

Player Tracking and Re-Identification in Sports Video

1. Approach and Methodology

We tackled the problem of real-time player detection and re-identification in a single video feed using a combination of YOLOv11 for object detection and DeepSORT for object tracking.

- YOLOv11 was custom-trained to detect only 'player' class bounding boxes from sports video footage.
- DeepSORT was used to assign and maintain unique player IDs across frames even when occlusions or exits occur.
- Additional filtering was applied based on confidence, aspect ratio, and bounding box area to reduce false positives.
- The output includes an annotated video with tracked player IDs and a CSV log for downstream analysis.

2. Techniques Tried and Their Outcomes

- Initially experimented with YOLOv5 and DeepSORT integration.
- Switched to YOLOv11 for higher detection accuracy and reduced latency in sports scenes.
- Adjusted DeepSORT parameters (max_age, min_hits) to improve player ID consistency.
- Applied size and aspect ratio filtering to discard unrealistic detections.
- Refined confidence thresholds to optimize detection reliability.
- Successfully maintained consistent player IDs through occlusions and re-entries.

3. Challenges Encountered

- Integrating YOLOv11 custom-trained model with DeepSORT required adjusting detection formatting.
- Encountered a TypeError in DeepSORT input format due to inconsistent detection tuple structures.
- Managing DeepSORT hyperparameters to minimize ID switches in dense player groups was challenging.
- Handling dependency issues and warning messages (e.g., deprecated parameters in TorchVision).
- Git errors during repository pushes due to large file sizes and remote sync conflicts.
- Addressed video resolution constraints and optimized output video encoding for smoother playback.