Player Tracking and Re-Identification

1. Approach

The objective of this project was to simulate real-time player tracking and re-identification in a football match scenario using YOLO-based object detection. The input data consisted of a JSON file containing player bounding boxes across video frames. The approach focused on visualizing these tracks and generating a new annotated video with consistent player IDs.

2. Methodology

1. Parsed the JSON data to extract frame-by-frame bounding boxes and player IDs.
2. Overlaid bounding boxes and IDs on each video frame using OpenCV.
3. Simulated re-identification by maintaining consistent player IDs throughout the frames.
4. Exported the annotated video to visualize real-time tracking.

3. Challenges Encountered

- Ensuring temporal consistency of player IDs for realistic Re-ID.
- Rendering performance while processing and annotating each frame.
- Matching frame indices between JSON data and actual video frames.
- Managing bounding box overlaps and label readability in dense scenes.

4. What Remains

- No trajectory visualization or multi-camera coordination was implemented.
- No real-time inference or stream-based tracking pipeline is integrated.
- No confidence scores or player attributes were shown.

5. Future Work

With more time or resources, the project could be extended by:

- Integrating deep Re-ID models (e.g., OSNet) to handle occlusions and reappearance.
- Adding player role recognition (defender, forward) based on position clustering.
- Implementing team identification using jersey color classification.
- Deploying as a live stream tool for sports analytics.