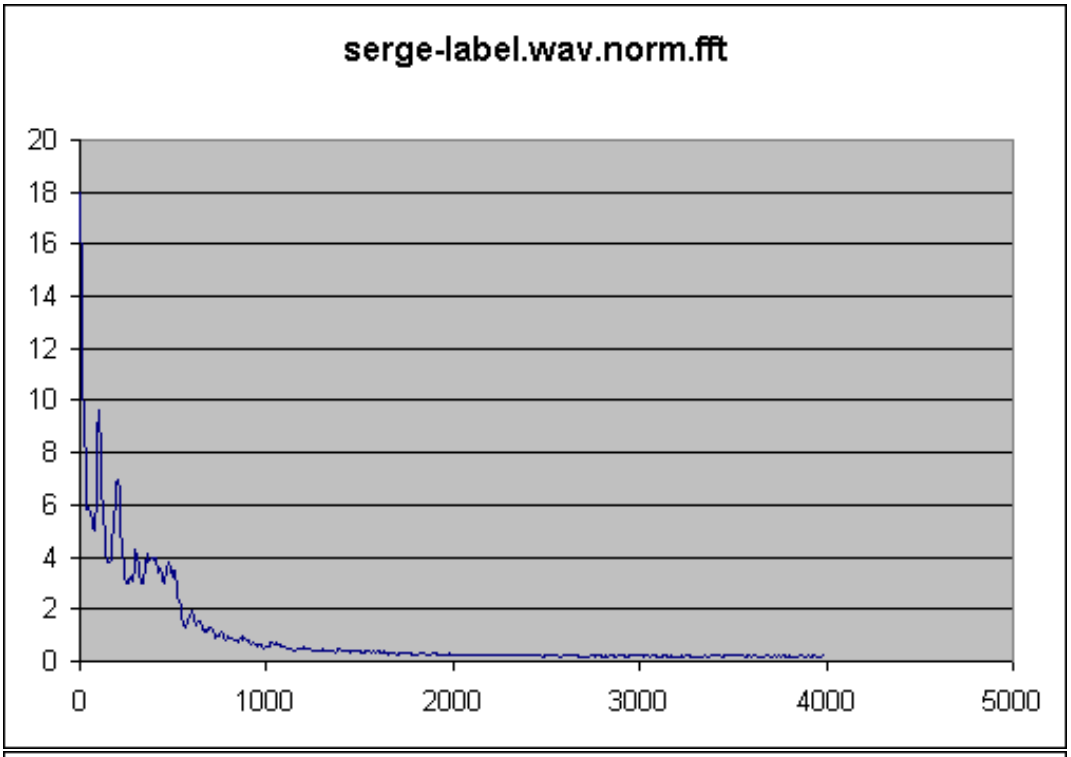
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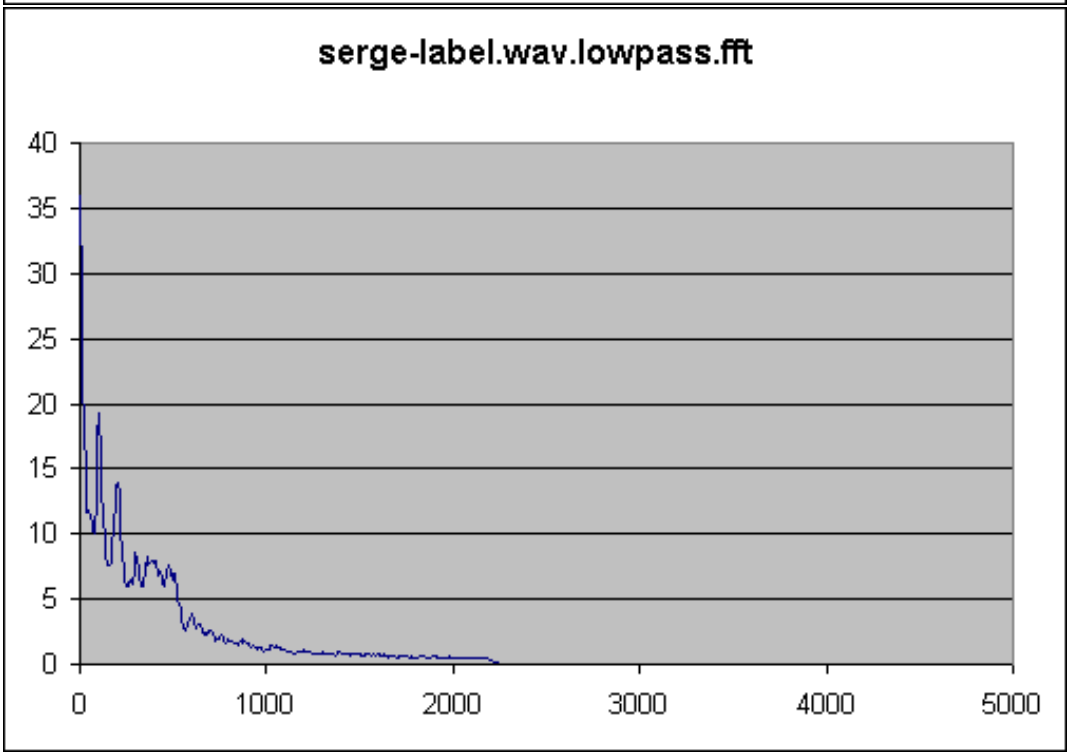
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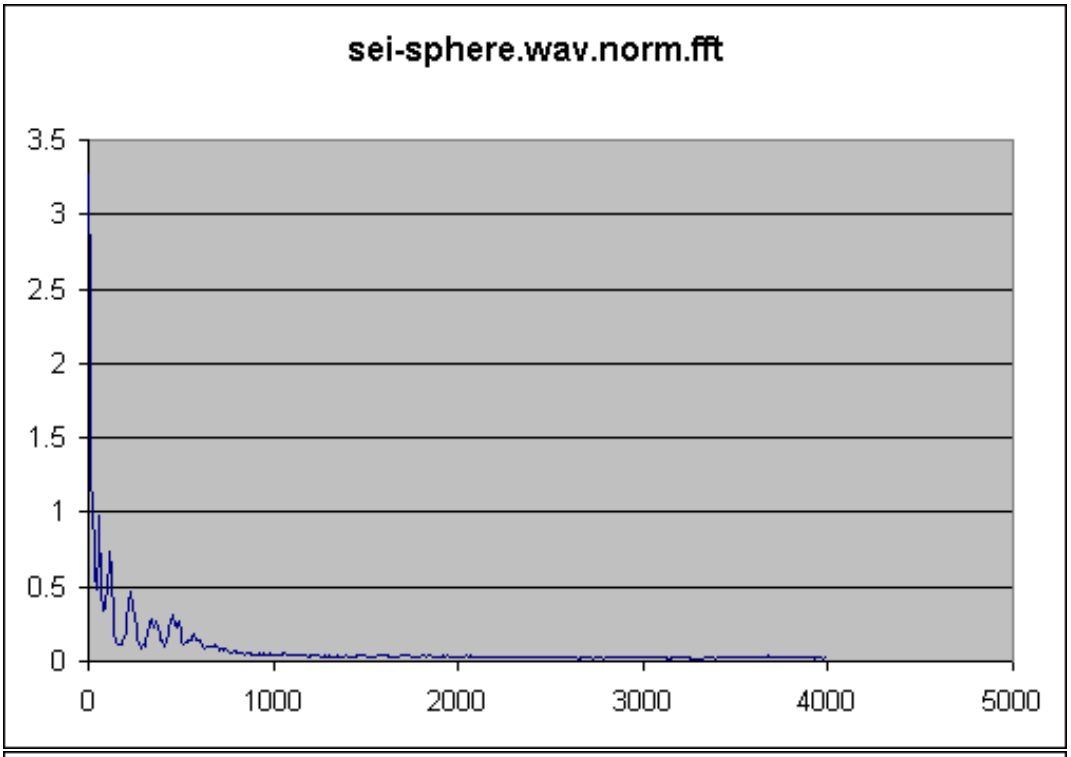
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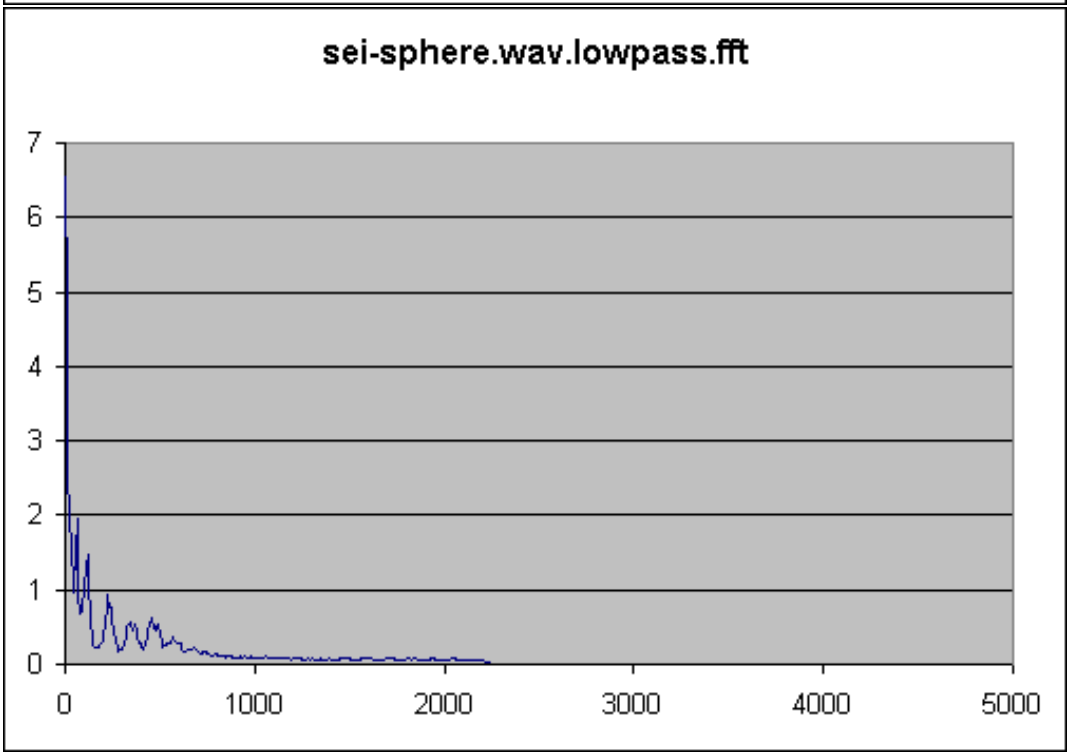
