Cricket Shot Type Detection from Video using CNN

Project Goal:

Detect cricket shot type (e.g., cover drive, pull shot) from a **video** input.

Technique Used: Image-based CNN (Convolutional Neural Network)

Why?

- CNNs are excellent at extracting patterns from **images**.
- Videos are broken into **frames (images)**, which are passed to the CNN.
- This is easier and faster than training directly on video.

Layers Used in CNN

Layer	Purpose
Conv2D	Finds image patterns like edges or shapes
MaxPooling2D	Reduces size, keeps key info
ReLU	Makes learning fast and effective
Flatten	Converts image to list for decision-making
Dense	Makes final decision (classification)
Softmax (last)	Converts outputs to class probabilities
Dropout	Prevents overfitting
BatchNormalization	Keeps learning stable

Why Not Use Other Techniques?

Technique	Why Not Used	Use Case

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

| Logistic Regression / Tree | Can't handle image patterns | Use for tabular data |

| 3D CNN | Needs large video dataset, slow to train | Use for full video analysis |

| LSTM | Needs frame sequences; adds complexity | Use when motion order matters |

Advanced Options

1. **Frame Voting:** Take multiple frames, predict each, choose most common.
2. **CNN + LSTM:** Extract features from each frame, pass to LSTM for motion learning.
3. **3D CNN:** Train on short clips to capture spatial + motion features.

Why This Approach is Smart

- Easier to train (images > videos)
- Faster predictions
- Good accuracy with limited data

Built with:

- TensorFlow/Keras
- Conv2D, Dense, Softmax, ReLU
- ImageDataGenerator for augmentation

Tip: Improve predictions by analyzing 510 key frames instead of just one.