بسم الله الرحمن الرحيم

ON OBTAINING PARAMETERS FOR A MODEL OF ARABIC SPEECH PRODUCTION

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ABSTRACT

In this Thesis, parameters for a model of Arabic speech production were obtained. These parameters can serve in many applications such as speech recognition systems and voice response systems. The model parameters obtained are:

1. The prediction and reflection parameters,
2. The pitch period,
3. The gain factor,
4. The voice/unvoiced parameters.

Beside these basic parameters, I have obtained the following:

1. The area function,
2. The spectrum and the formants,
3. The emphatic/nonemphatic parameters.

The Arabic voiced phonemes were analyzed, and their points of articulation were studied according to the rules of phonetics by first Arabic phoneticians such as Saibawihi. The articulation of the phonemes (ع ,غ , ظ ,ض) is discussed, since they are the Arabic distinctive sounds. The phoneme (غ) is analyzed showing the wrong articulation by Sudanese Arabic speakers. The results of the phoneme (ع) are compared to that of the phoneme (أ), and to the results obtained by X-Rays for Lebanese and Iraqi Arabic speakers.

A new parameter, emphatic /nonephatic parameters, is presented. This parameter depends on the area function and can distinguish between emphatic and nonemphatic sounds. For example, it can distinguish between the phoneme (ذ) and (ظ) , and between the phoneme (د) and (ض). The formula used for calculating this parameter has given good results for all the Arabic voiced sounds.

The results of a female speaker are added to show the difference in the wave form and frequency between male and female speakers.

At last the characteristics of mixed sounds (ذ , ز , ظ , ض) and quivering sounds (ب , د , ج , ط , ق) are presented and the results obtained for these sounds are discussed.