Driver Recognition Using FNN and Statistical methods

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Abstract

Advancements in biometrics-based authentication have led to its increasing prominence and are being incorporated into everyday tasks. Existing vehicle security systems rely only on alarms or smart card as forms of protection. A biometric driver recognition system utilizing driving behaviors can be incorporated into existing vehicle security system to form a multimodal identification system and offer a higher degree of multi-level protection. The system can be subsequently integrated into intelligent vehicle systems where it can be used for detection of any abnormal driver behavior for purpose of achieving safer driving. In this paper we present features extracted using Gaussian Mixture Models (GMM) from accelerator and brake pedal pressure signals which are used as inputs to a driver identification/verification system. The Evolving Fuzzy Neural Network (EFuNN) was used to demonstrate the validity of the proposed system. Results obtained from the experiments are compared to that of the statistical method and shows potential of the recognition system to be used for real-time application. A high identification rate and low verification error rate were obtained using the GMM-based features indicating considerable difference in the way different drivers apply pressure to the pedals.