

VOICED-UNVOICED CLASSIFICATION FOR RECOGNITION OF STOP CONSONANTS

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Significant error in stop consonant recognition is caused by the confusion between voiced stop consonants and their unvoiced counterparts. The recognition is based on Hidden Markov Models (HMM's) which use 12 mel-frequency cepstral coefficients and energy with their respective velocity and acceleration terms. The voicing state is the distinctive feature of homorganic stop consonants. According to recognition error-rate analysis, it seems that the cepstral feature does not accurately represent the voicing state of the modeled phone. For this purpose, we propose a voiced-unvoiced classifier in conjunction with HMM's to improve the recognition of stop consonants. The recognition is done in two passes. In the first pass, a phone recognizer uses well trained HMM's to identify a stop consonant. This pass provides the recognized stop consonant in addition to the log probability. In the second pass, the voiced-unvoiced classifier checks if the voicing state of the phone segment matches with its phonetic description. In the case of mismatch and low probability of recognition, the voiced (unvoiced) consonant is swapped with its corresponding unvoiced (voiced) counterpart. Recognition results are presented in terms of error-rate using different techniques of voiced-unvoiced classification. This method reduces the recognition error rate of stop consonants.

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