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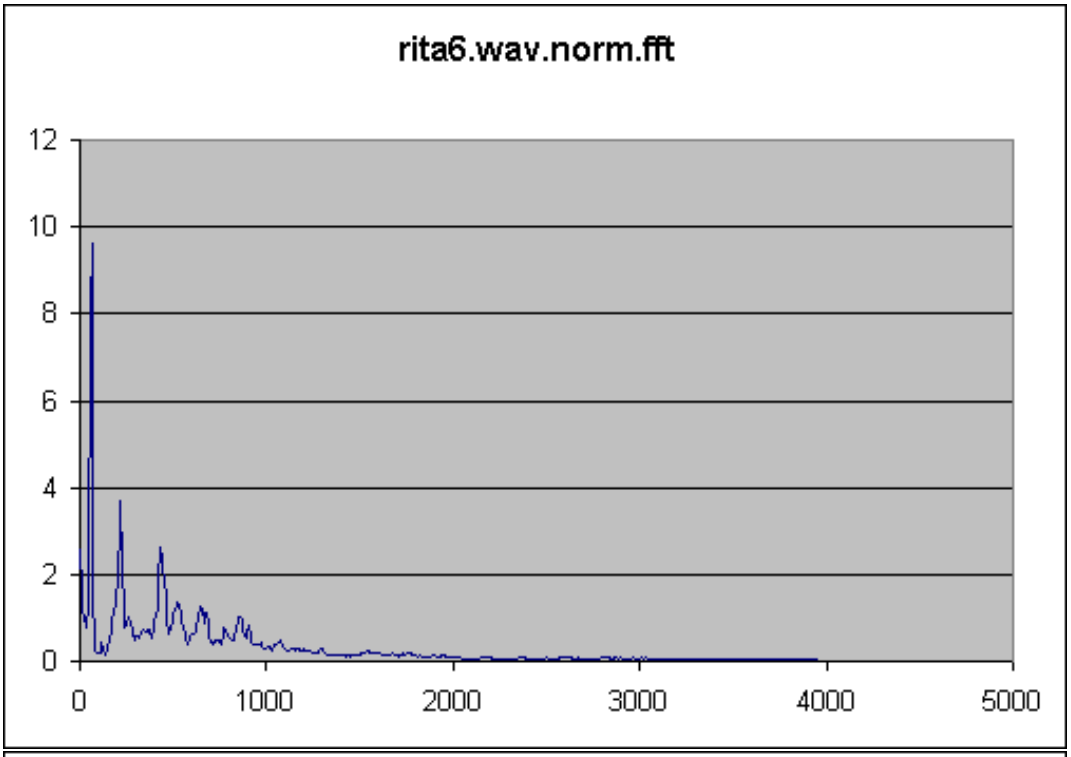
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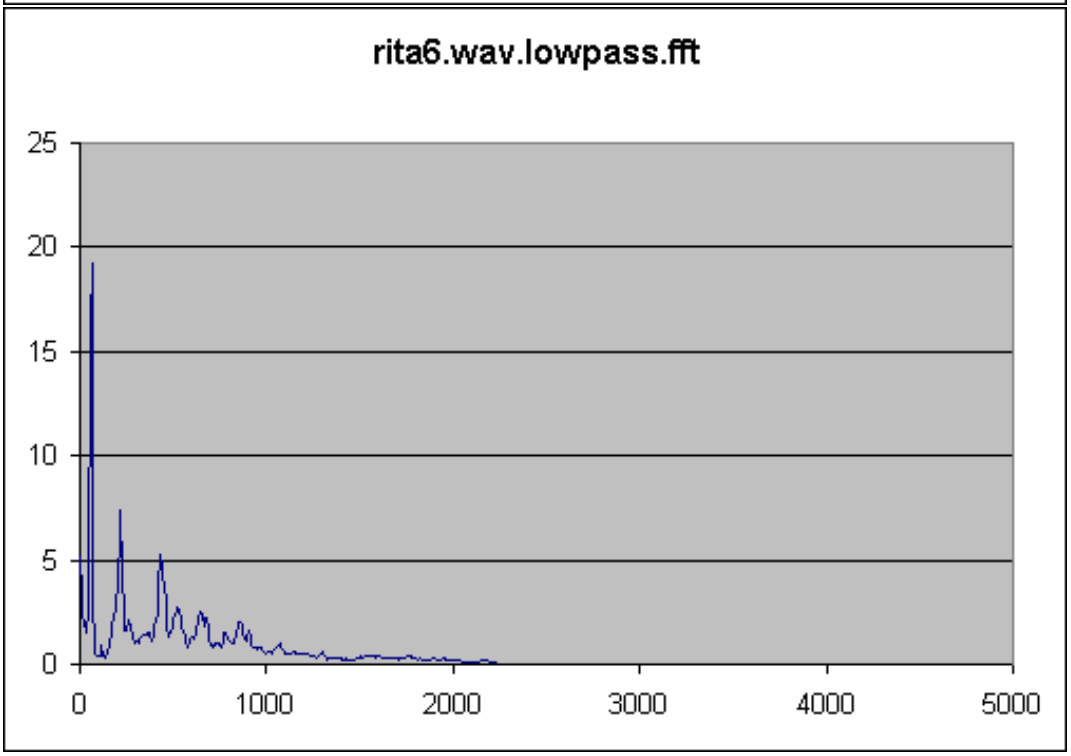
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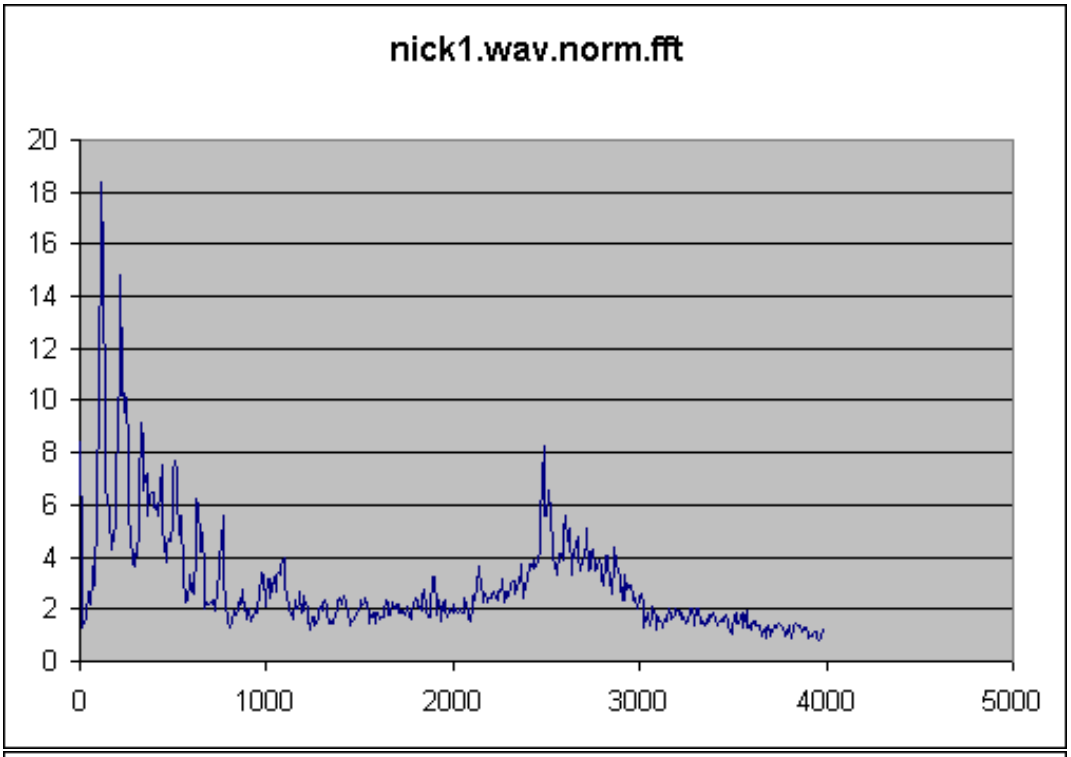
