

Analysis:

For this project I have been tasked with extracting audio features from a set of audio files and classifying these features with data mining algorithms. The GUI program *audioGUI.py* uses the functions provided by *audio.py* to extract features, plot the audio file's waveform and FFT graph, and classify the extracted features.

Design:

The algorithms used for feature extraction were taken from *Content Analysis for Audio Classification and Segmentation*. After building the functions and testing them on a single audio file, I made a loop to traverse the directory and create the training set and testing set feature files. With this completed I added the data mining functions to output the results in a file. In testing I would plot the waveform and FFT, and decided to leave these functions available to the user.

The GUI program uses *audio.py*'s methods to conveniently display the information to the screen.

Usage:

You will need to install the libraries AudioLab and Orange for python.

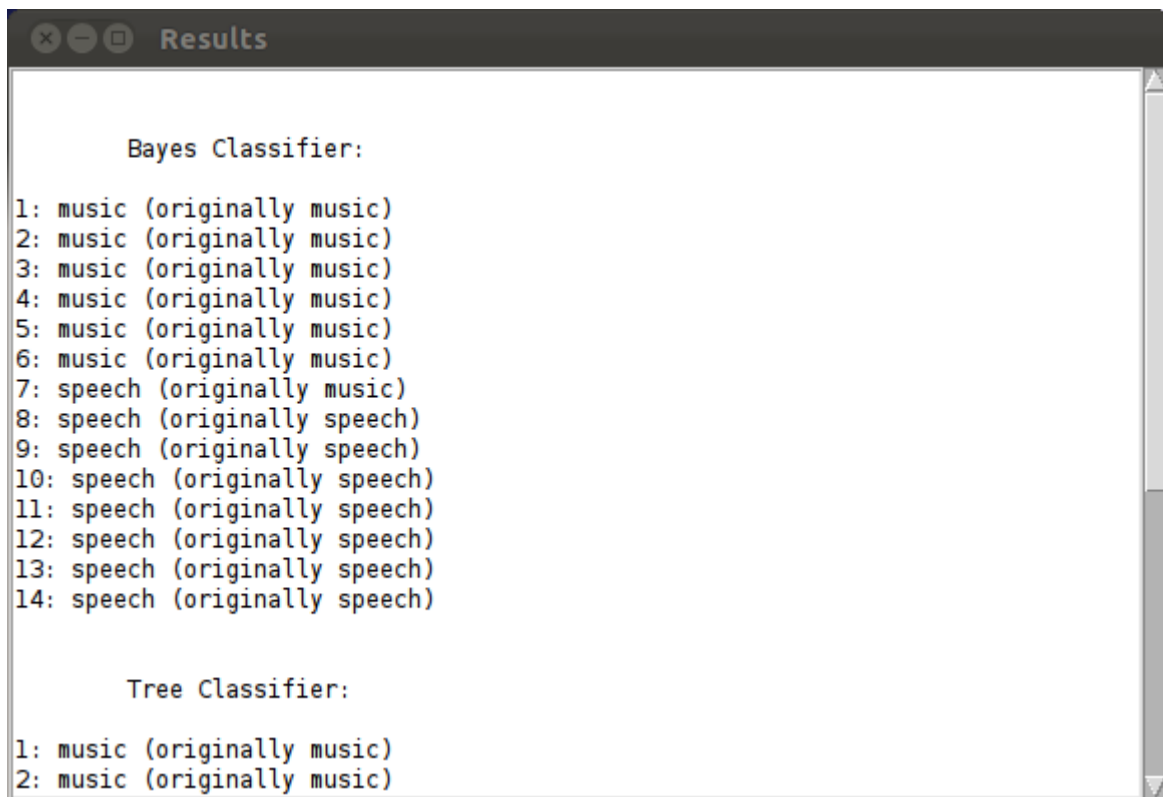
- | | | |
|----------|---|---|
| Orange | - | http://orange.biolabs.si/ |
| AudioLab | - | http://www.ar.media.kyoto-u.ac.jp/members/david/software/audiolab/sphinx/index.html |

Afterwards you may execute the file with "python audioGUI.py" in your terminal. The directory structure is as follows:

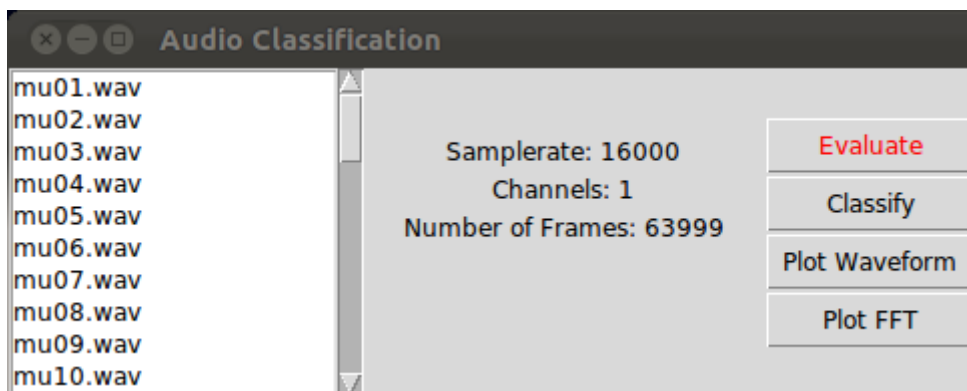
- | | | |
|----------------------|---|--|
| /data | - | Audio files, feature files, and results. |
| /data/test/ | - | Testing audio files |
| /data/train/ | - | Training audio files |
| /data/results | - | Data mining results file |
| /data/audioTest.tab | - | Testing set features file |
| /data/audioTrain.tab | - | Training set features file |
| /images/ | - | Folder to hold plot images |
| /audio.py | - | Function class for audio tasks |
| /audioGUI.py | - | GUI program to display the data |

