

Soccer Player Re-Identification - Brief Report

1. Approach and Methodology

The objective of the project is to map soccer players across two videos (broadcast and tacticam) such that the player retains a consistent ID. We achieve this using a three-step pipeline:

1. Detect players in each video using a provided YOLOv5/YOLOv8 object detection model.
2. Track each detected player across frames using DeepSORT to obtain unique track IDs.
3. Extract visual features using ResNet50 and match players across videos based on cosine similarity of averaged embeddings.

2. Techniques Tried and Outcomes

- Object Detection: Used a fine-tuned YOLOv5 model for accurate player and ball detection.
- Tracking: Employed DeepSORT to maintain player IDs within each video.
- Feature Extraction: Used pretrained ResNet50 to generate feature embeddings.
- Matching: Used cosine similarity between averaged embeddings to match players across videos.

The results were saved as CSVs, showing player mappings and their similarity scores. The system successfully mapped players like ID 1 to 1 and ID 27/29 to 23 with high confidence.

3. Challenges Encountered

- Handling varying camera angles and occlusions affected the consistency of detections.
- Embedding similarity wasn't perfect due to visual overlap between players.
- Ensuring frame alignment between videos and avoiding dropped frames during processing.
- Performance bottlenecks on CPU-only machines during video frame processing.

4. Incomplete Tasks / Future Improvements

- Improve embedding quality using task-specific re-identification models.

- Use temporal sequence modeling (e.g., LSTM) for more robust matching.
- Add real-time visual interface to display matched player tracks.
- Extend to include ball detection tracking and match context analysis.