Soccer Player Re-Identification - Final Report

Submitted by: A Beginner Enthusiast (with help from ChatGPT)

1. Approach and Methodology

The project detects soccer players from match footage using a pre-trained YOLOv11 model, classifies their teams based on jersey color (Red, White/Blue, or Yellow for referees), and re-identifies them across frames using spatial tracking. The approach includes frame-by-frame processing, bounding box drawing, labeling, and a live tactical map for player positions.

2. Techniques Used and Their Outcomes

- YOLOv11 for object detection.
- HSV-based color segmentation to classify team jerseys.
- Euclidean distance-based tracker for player re-identification.
- OpenCV for video processing and cropping.
- Matplotlib for tactical map visualization.

Outcome: The pipeline successfully detects, classifies, and re-identifies players with visual output in video and live map.

3. Challenges Encountered

- As a beginner, understanding detection, tracking, and visualization concepts was tough initially.
- Needed guidance in code structuring, using models, and debugging.
- Color-based team detection was inconsistent under different lighting.
- Struggled with OpenCV reading images and accuracy evaluation setup.

4. Incomplete Work / Future Improvements

- Accuracy can be improved with deep learning-based re-identification models (e.g., DeepSort).
- Color detection can be enhanced using clustering or adaptive thresholding.
- GUI labeling tool can be added for easier ground truth setup.
- With more time, I would also attempt to export player statistics and heatmaps.

5. Summary

This project demonstrates a complete pipeline from detection to team classification and tracking.

Despite starting from zero, with step-by-step support, I built a working system and learned a lot about real-world applications of computer vision. This is just the beginning of my AI journey.