Screenshots:

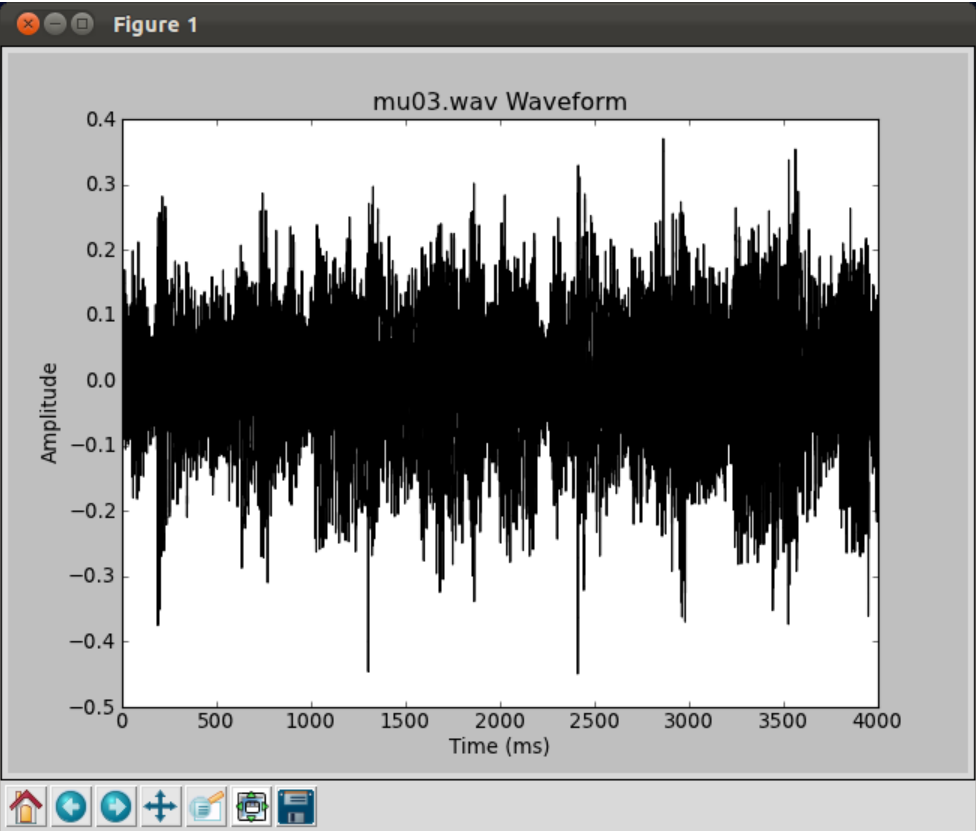
Results Window:



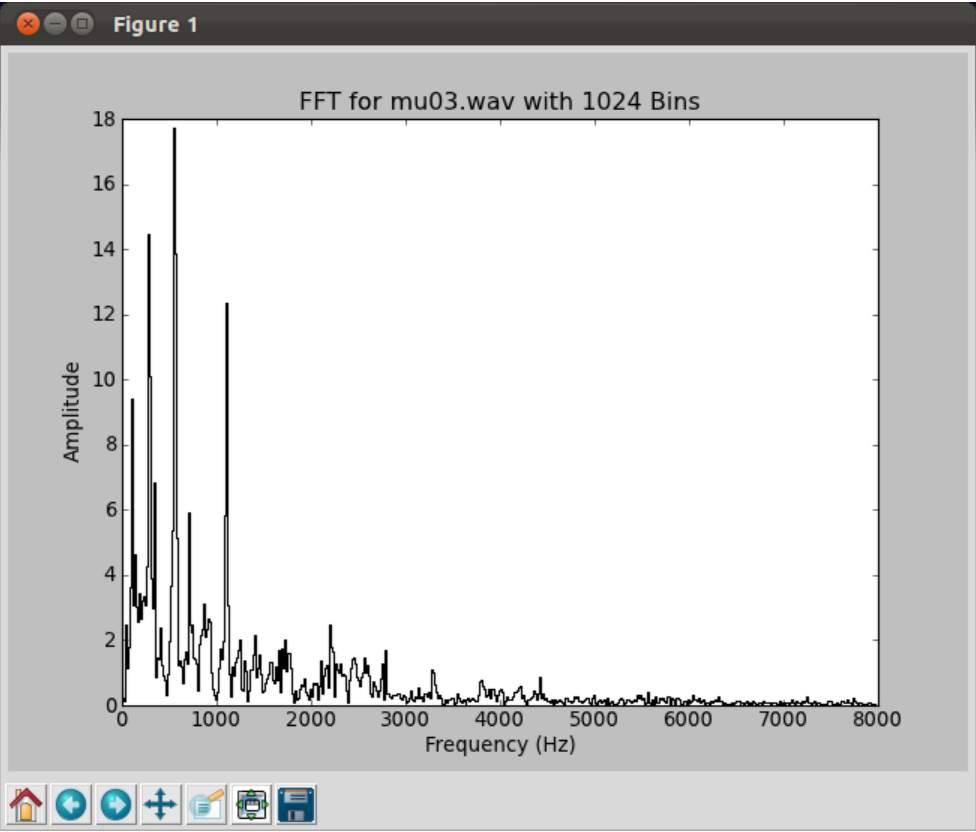
Main Window:



Waveform Plot:



FFT Plot:



Works Cited

- Lu, L., Zhang, H.J., & Jiang, H. (2002). Content Analysis for Audio Classification and Segmentation. *IEEE Transactions on Speech and Audio Processing*, 10(7), 504-516.