Multi-Camera Multi-Object Tracking and Re-Identification

Research Project
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Declaration

I certify that I have written the submitted work independently. All passages taken verbatim or in spirit from the published or unpublished work of others, or from the author's own work, are marked as taken. All sources and tools used in the work are acknowledged. The work has not been submitted to any other examination authority with the same content or in substantial parts.

Place, Date

Signature

Abstract

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1 Introduction

1.1 Lorem ipsum

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2 Structure

[1]: Current Trends in MCMOT. State of the Art. A lot of basic and advanced knowledge. Good for introduction. Analyzes 30 MCT algorithms.

[2]: Tracking framework for multiple interacting targets both overlapping and non-overlapping cameras, raw target trajectory with group state. SVMS, homography-based voting schema, networkflow problem, K-shortest paths algorithm.

[3]: Non-overlapping multiple cameras tracking based on smiliarity function. Data association method. Smilarity based on color appearance and camera topology. Use superpixels for extracting color features generated by Simple Linear Iterative Clustering K-means camera topology learning.

[4]: General description of multi-camera tracking. State of the Art, Markov Process, graph partition theory, tracking by joint constraints.

[5]: Indoor scene, multiple top-view **fisheye** cameras. Possible to cover large space, less occlusion among objects. People detection and tracking. Calibrate cameras, real time (FPS of about 10) without GPU support.

[6]: VOT21 Challenge Results. Considers single-camera, single-target, model-free tracking. VOT-RT2021 focuses on real-time RGB tracking. Requires predicting bounding boxes. Top two trackers: TrasT_M and STARK_RT.

[7]: VOT22 Challenge Results.

[8]: Mathematical multi-camera tracking approach. Pre-clustering obtained from 3D geometry projections.

[9]: Real-time distributed MCMOT system. City-scale scenario. Keeping communication and computing costs of each device low. Installs smart stations on the roadside and connects them to maintain communication. Decentralized Tracking. Kalman filter and hungarian algorithm. YoloX and DeepSORT.

[10]: Soccer Players. Raw detection heat maps. Google Research Football Environment. Multi camera, multi targets. Cameras have fixed positions. Do not use bounding boxes, instead raw input with heat maps. Graph Neural Network. No visual cues, such as jersey numbers. Player movement trajectories and interaction between neighborhood players.

[11]: Utilizes information regarding spatial and temporal consistency. Reconfigurable graph model. Two step approach: Associate all objects across cameras spatially then reconfig into a temporal graph model. Matching object across different views.

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