



Speech Gender Recognition Using a Multilayer Feature Extraction Method



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Abstract Human speech contains paralinguistic properties used in automatic speech recognition (ASR) systems. These properties are used in many ASR applications such as gender recognition, which is the main goal of this paper. Gender recognition has been the target of many researchers since recognizing the human gender (female or male) is essential in many applications especially in security applications. Through this work, an ASR has been proposed and implemented. The main goal of any ASR system is to determine the best features that can address the required recognition. The features deployed in this work are smoothness, pitch, the first two formants and spectral centroid variability (SCV). The new approach proposed in this work was using the analysis of variance (ANOVA) as a feature selector to choose the best combination of features that can lead to the best classification accuracy, and then apply the decision tree feature selection algorithm to choose the best group of features. Then use backpropagation neural network (NN), Gaussian mixture models (GMM) and SVM as separate classifiers. The common voice dataset was used as benchmark dataset through all experiments of this work. The best result gained with respect to the three genders was 74.87% using the pitch and the first two formant features and classified by NN. The best result gained with respect to the two genders (female and male) was 97.71% using the pitch, and the first two formant features are classified by NN.

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