Summary of the Project

Objective

To **map each player across two video feeds**—broadcast.mp4 and tacticam.mp4—such that every player has a **consistent ID** across both camera views.

Approach & Methodology

1. **Player Detection**
    - Uses a **YOLOv11** model pre-trained and fine-tuned specifically for **player and ball detection**.
    - Extracts bounding boxes and confidence scores from both videos.
2. **Feature Extraction**
    - For each detected player, an **HSV color histogram** is computed from the cropped bounding box.
    - Histograms are **normalized and flattened** into 512-dimensional vectors.
3. **Re-Identification (Matching)**
    - Constructs a **cosine similarity matrix** between histograms of detected players from both views.
    - Uses the **Hungarian algorithm** to perform **optimal one-to-one matching**.
    - Saves results in a structured CSV file.

Challenges Encountered

- Sensitivity of HSV histograms to lighting & viewpoint changes.
- Occlusion and blur reduced detection accuracy.
- False positives in cases of similar jersey colors.

Techniques Tried & Outcomes

Example mappings from player_matches.csv:

broadcast_id	tacticam_id	cosine_distance
7_0	8_0	0.1181
8_0	7_0	0.0989
10_0	60_0	0.0801
11_0	9_0	0.1434
17_0	31_0	0.0498