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IDENTIFY CRICKET SHOTS USING LINEAR REGRESSION

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Abstract:

In recent years, there has been a lot of interest in and attention to numerous sports. A significant chunk of the populace was desperate to attend a game because there hadn't been any athletic events throughout the outbreak's height. With millions of followers who follow the game faithfully, cricket is arguably the most popular sport in India. Enthusiastic about the game, spectators closely examine the abilities of each player, focusing on their shooting technique in particular. With the rise in popularity of fantasy leagues and other comparable services, people are becoming more interested in evaluating players before selecting them for their teams. The manual batter shot recognition method is one of the most time- and labor-intensive procedures.

Keywords : Machine Learning, Linear Regression, Cricket Shot Analysis, Feature Extraction, Data Modeling, Sports Analytics ,Training Data

1. Introduction

A thorough examination of a player's performance, encompassing shot choice, execution, and efficacy, is possible with the identification of cricket shots. Coaches, analysts, and players can improve overall game performance and strategy refinement with the use of this analysis. The method helps to produce extensive statistical data by precisely recognizing and classifying cricket shots. Insights about player preferences, advantages, disadvantages, and general playing patterns can be obtained from this data.

Through the use of machine learning, the project "Identify Cricket Shots Using Linear Regression" seeks to identify and categorize various cricket shot types from video footage. Based on many input data collected from the video, this system is intended to forecast the kind of shot a batsman would play. It does this by using linear regression, a statistical technique that models the relationship between a dependent variable and one or more independent variables. These characteristics could include the shot's angle, the batsman's position, the ball's speed, and other pertinent elements that affect shot classification.

In addition to automating shot identification—a task that has historically been completed by human observers—this method provides coaches and players with a quantifiable tool for evaluating performance in pre-game or practice scenarios. In order to provide comprehensive cricket analytics, the predictive model that was constructed using linear regression analyzes continuous data inputs and assigns a category label (kind of shot). For those looking for deeper insights into the mechanics of gameplay, broadcasters, sports commentators, and team strategists may find this technology very helpful. In the end, the incorporation of these machine learning methods promises to improve cricket comprehension and enjoyment via cutting-edge technology intervention.

2.Literature Survey

2.1 Paper Name: CRICKET SHOT DETECTION FROM VIDEOS

Paper Proposed:The videos are first divided into frames in order to better comprehend its structure. These frames are then fed into the CNN, or Convolutional Neural Network. Limitation : The range of camera angles utilized in various cricket broadcasts can impact the accuracy of shot recognition. Poor video quality or unconventional perspectives could make the device less effective.

2.2 Paper Name: :- Automatic Video Summarization from Cricket Videos Using Deep Learning

Paper Proposed:In this paper, we addressed the video summarizing technique for cricket matches using a supervised version of a Reinforcement Learning (RL) based framework. Limiation: The system may have trouble correctly assigning shots to certain players when there are several players overlapping in the field, particularly in situations involving close-range fielding or a packed field.

2.3 Paper Name : Deep CNN based Data-driven Recognition of Cricket Batting Shots

Paper Proposed:This paper deals with recognizing cricket batting shots from the videos. In order to apply data driven approach, dataset comprising of 800 videos have been collected and annotated as required. Models have been trained using 2D CNN with LSTM based sequential learning and 3D CNN. For video dataset, 3D models performed better than 2D models in recognizing a shot played.

Limiation : In fast-paced formats like T20 cricket, where shots are played quickly, the system may face challenges in precisely capturing and categorizing shots due to the rapid movement of players

2.4 Paper Name : Extraction of Strong and Weak Regions of Cricket Batsman through Text-Commentary Analysis

Proposed Paper:The strengths and weaknesses of cricket batsmen were extracted and discussed in the context of text- commentary in this paper. Additionally, by breaking down the strike rate of cricket batsmen into zones such as deep midwicket, square leg, long-on, long-off, and midwicket, among others, the suggested technique also does so. The espncricinfo sports website is the source of the data set used in the suggested method. Text commentary from International T20 matches played between 2008 and 2019 is included in the data set. These lines of analysis indicate that a player's strong and weak areas are determined by taking the pitch and ground area into account.Limitations: The accuracy with which the system detects and classifies cricket shots may be affected by variations in

2.5 Paper Name : AN INTERACTIVE APPROACH TO IDENTIFY CRICKET SHOTS THROUGH DEEP LEARNING MECHANISM

Paper Proposed: In order to get a noticeably superior outcome, the method for automatically evaluating cricket strokes that is presented in this research study employs deep learning techniques. The method discussed makes use of Convolutional Neural Networks to process the video input of every shot made by a cricket player. The CNN model is trained using a dataset of multiple Limitations: The training dataset may not have included enough representation of new or unusual shot types, making it difficult for the system to detect them accurately. It can have trouble with creative shots that players introduce.

