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Unsupervised Video Summarization using Cluster Analysis for Automatic Vehicles Counting and Recognizing

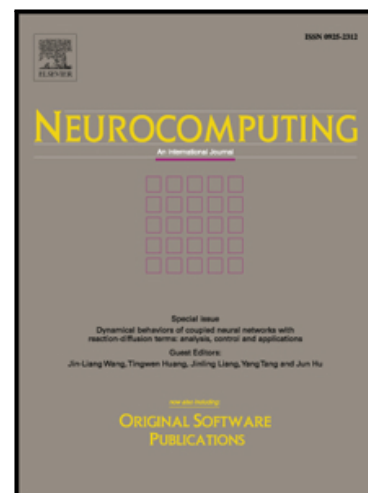
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1 Unsupervised Video Summarization using Cluster
 2 Analysis for Automatic Vehicles Counting and
 3 Recognizing

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11 **Abstract**

Automatic Vehicles Counting and Recognizing (AVCR) is a very challenging topic in transport engineering having important implications for the modern transport policies. Implementing a computer-assisted AVCR in the most vital districts of a country provides a large amount of measurements which are statistically processed and analyzed, the purpose of which is to optimize the decision-making of traffic operation, pavement design, and transportation planning. Since the advent of computer vision technology, video-based surveillance of road vehicles has become a key component in developing autonomous intelligent transportation systems. In this context, this paper proposes a Pattern Recognition system which employs an unsupervised clustering algorithm with the objective of detecting, counting and recognizing a number of dynamic objects crossing a roadway. This strategy defines a virtual sensor, whose aim is similar to that of an inductive-loop in a traditional mechanism, i.e. to extract from the traffic video streaming a number of signals containing anarchic information about the road traffic. Then, the set of signals is filtered with the aim of conserving only motion's significant patterns. Resulted data are subsequently processed by a statistical analysis technique so as to estimate and try to recognize a number of clusters corresponding to vehicles. Finite Mixture Models fitted by the EM algorithm are used to assess such clusters, which provides

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