System id: CVPIALAB_ACNL

Authors names:

Md Sultan Mahmud [1], Mohammed Yeasin [1], Faruk Ahmed [1], Rakib Al-Fahad [1], and Gavin M.

Bidelman [2, 3, 4]

Affiliations:

[1] Department of Electrical & Computer Engineering, University of Memphis, Memphis, TN, USA

[2] School of Communication Sciences & Disorders, University of Memphis, Memphis, TN, USA

[3] Institute for Intelligent Systems, University of Memphis, Memphis, TN, USA

[4] University of Tennessee Health Sciences Center, Department of Anatomy and Neurobiology,

Memphis, TN, USA

Email: <u>mmahmud@memphis.edu</u>, <u>myeasin@memphis.edu</u>, <u>mfahmed@memphis.edu</u>, <u>ralfahad@memphis.edu</u>, <u>gmbdlman@memphis.edu</u>

Title: Classification of sound using time-frequency features

Abstract: In this work, we used acoustic features and classical machine learning techniques to model five categories of sound. We extracted a total of eleven time and frequency domain features (zero crossing rate, entropy of energy, spectral spread, spectral entropy, MFCCS, chroma vector, etc.) from the raw audio signals using a 1 second window basis with a 0.5 second overlap. Extracted features were then lexicographically ordered and normalized to form a feature matrix. We used the labeled feature matrix to train five categories using a support vector machine (SVM). We used grid search method for parameter tuning and ten-fold cross-validation for evaluation. Once the classifier was trained, we then chose the best parameters (e.g., C=10, $\gamma=0.005$, etc.) of the classifier for this dataset. The optimal classifier was used on a validation set to evaluate test data.