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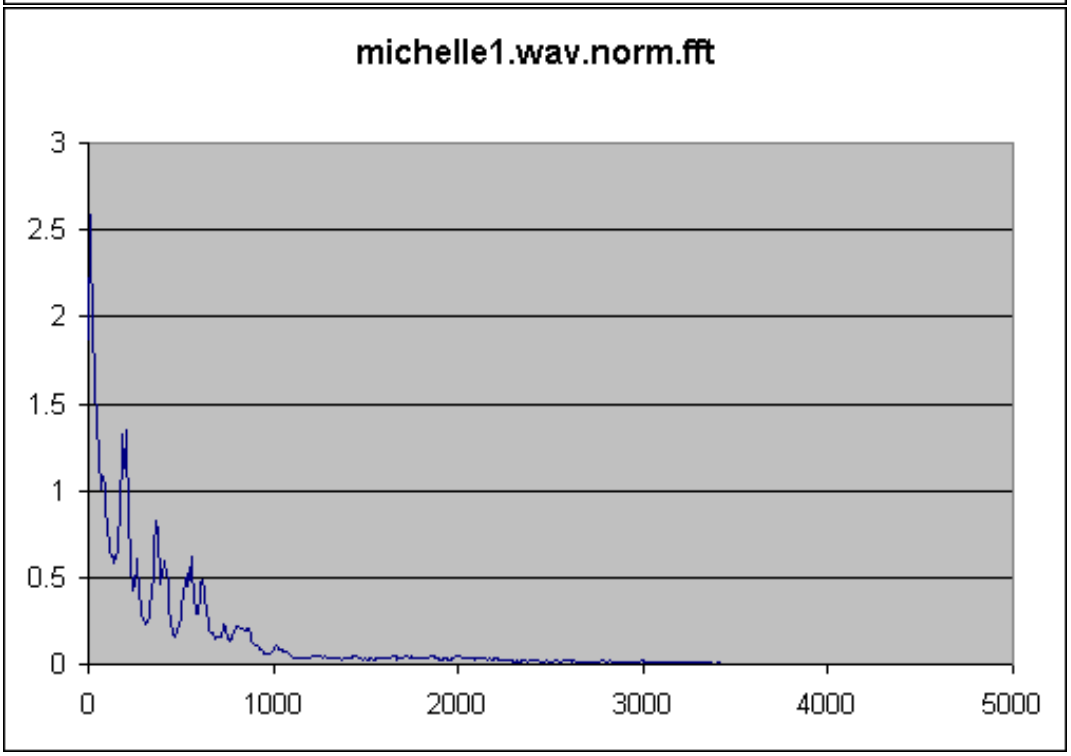
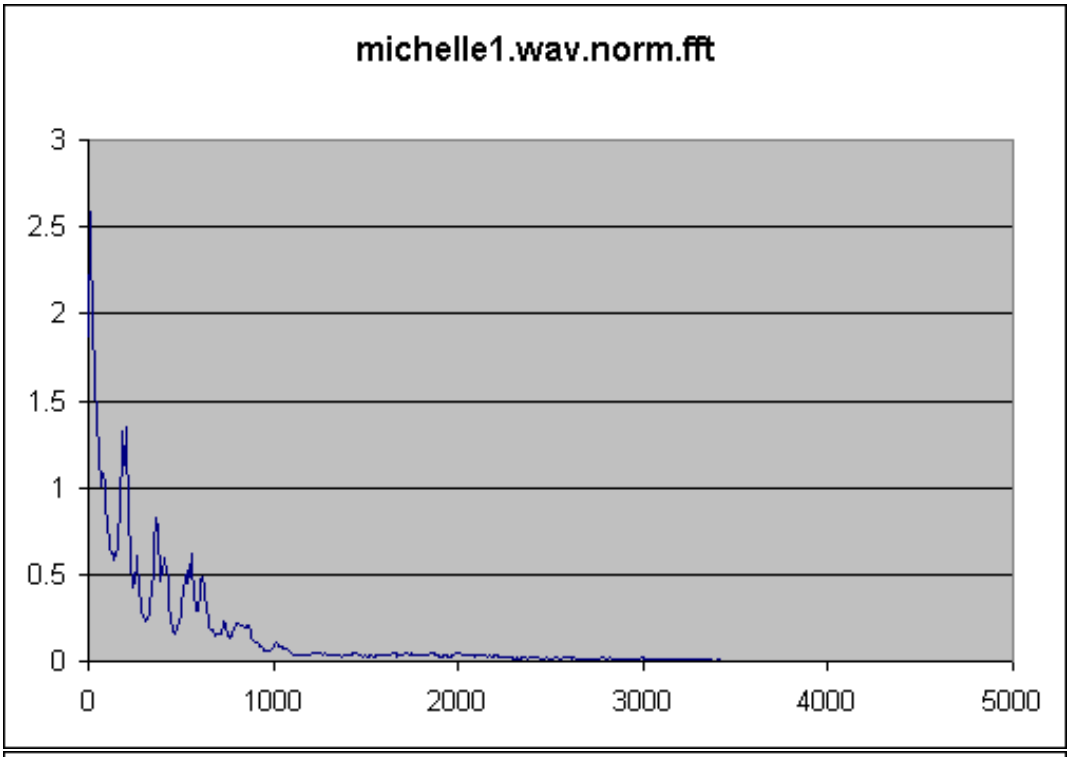
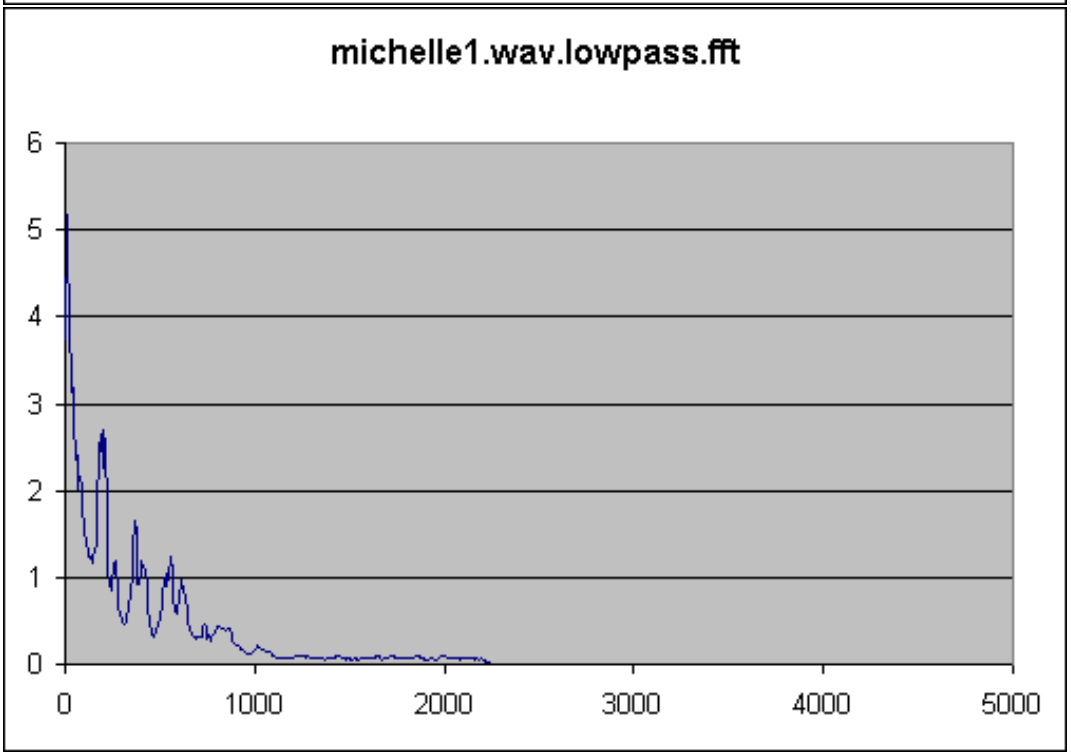
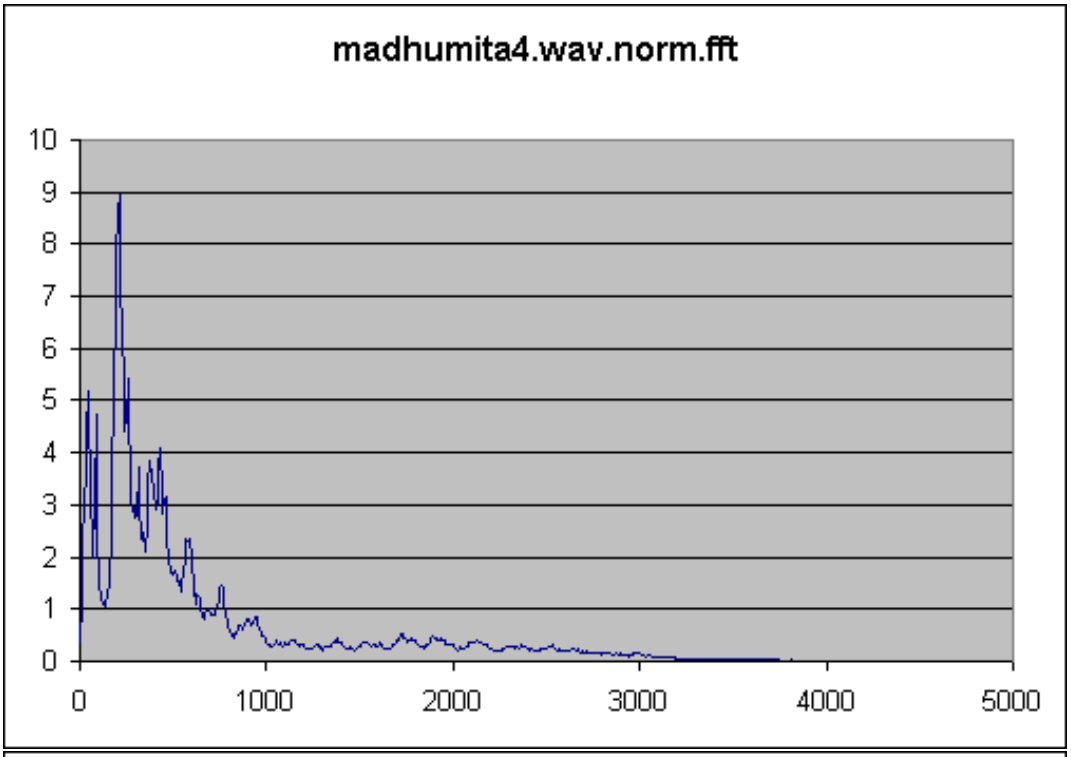
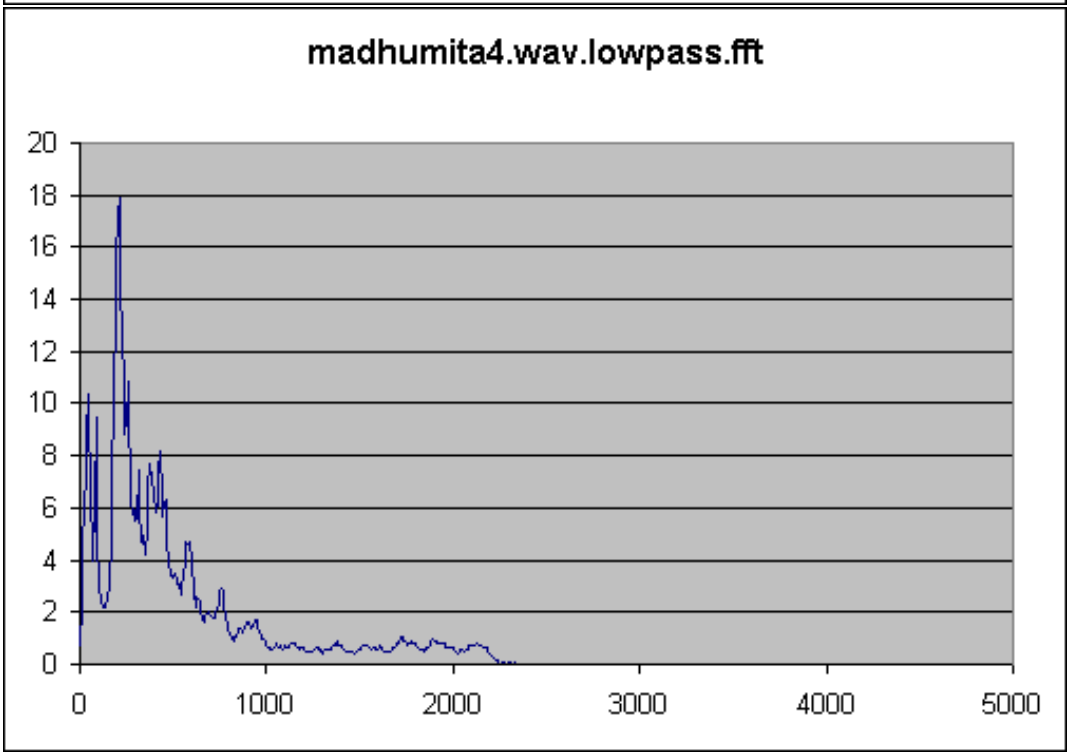
4000
5000


