Speaker Dependent and Independent Isolated Hindi Word Recognizer using Hidden Markov Model (HMM)

Abstract

Hindi is very complex language with large number of phonemes and being used with various ascents in different regions in India. In this manuscript, speaker dependent and independent isolated Hindi word recognizers using the Hidden Markov Model (HMM) is implemented, under noisy environment. For this study, a set of 10 Hindi names has been chosen as a test set for which the training and testing is performed. The scheme instigated here implements the Mel Frequency Cepstral Coefficients (MFCC) in order to compute the acoustic features of the speech signal. Then, K-means algorithm is used for the codebook generation by performing clustering over the obtained feature space. Baum Welch algorithm is used for re-estimating the parameters, and finally for deciding the recognized Hindi word whose model likelihood is highest, Viterbi algorithm has been implemented; for the given HMM. This work resulted in successful recognition with 98.6% recognition rate for speaker dependent recognition, for total of 10 speakers (6 male, 4 female) and 97.5% for speaker independent isolated word recognizer for 10 speakers (male).
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**Index Terms**

Computer Science  
Signal Processing

**Keywords**

MFCC  
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Hindi  
Isolated word  
K-Means  
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