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Neural Network Approach to Classifying Truck Traffic

Authors : Ren Moses

Abstract : The process of classifying vehicles on a highway is hereby viewed as a pattern recognition problem in which connectionist techniques such as artificial neural networks (ANN) can be used to assign vehicles to their correct classes and hence to establish optimum axle spacing thresholds. In the United States, vehicles are typically classified into 13 classes using a methodology commonly referred to as “Scheme F”. In this research, the ANN model was developed, trained, and applied to field data of vehicles. The data comprised of three vehicular features—axle spacing, number of axles per vehicle, and overall vehicle weight. The ANN reduced the classification error rate from 9.5 percent to 6.2 percent when compared to an existing classification algorithm that is not ANN-based and which uses two vehicular features for classification, that is, axle spacing and number of axles. The inclusion of overall vehicle weight as a third classification variable further reduced the error rate from 6.2 percent to only 3.0 percent. The promising results from the neural networks were used to set up new thresholds that reduce classification error rate.

Keywords : artificial neural networks, vehicle classification, traffic flow, traffic analysis, and highway opera-tions
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