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Cricket Match Prediction Using Machine Learning and Deep Learning

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Abstract

A subset of artificial intelligence (AI) known as machine learning (ML) enables software applications to improve their accuracy at predicting outcomes without being explicitly programmed to do so. In order to predict new output values, machine learning algorithms take historical data as their input. It is a method for making predictions that is based on machine learning. Records and previous statuses are trained in all dimensions, and they cover all important factors like toss, home ground, captains, favorite players, opposition battles, and previous stats, among other things with varying strengths for each factor. In the end, our system displays the most accurate, best-suited algorithm's quantitative results. Also, it shows how well our algorithms predict the number of runs scored, which is one of the most important match outcome parameters.

Keywords: Cricket analysis, classification, a machine learning algorithm, and prediction.

Introduction

We are aware that machine learning is a feature of modern life. The scientific study of algorithms and statistical models that computer systems use to carry out particular tasks without being explicitly programmed is known as machine learning (ML). This briefing aims to provide an overview of the machine learning methods that are utilized in sports analysis, team prediction, and winning probabilities.

Deep learning and machine learning come into play here because humans are unable to quickly identify patterns in large amounts of data. It trains the model in accordance with the players' and teams' previous performance against the opposing team. Using machine learning, we will develop a system that can analyze the situation, examine past performances, and predict cricket matches' scores. As you are aware, winning in cricket depends on a lot of important things, like each opponent's weaknesses, bowlers and batsmen, the team's current overall form, and individual players. Deep learning score prediction is another component of our project. The best-suited, highest-accuracy algorithm in our system finally displays quantitative results that demonstrate the prediction of the winning team.

Machine Learning

In this system, machine learning is used to analyze and compare players' past histories, climate, and venue characteristics. Based on these characteristics, a prediction is made about which 11 player will be the best for a particular match. When it comes to selecting better players for that particular match, this analysis is extremely helpful.

Deep Learning

In this system, utilizing only a machine learning algorithm results in a moderate level of accuracy; consequently, we used deep learning, which performs significantly better than our previous model and takes into account the characteristics that are capable of producing accurate results.

Literature Survey

Table-1: Literature Survey Table

Sr. No.	Paper name	Advantages	Limitations
1.	Analyzing the performance of the Indian Cricket Team using Weighted Association Rule Mining	1.Accurate output 2.Easy to use interface	1. Requires high internet speed for working
2.	A Classification Based Tool to Predict the Outcome in ODI Cricket	1.Speed, Portability Efficient to use and easy interface.	1.Less Cost-efficient. 2.User needs to put correct data or else it behaves abnormally.
3.	CricAI: A Classification Based Tool to Predict the Outcome in ODI Cricket	1. Easy to use interface	1. Requires high internet speed for working

System Architecture

The client in the system's architecture can be any user requesting a prediction of the match's score. a dataset that provides the server with the necessary player data for processing. In contrast, the user sends the information to the server, which reads it, performs the prediction and analysis, and returns the results to the user.

At the very end, a variety of machine learning algorithms are used to make predictions, with a particular prediction model being used for both the actual prediction and the data preprocessing steps. Importing the dataset, cleaning the dataset, normalizing the attributes of the dataset, and getting the dataset ready for the next processing step are all parts of the data preprocessing process.