2.Proposed Model

A predictive framework that analyzes video data and categorizes various cricket shots is created as part of the suggested model for recognizing cricket shots using linear regression. Moments of bat-ball contact are isolated using key frame extraction, and factors like bat angle, swing speed, and point of impact are identified via feature extraction algorithms. These variables are inputs into a linear regression model that establishes a correlation between them and certain shot types (e.g., drive, pull, hook). To achieve optimal predicted accuracy, the model can be trained with a large dataset of labeled shots. This will allow for real-time analytics and shot classification during live or recorded cricket matches.

3.1 Feature Collection

In order to detect cricket shots using linear regression, feature collection entails obtaining information that affects how various shot types are classified. Bat speed, shot angle, contact point, player stance, and timing are a few examples of these variables. In order to extract spatial and temporal information, video material is also examined frame-by-frame. Precise data on ball trajectory and swing mechanics can also be obtained by utilizing motion tracking technologies and batsensors.The cornerstone for training and fine-tuning the prediction model is this extensive dataset, which enables the algorithm to precisely connect particular actions and situations with a variety of cricket shots.

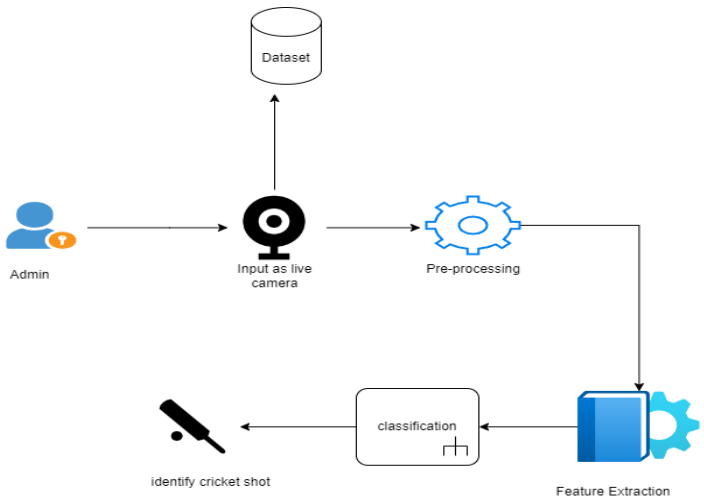

Fig.1 Flow of Proposed System

3.2 Mathematical Model

Let S be the Whole system S : (I,P,O)

- I-input
- P-procedure
- O-output

Input(I)

I = (Input as Live camera)

Where,

Live camera : for capturing players activity .

Procedure (P)

P = (I, Using I System perform operations and detect shots of cricket)

Output(O)

O = (System detect the players cricket shots.)

3.3 Algorithm

Linear regression

A basic machine learning approach for predicting numerical values based on input data is called linear regression. It makes the assumption that the characteristics and the target variable have a linear relationship. After learning which coefficients suit the data the best, the model is able to predict what will happen with new inputs. It is extensively used for activities including trend analysis, correlation investigation, and forecasting in many different domains.he cricket shot identification project employing LR algorithm can improve its capabilities, resolve existing issues, and make a contribution to the larger sports analytics and computer vision fields by concentrating on these upcoming improvements.

Define the problem: Identify the dependent variable and independent variables and determine if the problem is a binary classification problem.

Data preparation: Clean and preprocess the data, and make sure the data is suitable for logistic regression modeling.

Exploratory Data Analysis (EDA): Visualize the relationships between the dependent and independent variables, and identify any outliers or anomalies in the data. Feature Selection: Choose the independent variables that have a significant relationship with the dependent variable, and remove any redundant or irrelevant features.

Model Building: Train the logistic regression model on the selected independent variables and estimate the coefficients of the model.

Model Evaluation: Evaluate the performance of the logistic regression model using appropriate metrics such as accuracy, precision, recall, F1-score, or AUC-ROC.

Model improvement: Based on the results of the evaluation, fine-tune the model by adjusting the independent variables, adding new features, or using regularization techniques to reduce overfitting.