michelle1.wav.norm.fft
3
2.5
2
1.5
1
0.5
0
0
1000
2000
3000
4000
5000

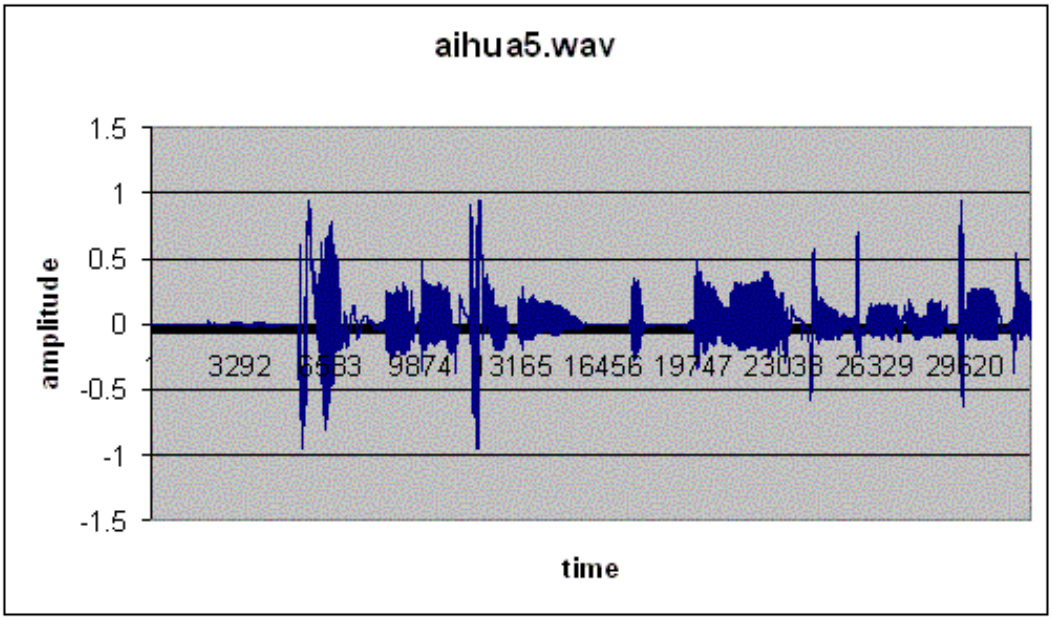

michelle1.wav.norm.fft
3
2.5
2
1.5
1
0.5
0
0
1000
2000
3000
4000
5000

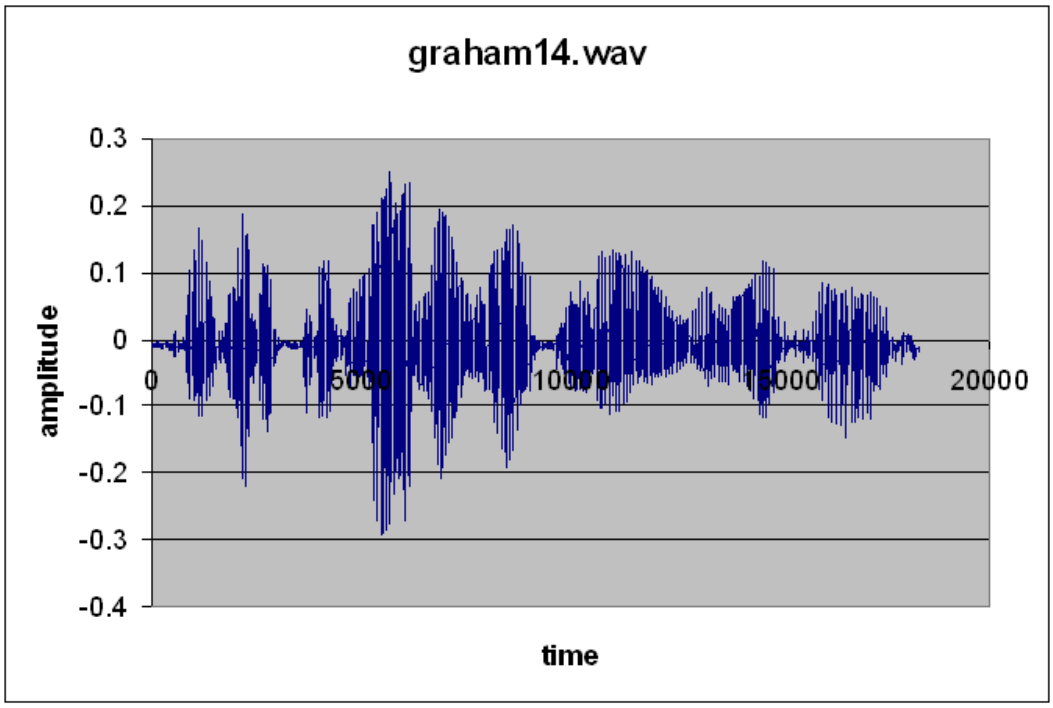

michelle1.wav.lowpass.fft
6
5
4
3
2
1
0
0
1000
2000
3000
4000
5000

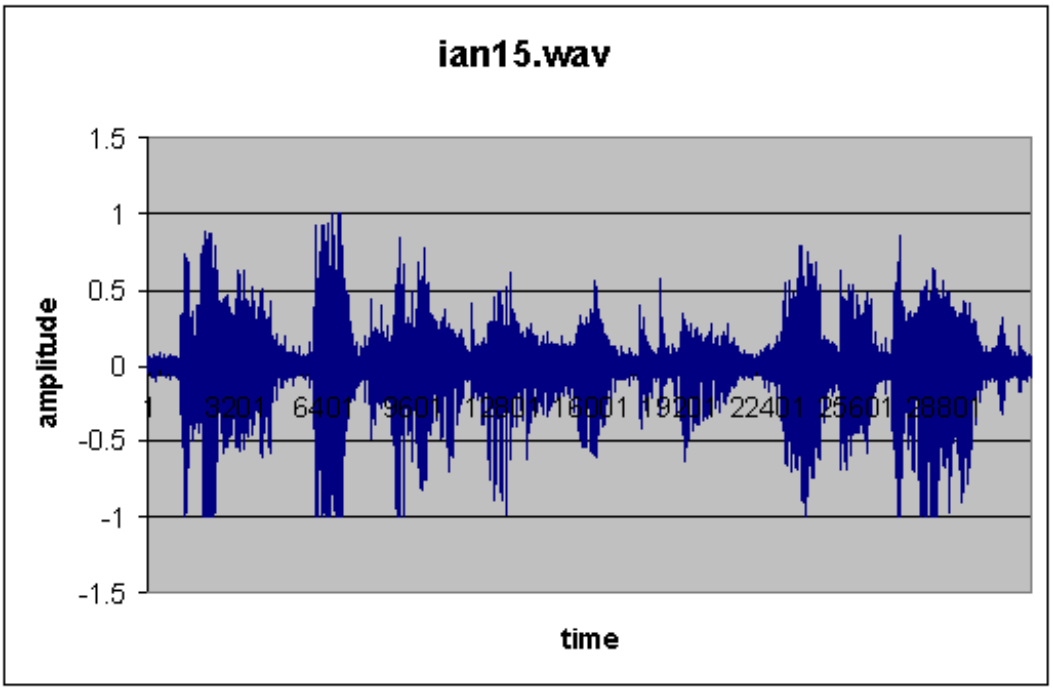

madhumita4.wav.norm.fft
10
9
8
7
6
5
4
3
2
1
0
0
1000
2000
3000
4000
5000

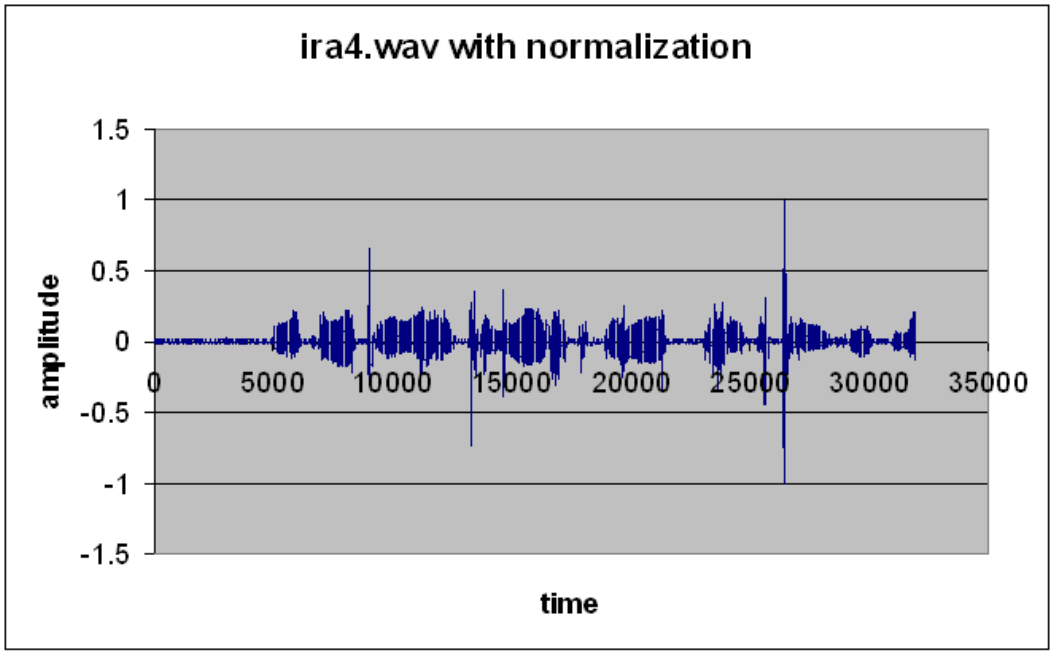

madhumita4.wav.lowpass.fft
20
18
16
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
5000

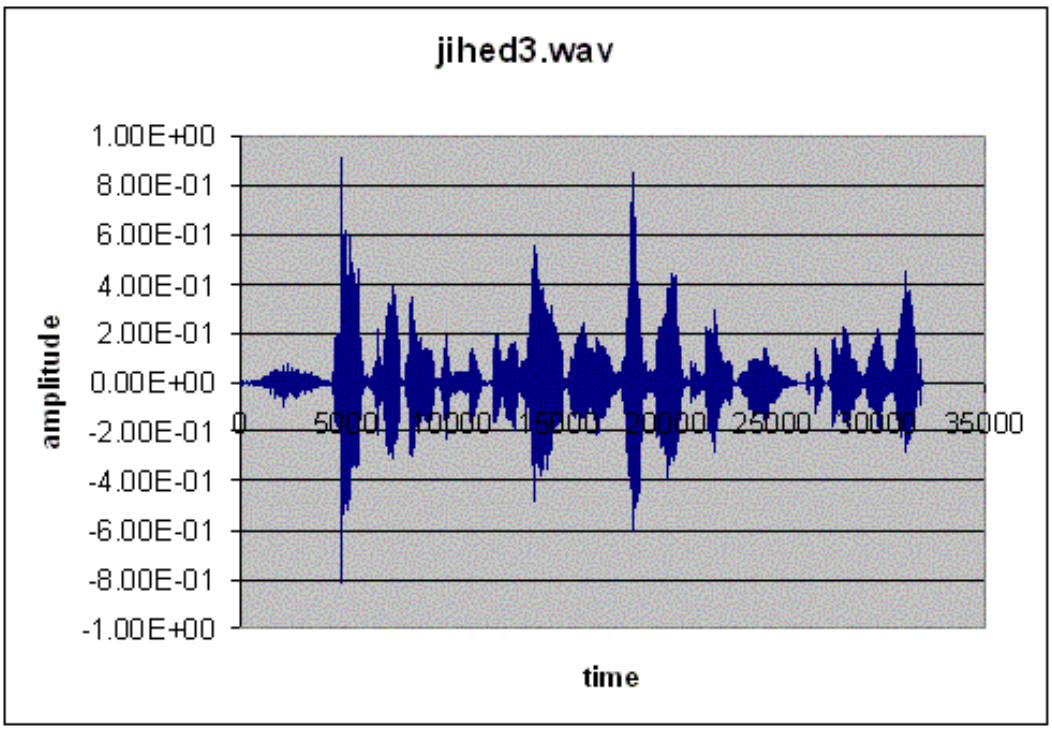
APPENDIX C - Wave Graphs of Testing Samples

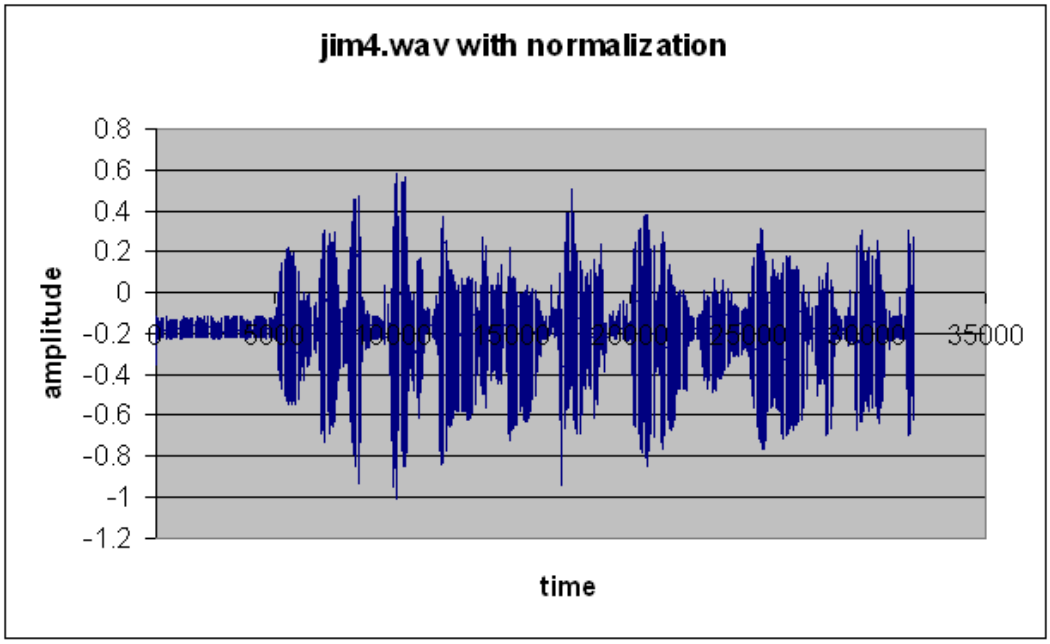

aihua5.wav
amplitude
1.5
1
0.5
0
-0.5
-1
-1.5
3292
9874
13165
16456
19747
23038
26329
29620
time

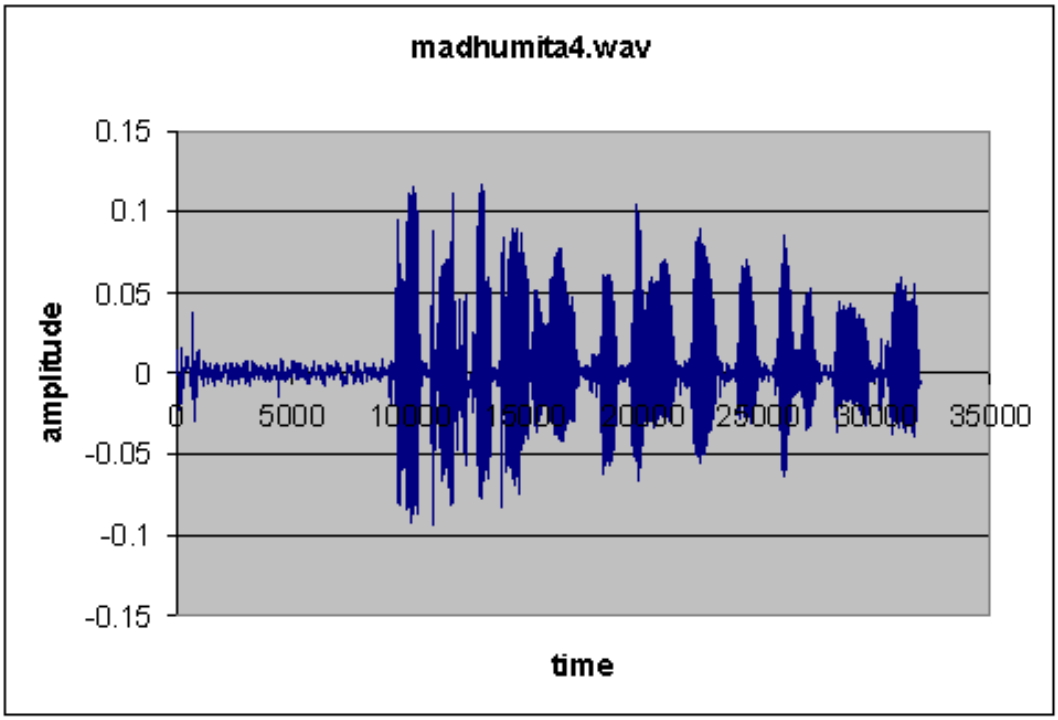

graham14.wav
amplitude
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
0
5000
10000
15000
20000
time

