

Synthetic sequences and ground-truth flow field generation for algorithm validation

Naveen Onkarappa · Angel D. Sappa

© Springer Science+Business Media New York 2013

Abstract Research in computer vision is advancing by the availability of good datasets that help to improve algorithms, validate results and obtain comparative analysis. The datasets can be real or synthetic. For some of the computer vision problems such as optical flow it is not possible to obtain ground-truth optical flow with high accuracy in natural outdoor real scenarios directly by any sensor, although it is possible to obtain ground-truth data of real scenarios in a laboratory setup with limited motion. In this difficult situation computer graphics offers a viable option for creating realistic virtual scenarios. In the current work we present a framework to design virtual scenes and generate sequences as well as ground-truth flow fields. Particularly, we generate a dataset containing sequences of driving scenarios. The sequences in the dataset vary in different speeds of the on-board vision system, different road textures, complex motion of vehicle and independent moving vehicles in the scene. This dataset enables analyzing and adaptation of existing optical flow methods, and leads to invention of new approaches particularly for driver assistance systems.

Keywords Ground-truth optical flow · Synthetic sequence · Algorithm validation

1 Introduction

Computer Vision has got applications in different fields of life. The research in computer vision is always motivated, as well as supported by the benchmarking dataset with ground-truth information. The availability of ground-truth information makes the dataset very useful for the evaluation of different methods. Generally, ground-truth can be obtained by manual labelling and/or sophisticated equipments such as for detection, recognition and segmentation tasks. Optical flow technique is an important approach in motion estimation that is

N. Onkarappa (✉) · A. D. Sappa
Computer Vision Center, Campus UAB, 08193, Bellaterra, Barcelona, Spain
e-mail: naveen@cvc.uab.es

A. D. Sappa
e-mail: asappa@cvc.uab.es