VOWEL CLASSIFICATION BASED ON FREQUENCY RESPONSE OF VOCAL TRACT

Abstract:

Automatic speech recognition (ASR) has made great strides with the development of digital signal processing hardware and software especially using English as the language of choice. In this paper, a modified feature extraction approach based on frequency response model of the vocal tract and Bark Scale using vowel utterances from Malaysian speakers is presented. This technique calculates mean and maximum energy values from fixed frequency bands between 20Hz to 2500Hz. The frequency band sizes are 100Hz, 200Hz, 300Hz, 400Hz and 500Hz These results are then compared with mean and maximum values of first 14 critical bands of the bark scale. The energy features obtained are classified using Multinomial Logistic Regression and used to detect five vowels of /a/, /e/, /i/, /o/ and /u/ recorded from 80 Malaysian speakers. The classification results obtained from the 100Hz and 200Hz bands gave better result than the Bark Scale. Vowel /a/, /e/ and /i/ obtained a perfect 100% detection rate for both 100Hz and 200Hz bands. Vowel /o/ and /u/ did not fare as good but still obtained greater than 90% classification rate.