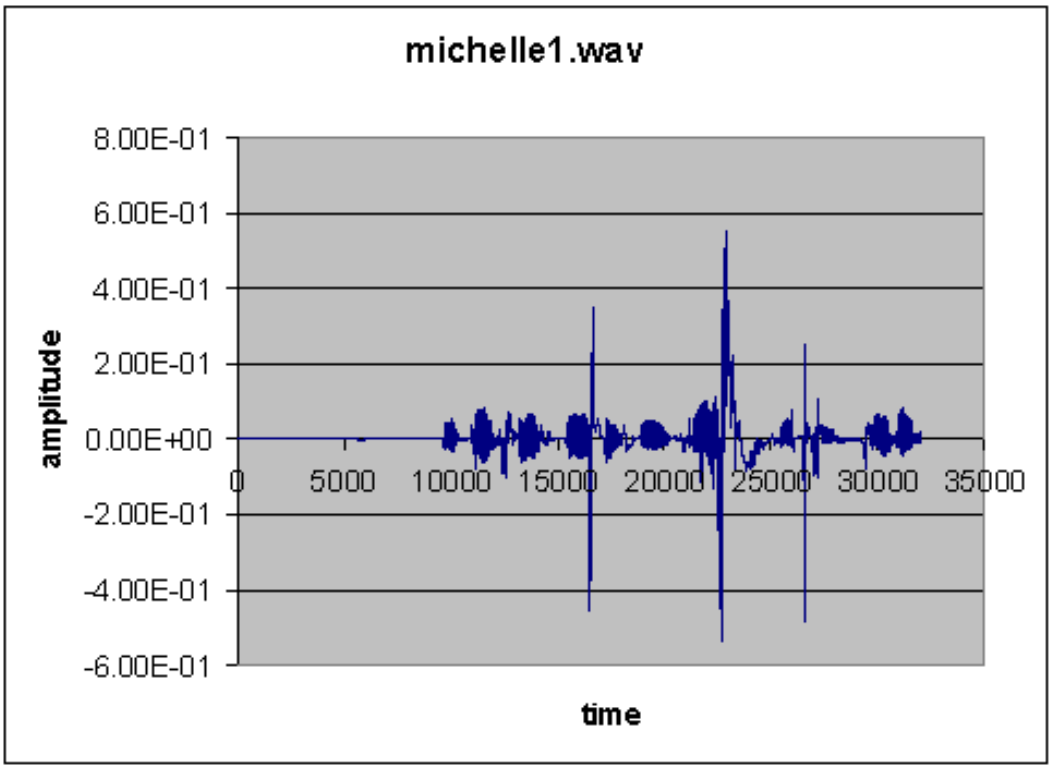

ian15.wav
amplitude
1.5
1
0.5
0
-0.5
-1
-1.5
time

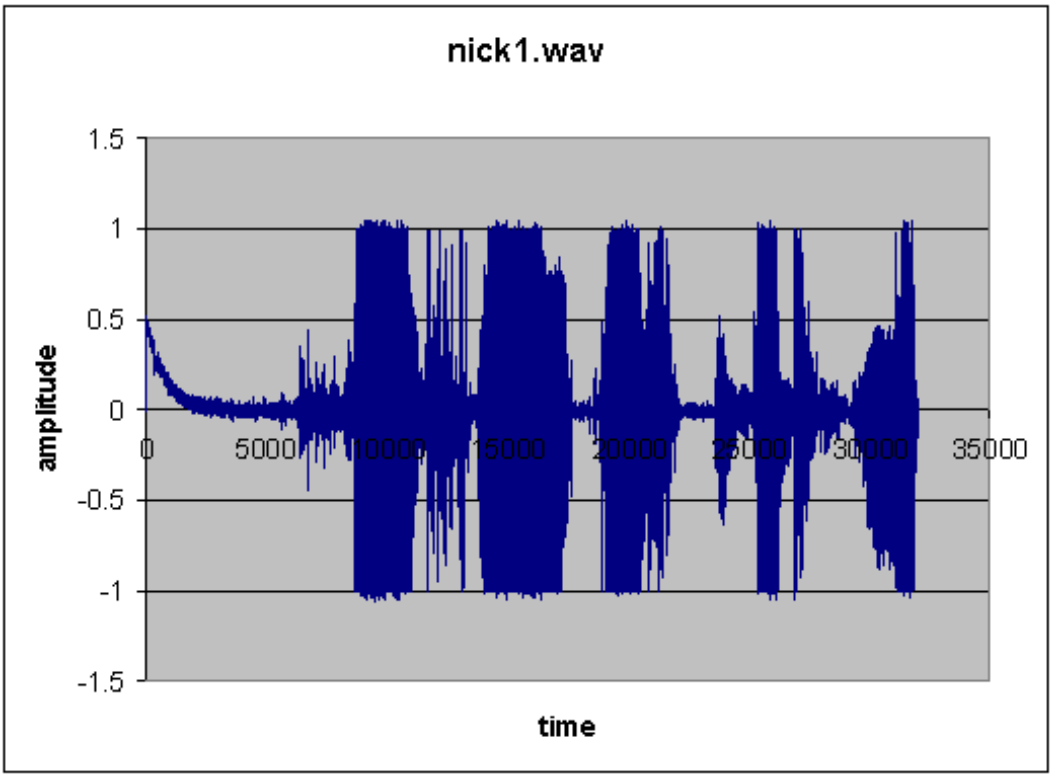

ira4.wav with normalization
amplitude
1.5
1
0.5
0
-0.5
-1
-1.5
0
5000
10000
15000
20000
25000
30000
35000
time

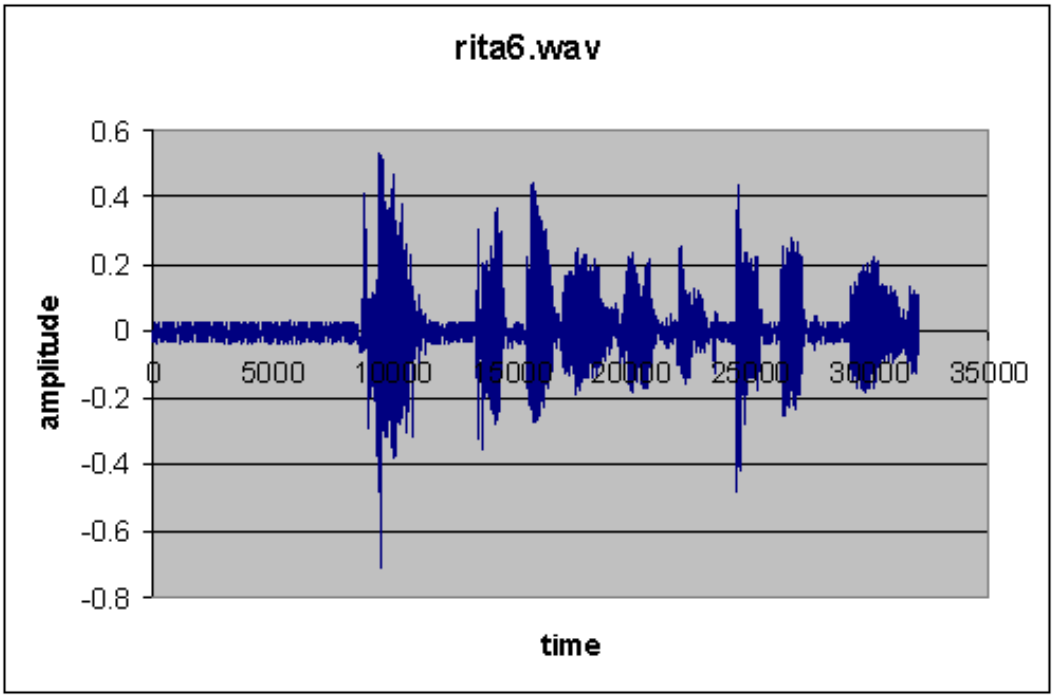

jihed3.wav
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
-2.00E-01
-4.00E-01
-6.00E-01
-8.00E-01
-1.00E+00
amplitude
0
35000
time

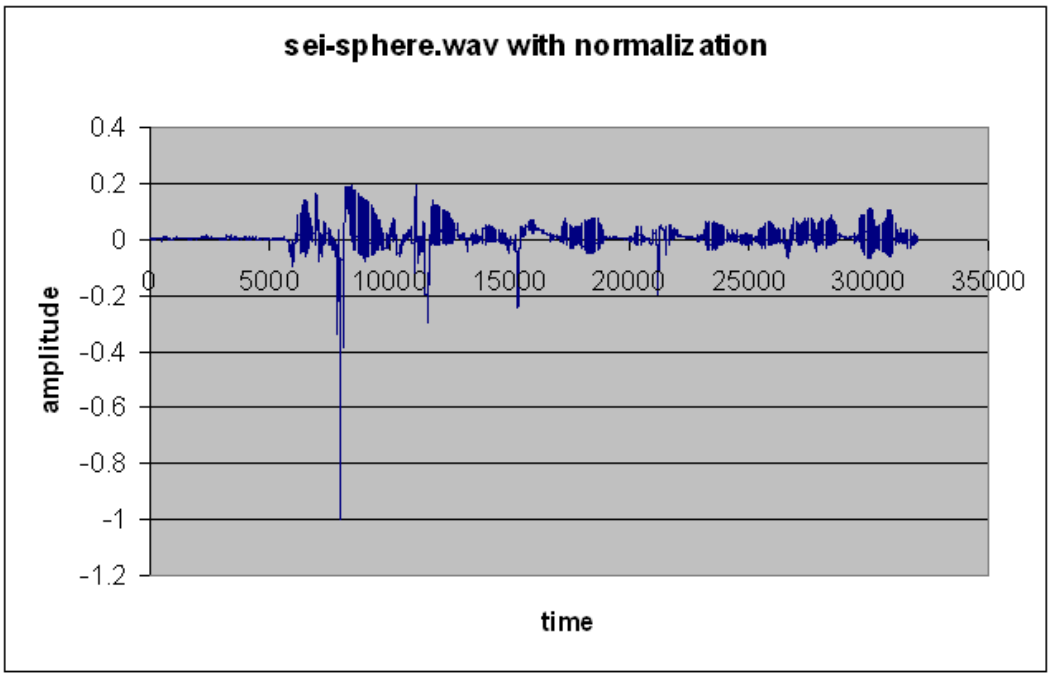

jim4.wav with normalization
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
amplitude
35000
time

