Player Detection and Unique ID Tracking in Cricket Footage

1. Objective

The objective of this assignment is to evaluate your ability to design and implement a computer vision pipeline capable of:

1. **Detecting all players** present in the cricket match footage.

2. **Assigning consistent, unique IDs to each player** across the entire video sequence.

The solution should demonstrate competency in deep learning based detection, multi-object tracking, and handling real-world challenges such as occlusion, motion blur, and players with similar uniforms.

2. Dataset

A video clip of a cricket match is given below.

Dataset Link: 🎬 K.AI Ass PT

3. Mandatory Requirements

Your submission **must include** the following components:

3.1 Player Detection

- Implement a player detection model capable of identifying all visible players in each frame or alternate frames.

3.2 Unique ID Assignment (Multi-Object Tracking)

- Each detected player must be assigned a unique and persistent ID.

- IDs must remain stable throughout the video, even when:

  - Players move rapidly

  - Players overlap or partially occlude each other

  - Camera motion or zoom occurs

3.3 Output Video

Produce a processed video showing:

- Markers/outlines or boxes around detected players
- The unique ID is clearly displayed above or near detections.

3.4 Code Submission

Submit clean, modular, and well-documented code, preferably in:

- Python scripts, or

- A Jupyter Notebook

A **README file** must be included with:

- Installation instructions

- Dependencies

- Steps to run the pipeline

3.5 Short Technical Report

A concise (1–2 pages) report describing:

- The model architecture

- The tracking algorithm selected

- How ID consistency is maintained

- Challenges encountered and how you handled them

- Potential future improvements

4. Optional Enhancements (Good-to-Have)

These are **not mandatory**, but implementing any of the following will be considered a strong plus:

4.1 Top-View (Bird's-Eye) Projection

Map the tracked player positions from the camera view onto a **top-down view** of the cricket field.

This can include:

- Homography-based coordinate transformation

- Visualization of player locations on a ground map

- Trajectory lines showing player movement over time

4.2 Trajectory Visualization

Generate:

- Movement paths

- Positional heatmaps

- Time-based spread patterns

This demonstrates a deeper understanding of analytics and spatial reasoning.

5. Useful Resources

 Following reference materials:

1. **Top-View Reference Image [📄 Top View.png]**
2. **Ground Image for Projection [📄 Ground Image.png]**

You may also use alternative open-source assets if needed.