

Accepted Manuscript

Title: Vehicle motion segmentation using rigid motion constraints in traffic video

Author: Xuan Wang Huansheng Song Qi Guan Hua Cui
Zhaoyang Zhang Haiying Liu



PII: S2210-6707(17)31008-9
DOI: <https://doi.org/doi:10.1016/j.scs.2018.07.026>
Reference: SCS 1196

To appear in:

Received date: 7-8-2017
Revised date: 26-4-2018
Accepted date: 26-7-2018

Please cite this article as: Xuan Wang, Huansheng Song, Qi Guan, Hua Cui, Zhaoyang Zhang, Haiying Liu, Vehicle motion segmentation using rigid motion constraints in traffic video, *Sustainable Cities and Society* (2018), <https://doi.org/10.1016/j.scs.2018.07.026>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Vehicle Motion Segmentation Using Rigid Motion Constraints in Traffic Video

Xuan Wang*, Huansheng Song, Qi Guan, Hua Cui, Zhaoyang Zhang, Haiying Liu

School of Information Engineering, Chang'an University, Xi'an, China

Abstract

Vehicle motion segmentation is an important task in intelligent transportation systems (ITS) for the sustainable development of smart city. In this paper, a novel trajectory clustering method is proposed using the rigid motion constraints (RMC) for the vehicle motion segmentation. Firstly, camera calibration is done for converting the 2D images to a copy one in 3D world. Then, the inverse projection image (IPI) can be obtained with a known 3D height information and the 2D image. Secondly, we present and verify the RMC of the feature point trajectories in the same rigid object and different rigid objects. By analyzing simulation results, we use the RMC as a measure to define the similarity function. Finally, spectral clustering is adopted to achieve the trajectory clustering, which contains two stages: initial clustering and inter-class merging. By applying this clustering method in actual traffic scene, much more stable clustering results can be obtained. Experimental results on traffic video demonstrate that the proposed method has a good performance in different traffic scenes. Moreover, its accuracy can reach 96% compared with other methods.

Keywords: Motion segmentation, Trajectory clustering, Camera calibration, Rigid motion constraints, Inverse projection mapping, Spectral clustering.

*Corresponding author
Email address: jessica036@126.com (Xuan Wang)

Download English Version:

<https://daneshyari.com/en/article/11001298>

Download Persian Version:

<https://daneshyari.com/article/11001298>

[Daneshyari.com](https://daneshyari.com)