# 🏆 Player Re-Identification using YOLOv11 + SORT

An end-to-end computer vision pipeline for real-time \*\*player detection\*\*, \*\*tracking\*\*, and \*\*re-identification\*\* using a single video feed. This project combines \*\*YOLOv11\*\* with \*\*SORT\*\* to ensure consistent ID assignment and tracking accuracy throughout a 15-second sports clip.

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## ️ Project Objective

Simulate intelligent player tracking by:

- 📌 Detecting players using a fine-tuned YOLOv11 model

- 📌 Assigning unique IDs based on early video frames

- 📌 Maintaining identities even when players leave and re-enter the frame

- 📌 Exporting data for analysis and visualization

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## 🚀 Technologies Used

| Tool / Library | Role |

|----------------------|----------------------------------|

| `Ultralytics YOLOv11`| Fast, accurate object detection |

| `SORT` | Realtime tracking with Kalman filter |

| `OpenCV` | Frame processing & annotation |

| `Python` | Core scripting language |

| `NumPy` | Numerical operations |

| `FilterPy` + `SciKit-Image` | Tracker dependencies |

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## 📂 Project Structure

├── yash.py # Main tracking script ├── players\_yolov11.pt # Fine-tuned YOLO model ├── 15sec\_input\_720p.mp4 # Input video feed ├── output\_tracking.mp4 # Annotated output video ├── tracking\_data.csv # Log of player ID & position └── sort/ └── sort.py # SORT tracker implementation

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## 🔧 Installation Guide

1. Clone the repository:

```bash

git clone https://github.com/<your-username>/player-reid-yolo-sort.git

cd player-reid-yolo-sort.

Install dependencies:

pip install ultralytics opencv-python numpy filterpy scikit-image.

Run the script:

python yash.py

Output will be saved as:

output\_tracking.mp4: showing tracked player IDs.

🧾 tracking\_data.csv: frame-by-frame log.

Sample Output Description

| **Frame** | **Player ID** | **x1** | **y1** | **x2** | **y2** | **Confidence** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 104 | 73 | 165 | 142 | 0.88 |
| 1 | 1 | 220 | 76 | 283 | 144 | 0.92 |

## Features:-

🎯 Real-time detection and ID assignment

🔁 Maintains player identities across movement & re-entry

📈 Exportable data for heatmap or trajectory analysis

✅ Compatible with appearance re-ID enhancements (DeepSORT-ready).

Understanding and tracking dynamic motion in sports or surveillance footage is key to intelligent systems. This project showcases how detection, tracking, and re-ID can work together for real-world applications in **computer vision**, **sports analysis**, and **DLNLP research**.