World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

A Reliable Multi-Type Vehicle Classification System

Authors : Ghada S. Moussa

Abstract : Vehicle classification is an important task in traffic surveillance and intelligent transportation systems. Classification of vehicle images is facing several problems such as: high intra-class vehicle variations, occlusion, shadow, illumination. These problems and others must be considered to develop a reliable vehicle classification system. In this study, a reliable multi-type vehicle classification system based on Bag-of-Words (BoW) paradigm is developed. Our proposed system used and compared four well-known classifiers; Linear Discriminant Analysis (LDA), Support Vector Machine (SVM), k-Nearest Neighbour (KNN), and Decision Tree to classify vehicles into four categories: motorcycles, small, medium and large. Experiments on a large dataset show that our approach is efficient and reliable in classifying vehicles with accuracy of 95.7%. The SVM outperforms other classification algorithms in terms of both accuracy and robustness alongside considerable reduction in execution time. The innovativeness of developed system is it can serve as a framework for many vehicle classification systems.

Keywords : vehicle classification, bag-of-words technique, SVM classifier, LDA classifier, KNN classifier, decision tree classifier, SIFT algorithm
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020