

A Study of Speaker Identification Using Irregular Decomposition Technique and
Artificial Neural Network

使用類神經及不規則分解技術於語者辨識系統之研究

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Abstract

A study of speaker identification for vehicle security systems based on the energy of speaker utterances is proposed in this paper. The proposed system consisted of a combination of signal pre-process, feature extraction using wavelet packet transform (WPT) and speaker identification using artificial neural network. In signal pre-process, the amplitude of utterances, for a same sentence, were normalized for preventing an error estimation caused by speakers' changed volume. In the feature extraction, three conventional methods were taking experiments and as comparisons with the irregular decomposition method in the proposed system. In order to verify the effect of the proposed system for identification, a general regressive neural network (GRNN) was used and compared in the experimental investigation. The experimental results demonstrated the effectiveness of the proposed speaker identification system and were compared with the discrete wavelet transform (DWT), conventional WPT and WPT in Mel scale.

Key words : Speaker identification; General regressive neural network; Wavelet packet transform

中文摘要

本研究提出一個以聲音能量為基礎的語者辨識系統應用於車輛安全裝置。本系統結合了語音的前置處理、小波特徵擷取以及類神經辨識器。在前置處理中，來自同一語者的語音首先被正規化，避免因為聲音振幅不同而造成誤判；在特徵擷取部份，三種傳統的方法將與本文所提出之不規則分解技術相互比較。為了驗證其辨識率，本文使用了廣義迴歸類神經網路(GRNN)來進行實驗。實驗的結果將呈現由本文提出之方法與離散小波、傳統小波包和梅爾刻度之小波包之間性能的比較。

關鍵字：語者辨識；廣義迴歸類神經網路；離散小波；小波包