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# Autonomous Vehicle Detection and Classification in High Resolution Satellite Imagery

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**Abstract :** High-resolution satellite images and remote sensing can provide global information in a fast way compared to traditional methods of data collection. Under such high resolution, a road is not a thin line anymore. Objects such as cars and trees are easily identifiable. Automatic vehicles enumeration can be considered one of the most important applications in traffic management. In this paper, autonomous vehicle detection and classification approach in highway environment is proposed. This approach consists mainly of three stages: (i) first, a set of preprocessing operations are applied including soil, vegetation, water suppression. (ii) Then, road networks detection and delineation is implemented using built-up area index, followed by several morphological operations. This step plays an important role in increasing the overall detection accuracy since vehicles candidates are objects contained within the road networks only. (iii) Multi-level Otsu segmentation is implemented in the last stage, resulting in vehicle detection and classification, where detected vehicles are classified into cars and trucks. Accuracy assessment analysis is conducted over different study areas to show the great efficiency of the proposed method, especially in highway environment.

**Keywords :** remote sensing, object identification, vehicle and road extraction, vehicle and road features-based classification
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