**Spot Emotions in human speech using SVM, LSVM and RF method**

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***Abstract***

1. **Objective of Project:**

In this project, our aim is to use support vector machine(SVM) and Random Forest model to classify different speech samples by emotional status.

1. **Tools and Approach**
   1. **Language and platform**:

MATLAB, Python.

* 1. **Training Data Source:**

The Interactive Emotional Dyadic Motion Capture (IEMOCAP) Database from University of Southern California. (http://sail.usc.edu/iemocap/)1

* 1. **Software Tools and Libraries:**

MATLAB machine learning tool box.

Tensor Flow

* 1. **Approach:**

We designed a two-step experiment:

Firstly, we use basic SVM and Least Squares SVM classifier, and compared their performance. In this step, our reference papers are: *A Tutorial on Support Vector Machines for Patten recognition.*2 *Least Square Support Vector Machine Classifier.*3

Secondly, we use Random Forest model. Our reference papers are: *Divide-and-Conquer based Ensemble to Spot Emotions in Speech using MFCC and Random Forest.*4

We plot the output data by MATLAB2015b, and analyze the performance for each model.

1. **Data Processing**

**3.1 Data Pre-processing**

**3.2 Data Normalization**

**3.3 Dimension Reduction**

Here we choose Principle Component Analysis(PCA) to avoid “curse of dimension”. Compared with Linear Discriminant Analysis(LDA), PCA reduces dimension for each category individually. Therefore, to categorical training data, PCA is a better choice.

1. **Model design**

**4.1 Support Vector Machine**

**4.2 Random Forest**

1. **Coding and compile**
2. **Output and screenshot**
3. **Performance Comparison and Analysis**

***Reference:***

[1] The Interactive Emotional Dyadic Motion Capture (IEMOCAP) Database [Advertisement]. (2004). Retrieved December 10, 2017, from http://sail.usc.edu/iemocap/

[2] A Tutorial on Support Vector Machines for Patten recognition.

[3] Least Square Support Vector Machine Classifier

[4] Badshah, A. M., Ahmad, J., Lee, M. Y., & Baik, S. W. (2016). Divide-and-Conquer based Ensemble to Spot Emotions in Speech using MFCC and Random Forest. Retrieved November 16, 2017, from https://arxiv.org/abs/1610.01382.

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Paper reading, find public database and apply for access, model design and implementation, coding and report writing.

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