DICIONARY LEARNING APPROACHES FOR LANGUAGE IDENTIFICATION

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Abstract—The With the growth of global partnership, the demands for communication across the boundaries of language are increasing. This gives rise to new challenges for Automatic Speech Recognition (ASR): before the machine can understand the meaning of the utterance, it must identify which language is being spoken. The task of automatic Language Identification (LID) is to quickly and accurately identify the spoken language being used (e.g. English or Mandarin Chinese).

Keywords— Speech Recognition, Language Identification , K-SVD algorithm, Dictionary learning, sparse representation

I. INTRODUCTION
Our model is made to classify multiple languages like (American English, cantose ,mandarin Russian ) with the purpose to convert speech waveform into a set of features or rather feature vectors for further analysis by using Dictionary learning is compact representation of training data or test data used to reduce complexity of the data ,this is the best way to represent signal.Dictionary learning is a branch of signal processing that aims to find the sparse representation of the input data in the form of linear combination of redundant basis vector..in language identification task features characteristics like MFCC are assumed to be language dependent, and thus language can be identified from them
In our project we have focused mainly to design automatic language identification system that extracts acoustic information from speech

II. K-SVD DICTIONARY LEARNING ALGORITHM
Initialize the dictionary use any pursuit algorithm to find sparse coding $X_1$ for the data set $Y$, using the dictionary $D$
\begin{itemize}
  \item [a)] Remove a basis vector $d_k$
  \item [b)] Compute the approximation error $E_k$
  \item [c)] Restrict $E_k$ to represent only data point that were actually using $d_k$
  \item [d)] Take the SVD of $E_k$
  \item [e)] Replace $d_k$ with the first column of $U$ in the SVD
\end{itemize}
2.1. OMP ALGORITHM
Select $d_k$ with maximum projection on residue from $D$ and $Y$

$$X_k = \arg \min ||Y - D_k \cdot X_k||$$

Update residue $Y - D_k \cdot X_k$

Check terminating condition

III. DATA BASE BUILDING
Training data
Speech utterances of four language was is used data _train
All four languages with 400 x 1278 different utterances having equal row
All four language with 400 x 1200 different utterances having equal row is selected

IV. K-SVD BASED LID SYSTEM
- Learn K-SVD dictionary from dev-data
- Find sparse representation of training and test data over learned dictionary
  $$Y_{trn} = D \cdot X_{trn}$$
  $$Y_{test} = D \cdot X_{test}$$
  Sparse representation can be achieved by using orthogonal matching pursuit
- Apply cosine distance score to find the score.
  $$Score = X_{trn} \cdot X_{test}$$
- Average the language specific of weight.
  $$Score1 = [ ] [ ] \cdot \frac{1}{\text{no of language}} \cdot \frac{1}{\text{no of test utter}}$$
- Declare the language class of each utterance based on the index of maximum value

V. RESULTS
- KSVD Dictionary Learning followed by sparse representation with CDS classifier
- Cosine classifiers on sparse signal
  Identification _rate = 87.3884  3.9063  6.8080  1.8973  5.0265
  91.7989  3.1746  0
  2.6601  8.2759  84.5320  4.5320
4.3053 4.8924 5.2838 85.5186
Average identification rate = 87.3095
- Identification task completed

VI. JOBS TO BE DONE
- Implementation of MATLAB code for pre-existing algorithm.
- Study of the corresponding pre-existing algorithms.
- Extraction of the parameters and then observation and analysis for output.
- The result will be compared and plotted in the code set prepared in MATLAB 2013.

Checking and comparison of the output for most efficient algorithm design

REFERENCES

Format of Reference
[1] Pallavi bharti(1), Richa bharti(2), "DICTIONARY LEARNING APPROACHES FOR LANGUAGE IDENTIFICATION ", IJRTER , 4 , 2017