

Supervisor's assessment of master's thesis
**Object Detection and Tracking by Convolutional
Neural-Networks in Traffic Scenes**
by Filip Langr

The major goals of the thesis were (1) to research the convolutional neural network (CNN) approach to object tracking, (2) suggest and implement a CNN-based method capable of tracking objects on video and (3) to evaluate and discuss the results on public benchmark data set. Solving Multi-object-tracking problem is a challenging and time consuming task on its own, all the more so when employing state-of-the-art deep-learning methods. It is safe to say the task this thesis focuses on is a difficult assignment.

First half of the thesis focuses mainly on the deep-learning Re-identification task. It explains the designed CNN architecture based on MobileNetV2 backbone, before going in detail over the training process and experiments. In the second half of the work can be found the integration within a tracking framework along with two other widely used approaches for comparison and their respective qualitative results.

Filip regularly consulted his progress with me, working on the task on his own with minimal guidance necessary. The qualitative results of his work did not manage to outperform state-of-the-art, but are close if not comparable in most metrics. That being said, it is a satisfactory outcome for purposes of the thesis assignment.

The main contribution of the thesis is a standalone custom framework for training Re-identification CNN based trackers. The student clearly shows understanding and knowledge of the theoretical background of his work, as can be seen in sections describing the proposed solution in detail. The language used is advanced, putting emphasis on covering the complex topics in comprehensible technical writing style. The size and extent of the thesis is more than sufficient, covering all goals of the assignment to a satisfactory degree.

Filip Langr helped us at GoodVision by tackling a difficult problem which traditional tracking approaches fail to deal with. Particularly in the scenarios with sparse detections and scenes with frequently reappearing objects, the results of his work are quite promising.

Therefore, I recommend to grade the thesis by **B - very good**.

Prague, 15 January 2020
Ing. Jan Krček, GoodVision Ltd.
Thesis supervisor