

Automatic Detection and Update of Region of Interest in Vehicular Traffic Surveillance Videos

Authors : Naydelis Brito Suárez, Deni Librado Torres Román, Fernando Hermosillo Reynoso

Abstract : Automatic detection and generation of a dynamic ROI (Region of Interest) in vehicle traffic surveillance videos based on a static camera in Intelligent Transportation Systems is challenging for computer vision-based systems. The dynamic ROI, being a changing ROI, should capture any other moving object located outside of a static ROI. In this work, the video is represented by a Tensor model composed of a Background and a Foreground Tensor, which contains all moving vehicles or objects. The values of each pixel over a time interval are represented by time series, and some pixel rows were selected. This paper proposes a pixel entropy-based algorithm for automatic detection and generation of a dynamic ROI in traffic videos under the assumption of two types of theoretical pixel entropy behaviors: (1) a pixel located at the road shows a high entropy value due to disturbances in this zone by vehicle traffic, (2) a pixel located outside the road shows a relatively low entropy value. To study the statistical behavior of the selected pixels, detecting the entropy changes and consequently moving objects, Shannon, Tsallis, and Approximate entropies were employed. Although Tsallis entropy achieved very high results in real-time, Approximate entropy showed results slightly better but in greater time.

Keywords : convex hull, dynamic ROI detection, pixel entropy, time series, moving objects

Conference Title : ICTTE 2024 : International Conference on Traffic and Transportation Engineering

Conference Location : Las Vegas, United States

Conference Dates : May 20-21, 2024