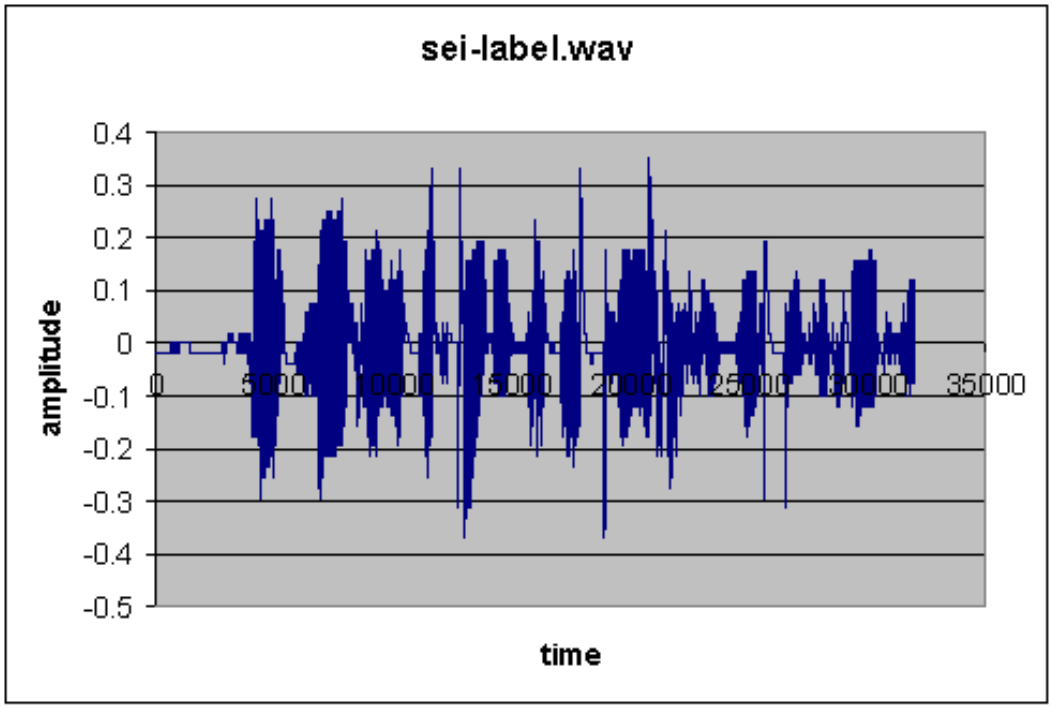

madhumita4.wav
amplitude
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
0
5000
10000
15000
20000
25000
30000
35000
time

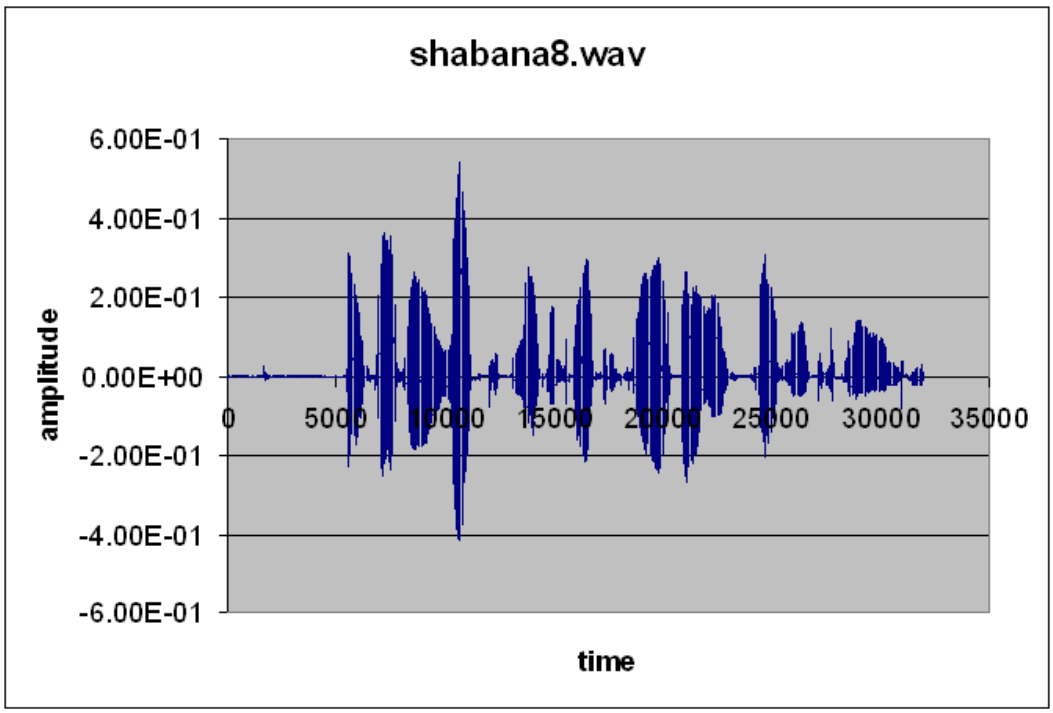

michelle1.wav
amplitude
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
-2.00E-01
-4.00E-01
-6.00E-01
0
5000
10000
15000
20000
25000
30000
35000
time

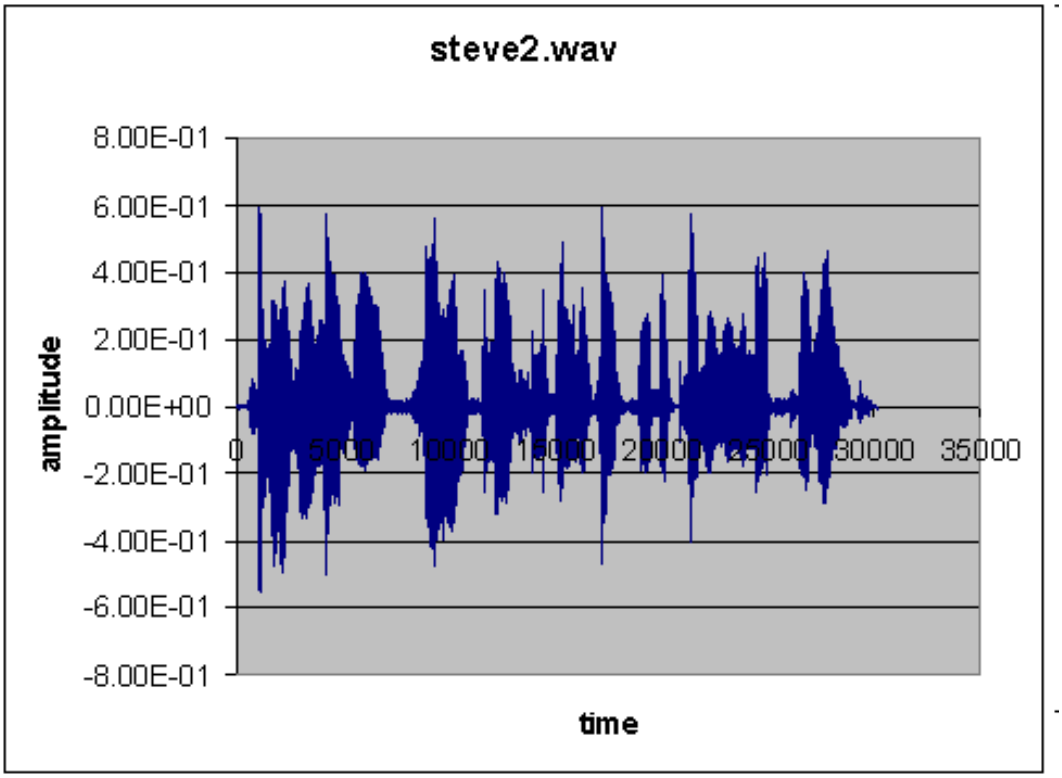

nick1.wav
amplitude
1.5
1
0.5
0
-0.5
-1
-1.5
0
5000
10000
15000
20000
25000
30000
35000
time

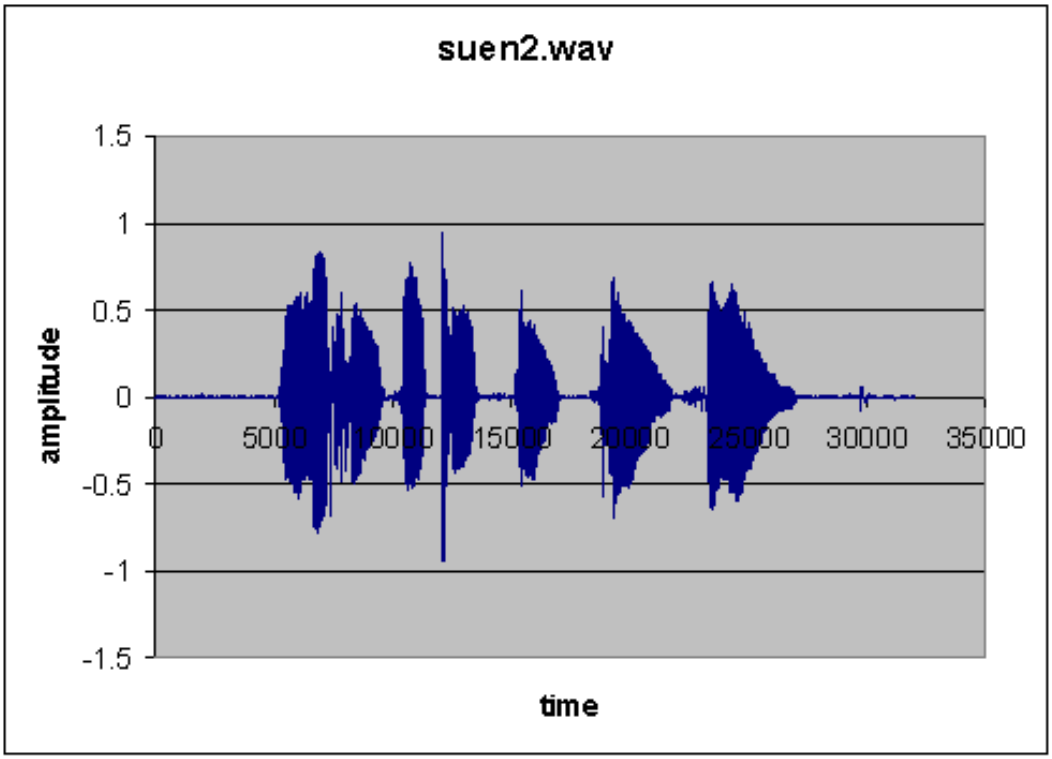

rita6.wav
amplitude
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
0
5000
10000
15000
20000
25000
30000
35000
time


sei-sphere.wav with normalization
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
0
5000
10000
15000
20000
25000
30000
35000
amplitude
time


sei-label.wav
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
0
5000
10000
15000
20000
25000
30000
35000
amplitude
time


shabana8.wav
6.00E-01
4.00E-01
2.00E-01
0.00E+00
-2.00E-01
-4.00E-01
-6.00E-01
amplitude
0
5000
10000
15000
20000
25000
30000
35000
time


steve2.wav
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
-2.00E-01
-4.00E-01
-6.00E-01
-8.00E-01
amplitude
0
5000
10000
15000
20000
25000
30000
35000
time


suen2.wav
1.5
1
0.5
0
-0.5
-1
-1.5
amplitude
0
5000
10000
15000
20000
25000
30000
35000
time

