GMM based Language Identification using MFCC and SDC Features

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Abstract

Language Identification (LID) is one of the most popular areas of research in speech signal processing. Now a day’s lots of approaches have been used to improve performance of LID system which includes Parallel Phone Recognition Language Modeling (PPRLM), Support Vector Machine (SVM) and general Gaussian Mixture Model (GMM) etc. The state-of-art LID system has been utilised lots of feature vectors like LPCC, MFCC, SDC and prosodic. Although fusion of prosodic features with MFCC features shows some improvement in the performance of the LID system. But still it is not sufficient. In this paper, a baseline system for the LID system in multilingual environments has been developed using GMM as a classifier and MFCC combined with Shifted-Delta-Cepstral (SDC) as front end processing feature vectors. In this works, we used the Arunachali Language Speech Database (ALS-DB), a multilingual and multichannel speech corpus which was recently collected from the four local languages namely Adi, Apatani, Galo and Nyishi in Arunachal Pradesh including Hindi and English as secondary languages. The performance of the LID system has been improved by combing MFCC and SDC features than its individual performances. The minimum ERR rates for the features MFCC and SDC individually are 19. 70% and 11. 83% respectively while minimum ERR rate for the combined features both MFCC and SDC is 6. 40%. Approximately 15. 00% and 6. 00% of performance of the LID system has been improved while using the combining features of MFCC
with SDC over the baseline systems that using MFCC and SDC features in individual respectively.

References

Acoustical Society of America, number 97, pages 31–44.
- Reynolds, D. A. Gaussian Mixture Models, MIT Lincoln Laboratory, 244 wood St. Lexinton, MA 02140,USA.

**Index Terms**

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