Model Deployment: Deploy the logistic regression model in a real-world scenario and make predictions on new data.

4.Results

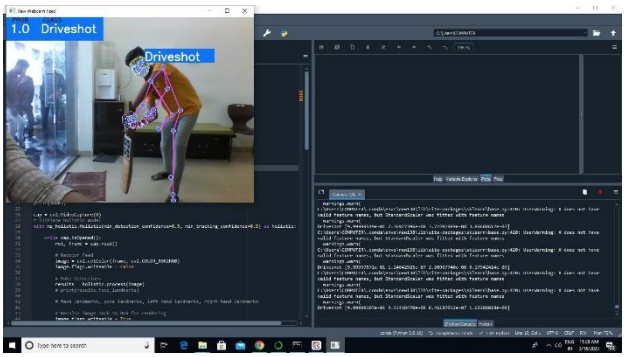

Fig.2 Driveshot

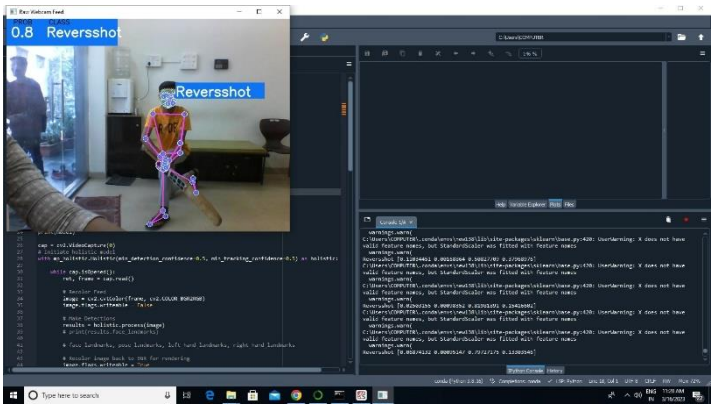

Fig.3 Revers shot

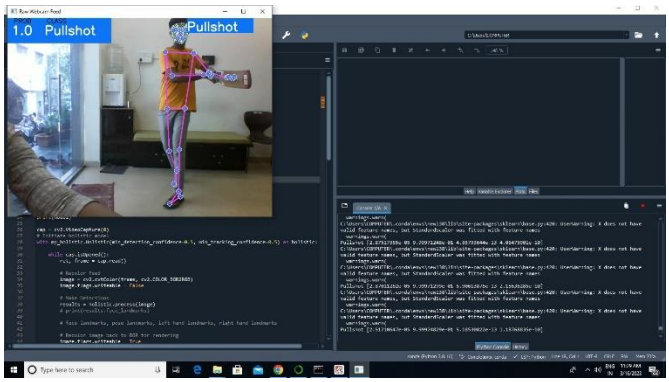

Fig.4 Pull shot

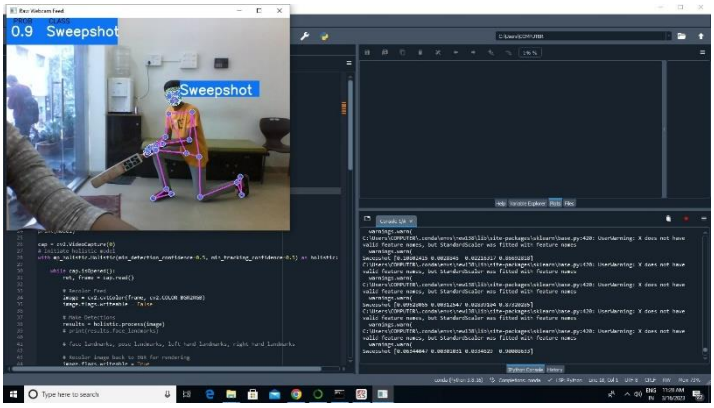

Fig.4 Sweep shot

Conclusion and Future Scope

Deep learning techniques are used in this research study's approach to automatically evaluate cricket strokes, yielding notably improved outcomes. The visual input from each cricket shot is used to powerLR in the described manner.A dataset including numerous distinct shots taken by a batsman is used to train LR. The dataset is preprocessed and then normalized before the preprocessed images are fed into the LR model for training. After training, the model is applied to test properly preprocessed and normalized input footage that hasn't been previously exposed to LR detection. The cricket shot assessment is performed by grouping the results in an efficient manner.

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