

Beyond simple thresholding: using tracklet information to improve selection of true positive detections for multiple object tracking

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Abstract. State of the art multiple object tracking (MOT) algorithms typically follow tracing by detection paradigm, in which detection and association are performed in separate steps. Selecting only true positive detected bounding boxes for association is one of the problems which remains largely unsolved. Existing methods usually rely on simple thresholding to discard detected bounding boxes with low detection confidence scores and recent methods (e.g. [1, 2]) have applied two-stage association to use low-confidence detections and remaining tracklets in the second stage. However, recent papers discussed the shortcomings of the two-stage association [3, 4]. In our research, we expand the idea of boosting detection confidence of likely objects from BoostTrack [4]. We experiment with different similarity measures in addition to intersection over union (shape, Mahalanobius distance, visual embedding) for increasing the detection confidence of bounding boxes where an object is likely to be. Furthermore, we introduce varying thresholds for increasing the detection confidence depending on the number of timesteps elapsed since the last association. We perform experiments on MOT17 [5] and MOT20 [6] datasets to demonstrate the effectiveness of our methods and achieve improvements in the MOTA metric indicating that our method increases the number of true positive detections used.

Keywords: multi-object tracking; detection confidence; tracking by detection.

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