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# A fast method for load detection and classification using texture image classification in intelligent transportation systems

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**Abstract**
The surveillance and management of cargo fleets is a crucial objective of intelligent transportation systems. Load, especially overload, has a destructive effect on roads and bridges, and monitoring it can increase the life of road surface and its structure. For low-end hardware with lack of CPU power and no GPU support, this paper presents a rapid method to detect whether heavy vehicles have loads or not; then it proposes a fast method for classifying load types to distinguish soil and construction waste from other miscellaneous loads for heavy weight vehicles. This paper applies a method for classifying cargo types using image processing and texture image classification. This method extracts features for statistical analysis of texture images based on gray-level co-occurrence matrices and local binary patterns. The classification is carried out by support vector machine, k-nearest neighborhood, K-mean, artificial neural networks and random forest classifiers. A large number of positive and negative patterns have been used to train these classifiers. We compare the performance of proposed extracted features and classifiers. The simulation results demonstrate that soil and construction waste can be identified from other miscellaneous loads effective in real-time implementation.

**Keywords** Intelligent transportation system · Texture classification · Machine learning · Overload detection · Real-time image processing

## 1 Introduction

Real-time traffic monitoring and vehicle traffic control are essential in Intelligent Transportation Systems (ITS) and will play an important role in tomorrow's smart cities. One option that accelerates the arrival of the smart city era is the development of technologies that

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