

國科會計畫

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## 利用語音為基礎之車輛駕駛者辨識安全系統

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### 中文摘要

本研究計畫的主要目的是發展一套利用駕駛人聲音為基礎，並輔以小波轉換分析與類神經分類技巧的智慧型駕駛人辨識安全系統，以有效地來作為車輛防盜裝置以及可替代免持鑰匙的研究。在本研究計畫中我們將以二年的時間較深入的來進行相關的研究與實現：包括語者語音信號特性探討、錄音分析實驗平台的建立、小波分析理論與技術之實現、智慧型分類辨識與實現、類神經的各種演算法的優缺點與適用性比較。在實驗中我們將先建立語者錄音實驗資料庫，並利用麥克風及個人電腦計算各個語者之語音特徵，之後輔以類神經分類。類神經的各種演算法包括倒傳遞、徑向基底神經網路及廣義回歸類神經網路及進行語者之識別與分類；在實驗過程中，本計畫將建立相關軟硬體介面與技術，進而提升應用該系統診斷與分類的正確率，最後並將此系統應用到實際車輛的安全系統。

關鍵字：語者識別；車輛安全系統；小波轉換；類神經網路；信號特徵擷取

## Abstract

The purpose of this project is to develop a system 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 wavelet transform technique and voice classification using artificial neural network. In the present project, a continuous wavelet transform algorithm combined with a feature selection method is proposed for analyzing fault signals in a speaker identification system. In the signal pre-process, the amplitude of utterances, for a same sentence, were normalized for preventing an error estimation caused by speakers' change in volume. In order to verify the effect of the proposed system for classification, a conventional back-propagation neural network (BPNN), Radial Basis Function Network (RBFN) and generalized regression neural network (GRNN) will be used and compared in the experimental investigation.

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