APPENDIX D - `SpeakerIdentApp` and `testing.sh` Run

```
Training...
Done training on folder "training-samples".
Done training on folder "training-samples".
Done training on folder "training-samples".
Done training on folder "training-samples".
Done training on folder "training-samples".
Done training on folder "training-samples".
Done training on folder "training-samples".
Done training on folder "training-samples".
Testing...
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
=============================================
               Config: -norm -fft -eucl
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 7
     Second Best Name: Alexei Mokhov
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
=============================================
               Config: -norm -fft -cheb
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 7
     Second Best Name: Alexei Mokhov
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
=============================================
               Config: -norm -lpc -eucl
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 5
     Second Best Name: Dr. Suen
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
=============================================
               Config: -norm -lpc -cheb
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 5
     Second Best Name: Dr. Suen
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
=============================================
               Config: -boost -fft -eucl
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 6
     Second Best Name: Margarita Mokhova
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
=============================================
               Config: -boost -fft -cheb
```

```
        Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 6
     Second Best Name: Margarita Mokhova
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===============================================
               Config: -low -fft -eucl
        Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 7
     Second Best Name: Alexei Mokhov
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===============================================
               Config: -low -fft -cheb
        Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 7
     Second Best Name: Alexei Mokhov
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===============================================
               Config: -low -lpc -eucl
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 14
     Second Best Name: Aihua
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===============================================
               Config: -low -lpc -cheb
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 14
     Second Best Name: Aihua
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===========================================
               Config: -high -fft -eucl
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 6
     Second Best Name: Margarita Mokhova
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===========================================
               Config: -high -fft -cheb
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 6
     Second Best Name: Margarita Mokhova
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===========================================
               Config: -high -lpc -eucl
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 13
     Second Best Name: Ira
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/aihua5.wav
===========================================
               Config: -high -lpc -cheb
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 14
     Expected Speaker: Aihua
       Second Best ID: 13
     Second Best Name: Ira
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===========================================
               Config: -norm -fft -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===========================================
               Config: -norm -fft -cheb
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===========================================
               Config: -norm -lpc -eucl
```

```
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===============================================
               Config: -boost -fft -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===============================================
               Config: -boost -fft -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
===============================================
               Config: -low -fft -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 2
     Second Best Name: Ian
```

```
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
=========================================
               Config: -low -fft -cheb
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 2
     Second Best Name: Ian
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
=========================================
               Config: -low -lpc -eucl
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
=========================================
               Config: -low -lpc -cheb
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
=========================================
               Config: -high -fft -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
=========================================
               Config: -high -fft -cheb
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
=========================================
               Config: -high -lpc -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham13.wav
=========================================
               Config: -high -lpc -cheb
```

```
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -norm -fft -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -norm -fft -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -boost -fft -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -boost -fft -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
```

```
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -boost -lpc -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -boost -lpc -cheb
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -low -fft -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -low -fft -cheb
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -low -lpc -eucl
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 9
     Second Best Name: Graham
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -low -lpc -cheb
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 9
     Second Best Name: Graham
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -high -fft -eucl
```

```
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -high -fft -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -high -lpc -eucl
        Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 9
     Second Best Name: Graham
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/graham14.wav
=============================================
               Config: -high -lpc -cheb
        Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 9
     Expected Speaker: Graham
       Second Best ID: 9
     Second Best Name: Graham
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -norm -fft -eucl
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -norm -fft -cheb
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
```

```
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -norm -lpc -cheb
         Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -boost -fft -eucl
         Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -boost -fft -cheb
         Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -boost -lpc -eucl
         Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -boost -lpc -cheb
         Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -low -fft -eucl
         Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -low -fft -cheb
```

```
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -low -lpc -eucl
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -low -lpc -cheb
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -high -fft -eucl
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -high -fft -cheb
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -high -lpc -eucl
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ian15.wav
=============================================
               Config: -high -lpc -cheb
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 2
     Expected Speaker: Ian
       Second Best ID: 1
     Second Best Name: Serge
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -norm -fft -eucl
         Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -norm -fft -cheb
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 11
     Second Best Name: Madhumita
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -norm -lpc -eucl
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 11
     Second Best Name: Madhumita
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -norm -lpc -cheb
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 11
     Second Best Name: Madhumita
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -boost -fft -eucl
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 13
     Second Best Name: Ira
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -boost -fft -cheb
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 13
     Second Best Name: Ira
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -boost -lpc -eucl
```

```
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 11
     Second Best Name: Madhumita
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===============================================
               Config: -low -fft -eucl
        Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===============================================
               Config: -low -fft -cheb
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 11
     Second Best Name: Madhumita
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===============================================
               Config: -low -lpc -eucl
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===============================================
               Config: -low -lpc -cheb
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===============================================
               Config: -high -fft -eucl
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 13
     Second Best Name: Ira
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -high -fft -cheb
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 13
     Second Best Name: Ira
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -high -lpc -eucl
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 5
     Second Best Name: Dr. Suen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/ira4.wav
===========================================
               Config: -high -lpc -cheb
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 13
     Expected Speaker: Ira
       Second Best ID: 5
     Second Best Name: Dr. Suen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -norm -fft -eucl
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -norm -fft -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 6
     Second Best Name: Margarita Mokhova
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -norm -lpc -eucl
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -norm -lpc -cheb
```

```
        Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 9
     Second Best Name: Graham
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===============================================
               Config: -boost -fft -eucl
        Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 0
     Second Best Name: Unknown
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===============================================
               Config: -boost -fft -cheb
        Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 2
     Second Best Name: Ian
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 2
     Second Best Name: Ian
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===============================================
               Config: -low -fft -eucl
        Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===============================================
               Config: -low -fft -cheb
        Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 1
     Second Best Name: Serge
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -low -lpc -eucl
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 2
     Second Best Name: Ian
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -low -lpc -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 2
     Second Best Name: Ian
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -high -fft -eucl
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 7
     Second Best Name: Alexei Mokhov
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -high -fft -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 7
     Second Best Name: Alexei Mokhov
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -high -lpc -eucl
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jihed3.wav
===========================================
               Config: -high -lpc -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 10
     Expected Speaker: Jihed Halimi
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
===========================================
               Config: -norm -fft -eucl
```

```
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
=============================================
               Config: -norm -fft -cheb
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
=============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
=============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
=============================================
               Config: -boost -fft -eucl
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
=============================================
               Config: -boost -fft -cheb
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
=============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
===========================================
               Config: -boost -lpc -cheb
         Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
===========================================
               Config: -low -fft -eucl
         Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
===========================================
               Config: -low -fft -cheb
         Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
===========================================
               Config: -low -lpc -eucl
         Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
===========================================
               Config: -low -lpc -cheb
         Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
===========================================
               Config: -high -fft -eucl
         Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
===========================================
               Config: -high -fft -cheb
```

```
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
=============================================
               Config: -high -lpc -eucl
        Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 9
     Second Best Name: Graham
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/jim6.wav
=============================================
               Config: -high -lpc -cheb
        Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 4
     Expected Speaker: Jimmy
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
=============================================
               Config: -norm -fft -eucl
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 11
     Second Best Name: Madhumita
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
=============================================
               Config: -norm -fft -cheb
        Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
=============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 5
     Second Best Name: Dr. Suen
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
=============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 11
     Second Best Name: Madhumita
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===========================================
               Config: -boost -fft -eucl
         Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 0
     Second Best Name: Unknown
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===========================================
               Config: -boost -fft -cheb
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===========================================
               Config: -boost -lpc -eucl
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 5
     Second Best Name: Dr. Suen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===========================================
               Config: -boost -lpc -cheb
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 5
     Second Best Name: Dr. Suen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===========================================
               Config: -low -fft -eucl
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 11
     Second Best Name: Madhumita
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===========================================
               Config: -low -fft -cheb
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 11
     Second Best Name: Madhumita
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===========================================
               Config: -low -lpc -eucl
```

```
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===============================================
               Config: -low -lpc -cheb
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===============================================
               Config: -high -fft -eucl
        Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===============================================
               Config: -high -fft -cheb
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===============================================
               Config: -high -lpc -eucl
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/madhumita4.wav
===============================================
               Config: -high -lpc -cheb
        Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 11
     Expected Speaker: Madhumita
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
===============================================
               Config: -norm -fft -eucl
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 10
     Second Best Name: Jihed Halimi
```

```
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -norm -fft -cheb
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 10
     Second Best Name: Jihed Halimi
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -norm -lpc -eucl
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 11
     Second Best Name: Madhumita
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -norm -lpc -cheb
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 11
     Second Best Name: Madhumita
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -boost -fft -eucl
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 13
     Second Best Name: Ira
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -boost -fft -cheb
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 13
     Second Best Name: Ira
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -boost -lpc -eucl
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 14
     Second Best Name: Aihua
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -boost -lpc -cheb
```

```
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 11
     Second Best Name: Madhumita
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
===============================================
               Config: -low -fft -eucl
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
===============================================
               Config: -low -fft -cheb
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
===============================================
               Config: -low -lpc -eucl
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 14
     Second Best Name: Aihua
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
===============================================
               Config: -low -lpc -cheb
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 14
     Second Best Name: Aihua
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
===============================================
               Config: -high -fft -eucl
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 13
     Second Best Name: Ira
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
===============================================
               Config: -high -fft -cheb
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 13
     Second Best Name: Ira
```

```
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -high -lpc -eucl
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 13
     Second Best Name: Ira
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/michelle1.wav
=============================================
               Config: -high -lpc -cheb
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 16
     Expected Speaker: Michelle
       Second Best ID: 13
     Second Best Name: Ira
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -norm -fft -eucl
         Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -norm -fft -cheb
         Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -norm -lpc -eucl
         Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -norm -lpc -cheb
         Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -boost -fft -eucl
```

```
        Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -boost -fft -cheb
        Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -low -fft -eucl
        Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 9
     Second Best Name: Graham
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -low -fft -cheb
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 15
     Second Best Name: Nick
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
=============================================
               Config: -low -lpc -eucl
        Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 1
     Second Best Name: Serge
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
===========================================
               Config: -low -lpc -cheb
         Speaker's ID: 2
   Speaker identified: Ian
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
===========================================
               Config: -high -fft -eucl
         Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 2
     Second Best Name: Ian
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
===========================================
               Config: -high -fft -cheb
         Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 2
     Second Best Name: Ian
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
===========================================
               Config: -high -lpc -eucl
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/nick1.wav
===========================================
               Config: -high -lpc -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 15
     Expected Speaker: Nick
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -norm -fft -eucl
         Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 18
     Second Best Name: Van Halen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -norm -fft -cheb
```

```
        Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
=============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
=============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 15
     Second Best Name: Nick
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
=============================================
               Config: -boost -fft -eucl
        Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
=============================================
               Config: -boost -fft -cheb
        Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
=============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 15
     Second Best Name: Nick
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
=============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 15
     Second Best Name: Nick
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -low -fft -eucl
         Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 18
     Second Best Name: Van Halen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -low -fft -cheb
         Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 15
     Second Best Name: Nick
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -low -lpc -eucl
         Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 2
     Second Best Name: Ian
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -low -lpc -cheb
         Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 18
     Second Best Name: Van Halen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -high -fft -eucl
         Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 18
     Second Best Name: Van Halen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -high -fft -cheb
