Abstract

This study concerns the use of Artificial Neural Networks (ANNs) in automatic classification of the emphatic consonants of the Standard Arabic Language (SAL). It reinforces the few works directed towards the speech recognition in Standard Arabic. We have applied the Time Delay Neural Network (TDNN) approach which permits a classification of the phonemes by taking into account the dynamic aspect of speech and consequently to overcome problems of coarticulation phenomenon. We have conducted a supervised training method based on Bayesian Regularization (BR) backpropagation coupled with the Levenberg-Marquardt (LM) optimization algorithm, to adjust the synaptic weights in order to minimize the error between the computed output and the desired output for all samples. Based on the results, the proposed Neural Network provides a higher percentage of recognition accuracy of the emphatic phonemes (92.25%). The choice of our study is quite important. Indeed, efficient phoneme classifiers lead to efficient word classifiers and the ability to recognize phonemes accurately provides the basis for an accurate recognition of words and continuous speech in the future.
Classification of the Arabic Emphatic Consonants using Time Delay Neural Network

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**Index Terms**

Computer Science

Artificial Intelligence

**Keywords**

Arabic phonemes; emphatics; Speech Recognition; Neural Networks; TDNN