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Vehicle Type Classification with Geometric and Appearance Attributes

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Abstract : With the increase in population along with economic prosperity, an enormous increase in the number and types of vehicles on the roads occurred. This fact brings a growing need for efficiently yet effectively classifying vehicles into their corresponding categories, which play a crucial role in many areas of infrastructure planning and traffic management. This paper presents two vehicle-type classification approaches; 1) geometric-based and 2) appearance-based. The two classification approaches are used for two tasks: multi-class and intra-class vehicle classifications. For the evaluation purpose of the proposed classification approaches' performance and the identification of the most effective yet efficient one, 10-fold cross-validation technique is used with a large dataset. The proposed approaches are distinguishable from previous research on vehicle classification in which: i) they consider both geometric and appearance attributes of vehicles, and ii) they perform remarkably well in both multi-class and intra-class vehicle classification. Experimental results exhibit promising potentials implementations of the proposed vehicle classification approaches into real-world applications.

Keywords : appearance attributes, geometric attributes, support vector machine, vehicle classification
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