

A Study of Driver Identification Using Voice Signal and Artificial Neural Network
利用語音信號之車輛駕駛者辨識系統

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Abstract

This paper presents a study of driver's voice feature selection and classification for speaker identification in a vehicle security system. The proposed system consisted of a combination of feature extraction using continuous wavelet technique and voice classification using artificial neural network. In the feature extraction, a time-averaged wavelet spectrum based on continuous wavelet transform is proposed. Meanwhile, the artificial neural network techniques were used for classification in the proposed system. In order to verify the effect of the proposed system for classification, a conventional back-propagation neural network (BPNN) and generalized regression neural network (GRNN) were used and compared in the experimental investigation. The experimental results demonstrated the effectiveness of the proposed speaker identification system. The identification rate is about 92% for using BPNN and 97% for using GRNN approach.

Key words : Speaker identification; Continuous wavelet transform; Artificial neural network

中文摘要

本篇論文主要是在描述發展一種應用於車輛駕駛者辨識之語音系統。探討駕駛者聲紋特徵之擷取和辨識，並企圖能應用在車輛安全系統上。此系統包括使用連續小波取得聲紋特徵及利用類神經作為分類器。在特徵擷取部份，使用平均時間小波能量在連續小波轉換上。同時利用倒傳遞類神經和廣義回歸類神經做駕駛者之辨識。實驗結果顯示此系統為一有效率的語者辨識系統，使用倒傳遞類神經辨識率約為 92% 及廣義回歸類神經為 97%，並期望能將本系統實際應用於車輛系統上。

關鍵字：語者辨識; 連續小波轉換; 類神經