Review of the Thesis

Automatic Traffic Video Surveillance: Fine-Grained Recognition of Vehicles and Automatic Speed Measurement

submitted by Jakub Sochor

The thesis deals with an important and timely topic. The automatic traffic real-time analysis is one of the essential keys for efficient transport/municipality management. In future, when autonomous driving become more prominent, it will perhaps also serve as an important source of independent data for safety checking.

The main objective of the thesis is to design algorithms for visual fine grained vehicle recognition and visual speed measurement. It assumes current infrastructure, surveillance cameras have been already installed. The objective is well grounded. The thesis achieves its objective as it brings new algorithms and studies the desired properties in great detail.

The thesis is very well written and clearly reveals the thoroughness of the author. The State of the art part reads comprehensive. I have have no doubts the author knows the current state of the art. What I miss a bit is a discussion how the new methods stand with respect to the listed previous work. Properties of the prior art are being described and a reader have no information in what sense are the new methods superior or complementary or faster or more automatic or simpler to implement. State of the art discussions have been also left along the papers which makes some part repetitive. I definitely appreciate the web site `https://medusa.fit.vubtr.cz/traffic`. All is there, codes, papers, data, figures. The web may serve as an example for of other PhD students. Great work, indeed. The core of the thesis consists of papers published at respectable conferences and journals. Again I have to emphasize the care the author(s) dedicated to illustrations, graphs and tables. Individual pieces of the whole system are (re)used in other components, which I consider a good thing. As an example, the new automatic calibration method partly relies on accurate car classification for estimating the absolute scale. Experiments are convincing.

The dissertation designs novel algorithms. Although the thesis was motivated from application side, it offers enough scientific contribution. I believe and hope the thesis will be an important resource for researchers and practitioners in the field. I have no doubt the author can conduct independent research work. The thesis contains enough novel results and describes them very thoroughly. *I do recommend the thesis for defense.*

Questions

1. Page 109, it is argued that the fact the constructed bounding box is too tight causes systematic errors in calibration.
   - I do not understand why.
   - If so, could be the systematic error compensated somehow?

2. Not a question, just comment. In video Accurate Speed Measurement from Uncalibrated ...[1], time 0:44, Skoda Octavia Mk1 is depicted with the total length 5.12 meters which is definitely not true (it is 4.51 meters). I suppose it was corrected for the real application. It is a bit confusing, though. Not many personal cars are over 5 meters.

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[1] https://www.youtube.com/watch?list=PL3hk0tx6a7N3mDXQGKtT7YaLAUfgmiSXo&time_continue=44&v=mHkz8yT_vxY