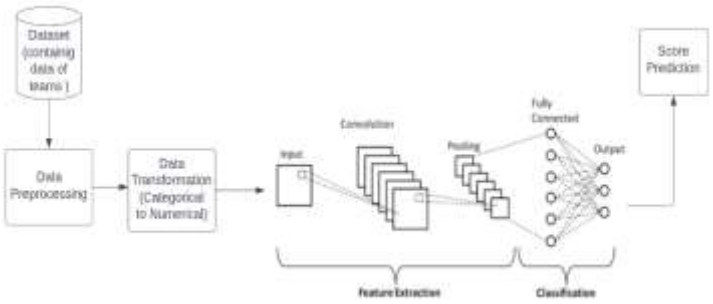

Fig.1: System Architecture

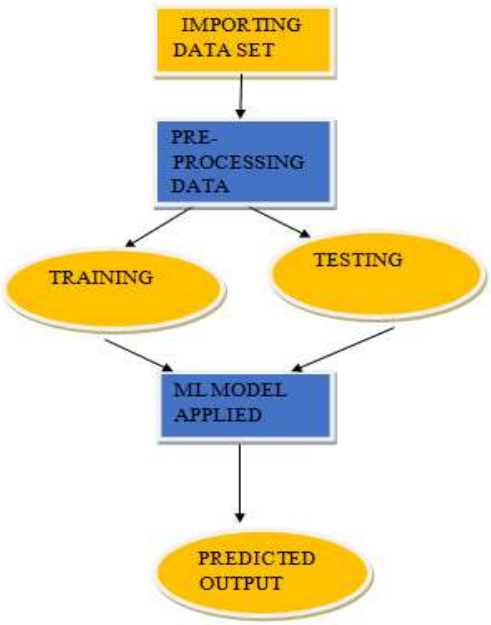

Fig. 2: Predictive system

UML Diagrams

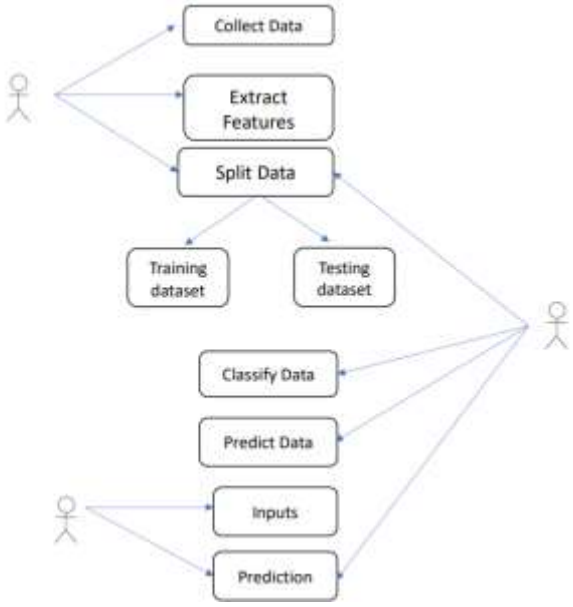

Fig. 3. Use case diagram

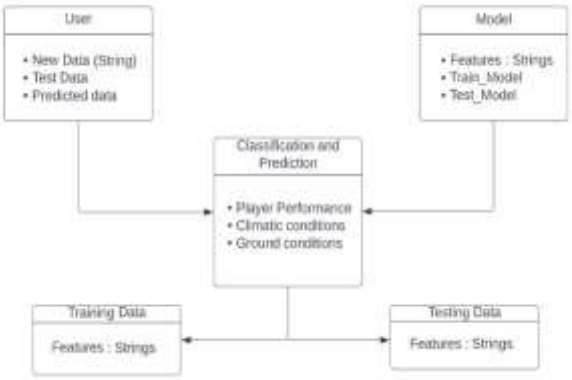

Fig. 4: Class diagram

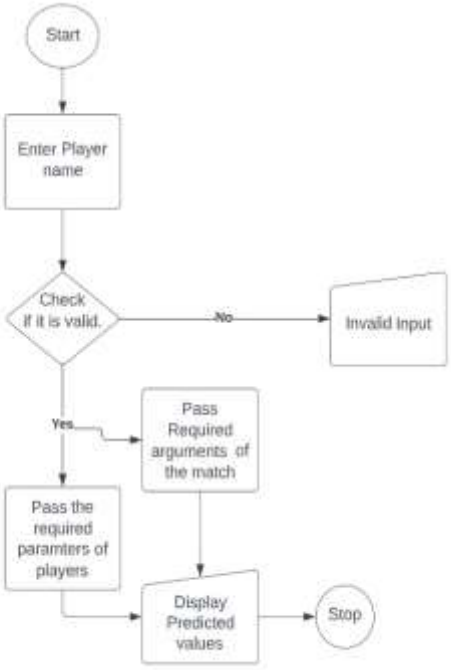

Fig. 5: Activity Diagram

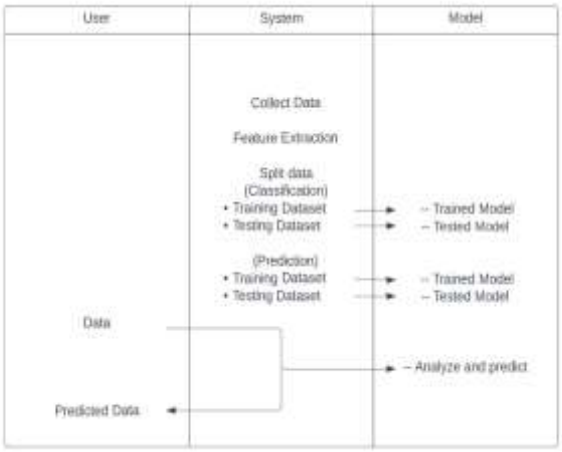

Fig. 6: Sequence diagram

Algorithm

Here, we discuss the entire algorithm used while developing the project.

A. Random Forest Regression

Random forest regression is a supervised learning algorithm that uses ensemble learning methods for regression. Ensemble learning methods combine predictions from multiple machine learning algorithms to produce more accurate predictions than a single model.

It contains various decision trees of different subsets of a dataset and takes the average for better predictive accuracy.

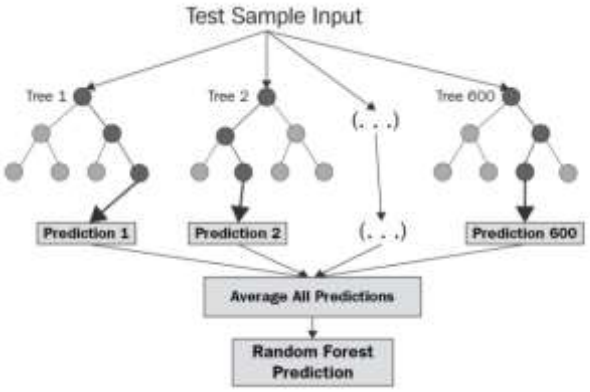

Fig. 8: Decision Tree

Steps Followed:

1. Randomly select k data points from the training set.
2. Construct a decision tree associated with these k data points.
3. Select the number N of trees to create and repeat steps 1 and 2.

4. For each new data point, it creates its own N-tree tree, predicts the y-value for that data point, and assigns one new data point to the average. Across all predicted y-values.

B. Deep Learning

Deep learning is part of a broader family of machine learning methods based on artificial neural networks with representation learning.

C. CNN model

It consists of three layers –

1.Convolutional layers - A number of filters (kernels) are used in the layer's parameters and can be visualized as neurons in the layer. They have weighted inputs and are based on input size (fixed square), also called receptive field. provide the output.

2. Pooling layers -the Pooling layer performs the function of reducing the spatial size of the Convolved Feature. This is to decrease the computational power required to process the data by reducing the dimensions.

3. Full-Connected Layers – The input to the fully connected layer is the output from the final Pooling or Convolutional Layer, which is flattened and then fed into the fully connected layer.

Conclusion

We analyzed and predicted scores of cricket matches with the help of Machine Learning and Deep Learning algorithms and compared the outcome of both the methods.

Acknowledgement

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