# Cross-Camera Player Mapping using Computer Vision & Machine Learning

## 🔍 Problem Breakdown

The task is to identify the player who performed a specific action (goal, pass, free kick, etc.) in a soccer video at a given timestamp — even when multiple cameras are recording the game from different angles.  
  
We break this into:  
1. Player and Ball Detection  
2. Player Tracking  
3. Jersey Number Recognition (OCR)  
4. Action Recognition (Video Understanding)  
5. Player Re-identification (Cross-Camera Mapping)

## 🧠 Modeling & Tool Choices

|  |  |  |
| --- | --- | --- |
| Task | Tool/Model | Why? |
| Detection | YOLOv8 | Fast, accurate object detection (real-time ready) |
| Tracking | DeepSORT | Works well with YOLO, tracks same players |
| OCR | EasyOCR | Recognizes jersey numbers easily |
| Action Detection | I3D / CNN + LSTM | Handles actions over time (video-based) |
| Re-ID | FastReID | Matches same players across different views |

## ⚙️ System Pipeline

Video Input  
 ↓  
[YOLOv8] Detect Players & Ball  
 ↓  
[DeepSORT] Track Player Movements  
 ↓  
[EasyOCR] Read Jersey Numbers  
 ↓  
[Action Detection Model] Detect Key Actions  
 ↓  
[FastReID] Match Players Across Cameras  
 ↓  
Final Output: Action done by which player, at what time, from which camera

## 🎯 Sample Output

{  
 "timestamp": "00:04:22",  
 "action": "Goal",  
 "player\_id": "Red Jersey #9",  
 "confidence": "93%",  
 "camera\_views": ["Cam 1", "Cam 3"]  
}

## 📁 Suggested Folder Structure

AI-Intern-Assignment/  
├── detection/  
│ └── yolo\_model.py  
├── tracking/  
│ └── deepsort\_tracker.py  
├── ocr/  
│ └── jersey\_number\_reader.py  
├── action\_recognition/  
│ └── action\_model.py  
├── reid/  
│ └── player\_mapper.py  
├── main\_pipeline.py  
└── README.md

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