Review for Learning a Neural Solver for Multiple Object Tracking

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1 Summary

In multiple object tracking task, tracking by detection is a widely used framework. There are learning based algorithms that improve the task of learning for MOT. In this paper, authors show that learning based methods does not need to be restricted on feature extraction, it can also be used in data association part. Authors experimented the method on MOT15, MOT16, MOT17 datasets and they showed significant improvements on (Multiple Object Tracking Accuracy) MOTA and (ID F1) IDF1 scores.

2 Strengths

- Learning based methods are used in both feature extraction and data association step. This way, MOT solver based on message passing networks exploits the graph structure of the problem to predict final solution.

- Novel time aware neural message passing update step is proposed for MOT.

- The method achieves state of the art performance in three public datasets.

3 Weaknesses

- When I looked at the studies citing the paper, some of them claims that this type of end to end learning method requires high annotation cost.

- The algorithm is able to run at 6.5 fps. Even though this performance is greater with respect to methods compared in this study, it may not be sufficient for online tracking applications.

4 Evaluation

MOT15, MOT16, MOT17 datasets are used for evaluation. Performance of the method is analyzed based on MOTA and IDF1 metrics. In the ablation studies, three main questions are assessed, the performance of neural message passing updates, impact of the number of message passing steps in network training to overall tracking performance, the effect of different features on different evaluation metrics. Their results set a new state of the art performance by a significant margin.

5 Final Comments and Future Work

Implementing fully learning based pipeline in MOT significantly outperforms the previous methods due to evaluating higher order information. In data association task, this type of learning based methods may lead to greater performance. In the future works, integrated learning approach can be improved.