

Master's internship: Multi-Object-Tracking Using Deep Neural Networks

Nowadays, most of the state-of-the-art applications in Computer Vision are learning based and use recent Deep Convolutional Neural Networks (DCNN). Multiple Object Tracking (MOT) is the process of estimating trajectories of a pre-defined category of objects in a video sequence. DCNN provide a very accurate detection of objects into an image. The problematic is to associate detected objects with previous targets (trajectories). Recent works focusses on metric learning for data association with Siamese networks and triple loss approaches. However, these approaches provide only measurements between targets and detections to a classical matching algorithm.

The aim of this internship is to propose an original approach of association that uses the recent relational networks. The resulting network will be trained to produce the matching output. MOT models must deal with a varying number of objects. However, DCNN are design for a static number of inputs. Here, we will propose a relational network to solve this problem.

Experiments will be achieved in the context of detection and prediction of trajectories of moving object for autonomous driving. This application is closely linked with the first challenge of the labex ImoBS3.

After a bibliography study of the topic of MOT and relational networks, the student will propose some possible deep neural networks to achieve the matching task. Selected solutions will be implemented and evaluated on both toy and public MOT datasets.

Keywords:

- Machine Learning, Deep Learning, Computer Vision, Pytorch.

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Bibliography

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