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Road Vehicle Recognition Using Magnetic Sensing Feature Extraction and Classification

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Abstract : This paper presents a road vehicle detection approach for the intelligent transportation system. This approach mainly uses low-cost magnetic sensor and associated data collection system to collect magnetic signals. This system can measure the magnetic field changing, and it also can detect and count vehicles. We extend Mel Frequency Cepstral Coefficients to analyze vehicle magnetic signals. Vehicle type features are extracted using representation of cepstrum, frame energy, and gap cepstrum of magnetic signals. We design a 2-dimensional map algorithm using Vector Quantization to classify vehicle magnetic features to four typical types of vehicles in Australian suburbs: sedan, VAN, truck, and bus. Experiments results show that our approach achieves a high level of accuracy for vehicle detection and classification.

Keywords : vehicle classification, signal processing, road traffic model, magnetic sensing
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