Fairplay Moments Detection in Cricket

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1. Overview

This project focuses on detecting fairplay moments in cricket matches such as handshakes, helping opponents, and other sportsmanlike gestures. The aim is to identify such moments using computer vision and machine learning to enhance sponsor placement opportunities during these high-value segments.

2. Dataset

The dataset was created by manually labeling key fairplay gestures from cricket match frames. The categories included:
- 10 frames showing handshakes
- 11 frames showing hugs
- 10 frames showing players helping others (e.g., tying laces)
- 21 normal non-fairplay moments

These frames were labeled in a CSV file and used to create a training dataset by extracting 34 pose keypoints using YOLOv8-pose.

Example of a fairplay moment from the dataset:

3. Working

The system works in two major phases:
1. Pose Estimation: Using YOLOv8 pose detection, keypoints of human joints are extracted from frames.
2. Classification: The extracted pose keypoints (x, y coordinates) are used as features to train a Random Forest classifier to predict whether a frame contains a fairplay moment.

4. Libraries and Other Tools Used

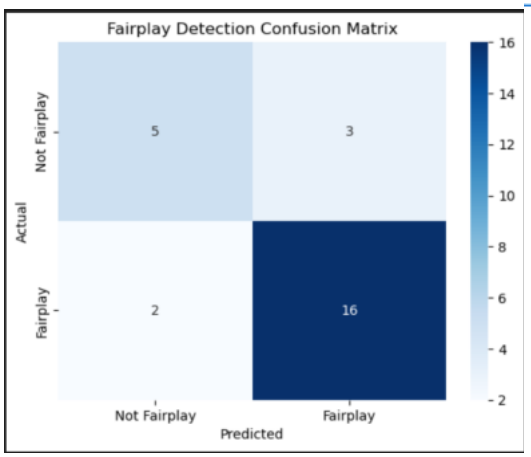
The project utilized the following technologies and libraries:
- OpenCV (frame extraction)
- Ultralytics YOLOv8 (pose estimation)
- Scikit-learn (training and evaluation of classifier)
- Pandas, NumPy (data manipulation)
- Matplotlib & Seaborn (visualizations)
- Python (entire implementation in Jupyter Notebook)

5. Training

The model was trained using scikit-learn's RandomForestClassifier. The keypoints were used as features, and the manually labeled fairplay flag was the target.

6. Evaluation / Results

The model achieved high accuracy on a manually labeled test set. Evaluation was done using precision, recall, F1-score, and a confusion matrix.
The final model reached:
- Accuracy: 81%
- Fairplay Precision: 84%
- Fairplay Recall: 89%
The confusion matrix is shown below:



Classification Report:

	precision	recall	f1-score	support
0	0.71	0.62	0.67	8
1	0.84	0.89	0.86	18
accuracy			0.81	26
macro avg	0.78	0.76	0.77	26
weighted avg	0.80	0.81	0.80	26