         Speaker's ID: 19
   Speaker identified: RHCP
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 18
     Second Best Name: Van Halen
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===========================================
               Config: -high -lpc -eucl
```

```
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rhcp9.wav
===============================================
               Config: -high -lpc -cheb
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 19
     Expected Speaker: RHCP
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -norm -fft -eucl
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -norm -fft -cheb
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -boost -fft -eucl
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 5
     Second Best Name: Dr. Suen
```

```
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
=============================================
               Config: -boost -fft -cheb
         Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 5
     Second Best Name: Dr. Suen
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
=============================================
               Config: -boost -lpc -eucl
         Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
=============================================
               Config: -boost -lpc -cheb
         Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
=============================================
               Config: -low -fft -eucl
         Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
=============================================
               Config: -low -fft -cheb
         Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
=============================================
               Config: -low -lpc -eucl
         Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
=============================================
               Config: -low -lpc -cheb
```

```
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 4
     Second Best Name: Jimmy
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -high -fft -eucl
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -high -fft -cheb
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -high -lpc -eucl
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/rita6.wav
===============================================
               Config: -high -lpc -cheb
        Speaker's ID: 6
   Speaker identified: Margarita Mokhova
Expected Speaker's ID: 6
     Expected Speaker: Margarita Mokhova
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===============================================
               Config: -norm -fft -eucl
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===============================================
               Config: -norm -fft -cheb
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 10
     Second Best Name: Jihed Halimi
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===========================================
               Config: -norm -lpc -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 7
     Second Best Name: Alexei Mokhov
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===========================================
               Config: -norm -lpc -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===========================================
               Config: -boost -fft -eucl
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 13
     Second Best Name: Ira
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===========================================
               Config: -boost -fft -cheb
         Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 13
     Second Best Name: Ira
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===========================================
               Config: -boost -lpc -eucl
         Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===========================================
               Config: -boost -lpc -cheb
         Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===========================================
               Config: -low -fft -eucl
```

```
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 10
     Second Best Name: Jihed Halimi
--------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
============================================
               Config: -low -fft -cheb
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 10
     Second Best Name: Jihed Halimi
--------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
============================================
               Config: -low -lpc -eucl
        Speaker's ID: 7
   Speaker identified: Alexei Mokhov
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 5
     Second Best Name: Dr. Suen
--------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
============================================
               Config: -low -lpc -cheb
        Speaker's ID: 7
   Speaker identified: Alexei Mokhov
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 1
     Second Best Name: Serge
--------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
============================================
               Config: -high -fft -eucl
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 13
     Second Best Name: Ira
--------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
============================================
               Config: -high -fft -cheb
        Speaker's ID: 16
   Speaker identified: Michelle
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 13
     Second Best Name: Ira
--------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
============================================
               Config: -high -lpc -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 4
     Second Best Name: Jimmy
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/sei-sphere.wav
===========================================
               Config: -high -lpc -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 7
     Expected Speaker: Alexei Mokhov
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -norm -fft -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -norm -fft -cheb
         Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 0
     Second Best Name: Unknown
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -norm -lpc -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 4
     Second Best Name: Jimmy
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -norm -lpc -cheb
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 4
     Second Best Name: Jimmy
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -boost -fft -eucl
         Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 0
     Second Best Name: Unknown
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -boost -fft -cheb
```

```
        Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 0
     Second Best Name: Unknown
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
=============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
=============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 4
   Speaker identified: Jimmy
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
=============================================
               Config: -low -fft -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
=============================================
               Config: -low -fft -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
=============================================
               Config: -low -lpc -eucl
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
=============================================
               Config: -low -lpc -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 3
     Second Best Name: Steve
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -high -fft -eucl
         Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 0
     Second Best Name: Unknown
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -high -fft -cheb
         Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 0
     Second Best Name: Unknown
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -high -lpc -eucl
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/serge-label.wav
===========================================
               Config: -high -lpc -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 1
     Expected Speaker: Serge
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===========================================
               Config: -norm -fft -eucl
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===========================================
               Config: -norm -fft -cheb
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===========================================
               Config: -norm -lpc -eucl
```

```
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 5
     Second Best Name: Dr. Suen
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===============================================
               Config: -boost -fft -eucl
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===============================================
               Config: -boost -fft -cheb
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 14
     Second Best Name: Aihua
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 14
     Second Best Name: Aihua
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
===============================================
               Config: -low -fft -eucl
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 10
     Second Best Name: Jihed Halimi
```

```
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
=========================================
               Config: -low -fft -cheb
         Speaker's ID: 10
   Speaker identified: Jihed Halimi
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
=========================================
               Config: -low -lpc -eucl
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 9
     Second Best Name: Graham
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
=========================================
               Config: -low -lpc -cheb
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 9
     Second Best Name: Graham
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
=========================================
               Config: -high -fft -eucl
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
=========================================
               Config: -high -fft -cheb
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
=========================================
               Config: -high -lpc -eucl
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/shabana8.wav
=========================================
               Config: -high -lpc -cheb
```

```
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 17
     Expected Speaker: Shabana
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -norm -fft -eucl
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -norm -fft -cheb
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -boost -fft -eucl
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -boost -fft -cheb
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
```

```
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
===============================================
               Config: -boost -lpc -eucl
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 11
     Second Best Name: Madhumita
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
===============================================
               Config: -boost -lpc -cheb
         Speaker's ID: 14
   Speaker identified: Aihua
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 11
     Second Best Name: Madhumita
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
===============================================
               Config: -low -fft -eucl
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
===============================================
               Config: -low -fft -cheb
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
===============================================
               Config: -low -lpc -eucl
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
===============================================
               Config: -low -lpc -cheb
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
===============================================
               Config: -high -fft -eucl
```

```
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -high -fft -cheb
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -high -lpc -eucl
        Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test1.wav
=============================================
               Config: -high -lpc -cheb
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -norm -fft -eucl
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -norm -fft -cheb
        Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 0
     Second Best Name: Unknown
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 5
     Second Best Name: Dr. Suen
```

```
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -norm -lpc -cheb
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 5
     Second Best Name: Dr. Suen
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -boost -fft -eucl
         Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -boost -fft -cheb
         Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 5
     Second Best Name: Dr. Suen
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -boost -lpc -eucl
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 5
     Second Best Name: Dr. Suen
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -boost -lpc -cheb
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 5
     Second Best Name: Dr. Suen
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -low -fft -eucl
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
=============================================
               Config: -low -fft -cheb
```

```
        Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 0
     Second Best Name: Unknown
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
===============================================
               Config: -low -lpc -eucl
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
===============================================
               Config: -low -lpc -cheb
        Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
===============================================
               Config: -high -fft -eucl
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
===============================================
               Config: -high -fft -cheb
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
===============================================
               Config: -high -lpc -eucl
        Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve-test2.wav
===============================================
               Config: -high -lpc -cheb
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 11
     Second Best Name: Madhumita
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -norm -fft -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -norm -fft -cheb
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -norm -lpc -eucl
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 11
     Second Best Name: Madhumita
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -norm -lpc -cheb
         Speaker's ID: 13
   Speaker identified: Ira
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 11
     Second Best Name: Madhumita
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -boost -fft -eucl
         Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -boost -fft -cheb
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 9
     Second Best Name: Graham
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -boost -lpc -eucl
```

```
        Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
=============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 11
   Speaker identified: Madhumita
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
=============================================
               Config: -low -fft -eucl
        Speaker's ID: 15
   Speaker identified: Nick
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 9
     Second Best Name: Graham
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
=============================================
               Config: -low -fft -cheb
        Speaker's ID: 9
   Speaker identified: Graham
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
=============================================
               Config: -low -lpc -eucl
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
=============================================
               Config: -low -lpc -cheb
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 2
     Second Best Name: Ian
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
=============================================
               Config: -high -fft -eucl
        Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -high -fft -cheb
         Speaker's ID: 17
   Speaker identified: Shabana
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -high -lpc -eucl
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/steve2.wav
===========================================
               Config: -high -lpc -cheb
         Speaker's ID: 3
   Speaker identified: Steve
Expected Speaker's ID: 3
     Expected Speaker: Steve
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -norm -fft -eucl
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -norm -fft -cheb
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -norm -lpc -eucl
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -norm -lpc -cheb
```

```
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
=============================================
               Config: -boost -fft -eucl
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
=============================================
               Config: -boost -fft -cheb
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 1
     Second Best Name: Serge
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
=============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
=============================================
               Config: -boost -lpc -cheb
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
=============================================
               Config: -low -fft -eucl
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
=============================================
               Config: -low -fft -cheb
        Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
```

```
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -low -lpc -eucl
         Speaker's ID: 1
   Speaker identified: Serge
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 0
     Second Best Name: Unknown
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -low -lpc -cheb
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -high -fft -eucl
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -high -fft -cheb
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 1
     Second Best Name: Serge
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -high -lpc -eucl
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/suen2.wav
===========================================
               Config: -high -lpc -cheb
         Speaker's ID: 5
   Speaker identified: Dr. Suen
Expected Speaker's ID: 5
     Expected Speaker: Dr. Suen
       Second Best ID: 3
     Second Best Name: Steve
-------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
===========================================
               Config: -norm -fft -eucl
```

```
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 15
     Second Best Name: Nick
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=============================================
               Config: -norm -fft -cheb
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 15
     Second Best Name: Nick
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=============================================
               Config: -norm -lpc -eucl
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 4
     Second Best Name: Jimmy
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=============================================
               Config: -norm -lpc -cheb
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 9
     Second Best Name: Graham
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=============================================
               Config: -boost -fft -eucl
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 15
     Second Best Name: Nick
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=============================================
               Config: -boost -fft -cheb
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 15
     Second Best Name: Nick
---------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=============================================
               Config: -boost -lpc -eucl
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 15
     Second Best Name: Nick
```

```
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=========================================
               Config: -boost -lpc -cheb
         Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 15
     Second Best Name: Nick
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=========================================
               Config: -low -fft -eucl
         Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 15
     Second Best Name: Nick
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=========================================
               Config: -low -fft -cheb
         Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 15
     Second Best Name: Nick
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=========================================
               Config: -low -lpc -eucl
         Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=========================================
               Config: -low -lpc -cheb
         Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=========================================
               Config: -high -fft -eucl
         Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 2
     Second Best Name: Ian
-----------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
=========================================
               Config: -high -fft -cheb
```

```
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 2
     Second Best Name: Ian
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
===============================================
               Config: -high -lpc -eucl
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------------
=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
DOING FILE:
testing-samples/vanh9.wav
===============================================
               Config: -high -lpc -cheb
        Speaker's ID: 18
   Speaker identified: Van Halen
Expected Speaker's ID: 18
     Expected Speaker: Van Halen
       Second Best ID: 10
     Second Best Name: Jihed Halimi
-----------------------------------------------
Stats:
1st CONFIG: -boost -fft -eucl , GOOD: 13, BAD: 7, %: 65.0
2nd CONFIG: -boost -fft -eucl , GOOD: 16, BAD: 4, %: 80.0
1st CONFIG: -low -lpc -eucl , GOOD: 11, BAD: 9, %: 55.00000000000001
2nd CONFIG: -low -lpc -eucl , GOOD: 13, BAD: 7, %: 65.0
1st CONFIG: -norm -fft -cheb , GOOD: 16, BAD: 4, %: 80.0
2nd CONFIG: -norm -fft -cheb , GOOD: 17, BAD: 3, %: 85.0
1st CONFIG: -boost -lpc -eucl , GOOD: 13, BAD: 7, %: 65.0
2nd CONFIG: -boost -lpc -eucl , GOOD: 15, BAD: 5, %: 75.0
1st CONFIG: -norm -lpc -cheb , GOOD: 13, BAD: 7, %: 65.0
2nd CONFIG: -norm -lpc -cheb , GOOD: 15, BAD: 5, %: 75.0
1st CONFIG: -high -fft -eucl , GOOD: 14, BAD: 6, %: 70.0
2nd CONFIG: -high -fft -eucl , GOOD: 18, BAD: 2, %: 90.0
1st CONFIG: -high -lpc -cheb , GOOD: 12, BAD: 8, %: 60.0
2nd CONFIG: -high -lpc -cheb , GOOD: 14, BAD: 6, %: 70.0
1st CONFIG: -low -fft -eucl , GOOD: 14, BAD: 6, %: 70.0
2nd CONFIG: -low -fft -eucl , GOOD: 17, BAD: 3, %: 85.0
1st CONFIG: -norm -fft -eucl , GOOD: 14, BAD: 6, %: 70.0
2nd CONFIG: -norm -fft -eucl , GOOD: 18, BAD: 2, %: 90.0
1st CONFIG: -boost -fft -cheb , GOOD: 14, BAD: 6, %: 70.0
2nd CONFIG: -boost -fft -cheb , GOOD: 15, BAD: 5, %: 75.0
1st CONFIG: -norm -lpc -eucl , GOOD: 13, BAD: 7, %: 65.0
2nd CONFIG: -norm -lpc -eucl , GOOD: 15, BAD: 5, %: 75.0
1st CONFIG: -low -lpc -cheb , GOOD: 13, BAD: 7, %: 65.0
2nd CONFIG: -low -lpc -cheb , GOOD: 15, BAD: 5, %: 75.0
1st CONFIG: -boost -lpc -cheb , GOOD: 13, BAD: 7, %: 65.0
2nd CONFIG: -boost -lpc -cheb , GOOD: 15, BAD: 5, %: 75.0
1st CONFIG: -high -fft -cheb , GOOD: 14, BAD: 6, %: 70.0
2nd CONFIG: -high -fft -cheb , GOOD: 18, BAD: 2, %: 90.0
1st CONFIG: -high -lpc -eucl , GOOD: 11, BAD: 9, %: 55.00000000000001
2nd CONFIG: -high -lpc -eucl , GOOD: 14, BAD: 6, %: 70.0
1st CONFIG: -low -fft -cheb , GOOD: 12, BAD: 8, %: 60.0
2nd CONFIG: -low -fft -cheb , GOOD: 14, BAD: 6, %: 70.0
Testing Done
```

APPENDIX E - MARF Source Code

Since the code is too large, and far not all of it are relevant to Pattern Recognition, we decided not to put it into the report; instead you can download it from `<http://marf.sf.net>`, specifically:

The latest version: `<http://marf.sourceforge.net/marf.tar.gz>`

Browse code and revision history online: `<http://cvs.marf.sf.net/cgi-bin/viewcvs.cgi/marf/>`

APPENDIX F - SpeakerIdentApp Source Code