Player Re-Identification Using YOLOv11 and DeepSORT

Objective

To re-identify soccer players in a single video feed using deep learning and maintain consistent IDs even when players disappear and re-enter the scene.

Tools Used

- YOLOv11 (Ultralytics): Used for detecting objects (players, ball) in each frame.
- DeepSORT: A multi-object tracking algorithm that maintains unique identities across frames.
- OpenCV: Used for video processing, frame display, and output writing.

Approach

1. Detection:
   - Each frame is passed through the YOLO model (best.pt) which was fine-tuned to detect players and the ball.
   - We filter detections by class and confidence (conf > 0.3).

2. Automatic Player Class Identification:
   - The player class (cls) is auto-inferred in the first few frames (excluding class 0, which is often the ball).
   - This ensures flexibility even if the model changes slightly.

3. Tracking with DeepSORT:
   - For every detected player, DeepSORT assigns a unique ID and tracks movement across frames.
   - Even if a player leaves and re-enters the frame, they retain the same ID.

4. Visualization:
   - Green bounding boxes and player IDs are drawn on the frame in real-time.
   - Output is saved as output_option2.mp4.

Results

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- All players are assigned unique IDs from the start.
- IDs remain consistent even when players disappear from the frame.
- Smooth, real-time visualization of player tracking is achieved.

Conclusion

This system simulates real-world sports analytics solutions by combining object detection and multi-object tracking to achieve player re-identification in sports video footage.