

GMM and HNM Based Analysis of Emotional Speech

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Objectives: *Speech signal characteristics vary for different emotional states and hence emotions can be detected by critically analyzing these variations. Present experiment estimates Gaussian mixture model (GMM) parameter such as priorities, correlation and covariance for emotional states of the speaker. MFCC (mel frequency cepstral coefficients) based feature extraction of harmonic and noise model (HNM) synthesized speech in two emotional states (neutral and anger) has been performed using Gaussian mixture model (GMM). Method / A*

analysis: *20 MFCC Coefficients are modeled using 4 GMM functions and each function is in 20 dimensions. HNM outperforms almost all models of speech synthesis in terms of characteristics like naturalness and intelligibly so HNM has been employed for analysis-synthesis purpose. GMM model shows quite good flexibility in modeling almost all signals efficiently so HNM parameters are first extracted using MFCC coefficients followed by their GMM modeling. The main application area of this research is in emotion detection. Data for recording included sentences of six speakers in Hindi and English language for neutral and anger state.*

Findings: *Experimental results suggest that GMM proves to be an efficient technique for modeling emotions. In future GMM based transformation of speech will be carried out.*