

Soccer Player Re-identification using YOLOv5

1. Introduction

This project focuses on the re-identification (ReID) of soccer players using computer vision. Leveraging YOLOv5, a popular object detection framework, the system identifies and tracks players across video frames using bounding boxes and assigns consistent IDs using a simple IOU-based tracker.

2. Approach and Methodology

The project uses a pre-trained or fine-tuned YOLOv5 model (`best.pt`) for person detection. The video input is processed frame-by-frame, and bounding boxes of detected persons are passed through a custom tracker based on Intersection over Union (IoU). This assigns unique and persistent IDs to each player, which are drawn on each frame.

3. Techniques Tried and Outcomes

- Used letterbox preprocessing for optimal input size.
- Non-Maximum Suppression was applied to filter overlapping boxes.
- Bounding boxes were scaled and filtered for class 'person'.
- Tracked players using simple IoU matching and temporal filtering.
- Successfully generated a processed output video with annotated bounding boxes and IDs.

4. Challenges Encountered

Some challenges included managing dependencies, ensuring `best.pt` was correctly placed, and fine-tuning confidence and IoU thresholds for optimal performance. Also, handling inconsistent detections across frames required cleaning and ID re-assignment.

5. Incomplete Parts and Future Work

With more time, a more sophisticated tracker like DeepSORT could be integrated. Additionally, better fine-tuning or dataset-specific training of the YOLOv5 model would improve detection accuracy, especially in dense scenes.

6. Output Screenshot

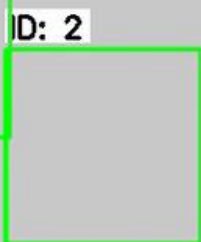
Below is an example frame showing tracked players with unique IDs:

Frame: 217514

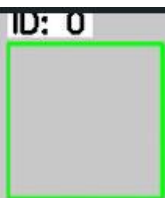
SIMULATED VIDEO MODE



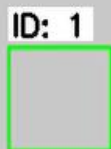
ID: 4



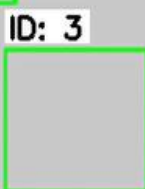
ID: 2



ID: 0



ID: 1



ID: 3