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IPL Score Prediction System using Machine Learning

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ABSTRACT: The Indian Premier League is one of the most viewed and highly competitive cricket leagues around the world. Hence, the prediction of the IPL score has much value to the enthusiasts, analysts, and every stakeholder in the cricketing ecosystem. This project has been designed to predict the scores of IPL matches using machine learning techniques on historical data and real-time match conditions. In this aspect, a rich dataset containing a number of match features helps us out with statistics from players, performance metrics from the teams, pitch conditions, and weather factors. Our methodology encompasses data preprocessing, feature selection, and using multiple machine learning algorithms like linear regression, decision trees, random forest, and gradient boosting. Predictive accuracy provides the metric utilized for the evaluation of models. There are many metrics used, including Mean Absolute Error and Root Mean Squared Error as indicators. Comparative analysis gives information about the strengths and limitations of each model; hence, it guides on the choice of the best algorithm that can be used in score prediction. Preliminary results are very promising in terms of accuracy and show the potential of machine learning in enhancing the predictability of IPL scores. This project hence offers great contributions toward sports analytics but lays a foundation for further research in predictive modelling for cricket and possibly other sport.

I. INTRODUCTION

The Indian Premier League has been the most-read and competitive cricket league in the world, thus laying millions of fans at the edge of their seats because of nail-biting matches or star-studded teams. Ability in predicting IPL scores holds a lot of potential. In this project, conduct and discuss a robust model in the prediction of IPL scores using machine learning techniques. Hence, we will look into the historic data of the matches and performance of each player, besides various match conditions, to understand what patterns and which factors peg the scoring dynamics of IPL matches. This has to be attained through the application of advanced algorithms, rigorous validation, and feature engineering in order to ensure the accuracy and reliability of predictions. The current project not only shapes part of the power of machine learning in sports analytics but also contributes to the growing literature available on predictive modelling in the context of cricket.

II. RELATED WORK

[1]. Since IPL is an outrageously expensive game, the demand for players receives filling in their pockets with an amount of more than $2 million per season. So, every player's performance and rating per season is the need of the hour. IPL data analysis can evaluate a batter or bowler's performance much more precisely. Machine learning algorithms profit from a huge amount of information and statistics involved in cricket to forecast the result of match. In this paper, the authors aim was to predict the winning probability of IPL cricket matches in every ball of an over while running the second inning. [2]. The paper will mainly aim to design a model to predict final score of the initial innings and the estimate of the outcome of match in the second innings for the limited overs cricket match. This can take into consideration such factors as the toss, the ODI ranking of the teams, and the home team advantage while making the predictions. There will be two different models—one for the initial innings and other for second innings using the Linear Regression classifier and Naive Bayes classifier respectively on the past matches have been proposed. Reinforcement algorithm will be used instead of linear regression.

[3]. This research paper provides an alternative to Run rate-based forecasting, which is widely used but ineffective. Agreed that our process is not as easy as the former one but preliminary results sure show potential. Our most accurate model uses the „ELU" activation function on the output layer and MeanSquareError as the loss function and outperforms the score forecasted by run rate. Our model produces RootMeanSquareError of 7.0 as compared to 18.11

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made by the run rate-based prediction. While both the models have many differences, they follow a similar error pattern achieving a minimum at around Over number 6 and elevated error past 14 Overs. While cricket has advanced by leaps and bounds, we are yet to find an accurate and efficient method for forecasting scores. Our approach shows promise, and with further research it could unseat the conventionally followed method. [4].In this paper prediction of a winner in a sport like cricket is especially challenging and involves very complex processes. But with the introduction of machine learning, this can be made much easier and simpler. In this paper, various factors have been identified that contribute to the results of matches in the Indian Premier League. Factors which are having a major impact on the outcome of an IPL match include the teams playing, the venue, the city, the toss winner and the toss decision. We have analysed IPL data sets and predicted game results based on player performance. The methods used in the work to obtain the final test are as follows: Logistic regression, Support Vector Machine.[5].In this paper even after in depth studying the features and keeping in mind all conditions and factors for any particular match, we can't say anything with surety regarding the result of a match because we don't have much data yet for the machine to be trained on [as only few thousand matches were played in total yet]. Some nations are relatively newer to start playing international level cricket, so very little data is available for them. But we will try to maximize the accuracy of our prediction using suitable approaches even with a limited amount of data. Also, a single algorithm can produce different results for multiple features and multiple datasets. Each algorithm has its own advantages and disadvantages. We noticed that, compared to others, neural network has the highest; it provides accuracy in most of the cases, but it needs a huge data set to train the neural network model, so it is considered as an expensive technique. Feature and dataset selection directly impacts the performance of the model.

III. PROPOSED SYSTEM

The proposed IPL score predictor has the motive of revolutionizing current methodologies of all working modules with advanced machine learning techniques and comprehensive data analytics. It will have an enriched dataset consisting of historical statistics of the matches, player performance metrics, pitch conditions, weather data, and contextual variables, coupled at its core with state-of-the-art algorithms such as ensemble methods and deep learning models, along with feature engineering techniques. It will then be able to learn the complicated patterns and interactions invariant in the data, hence improving the prediction accuracy of the system. Further, owing to its real-time update and adaptive learning features, it will continue to remain responsive to the match dynamics, which go on changing; hence, it is going to be reliable during the whole tournament. The proposed system uses the popular machine learning algorithms like Random Forest, Decision tree and Neural network.

Advantages of Proposed system:

- Enhanced prediction accuracy
- Robust handling of features
- Flexibility and adaptability
- Feature importance analysis
- Scalability

IV. RESULTS

The following algorithms gave the respective accuracy and mean absolute error when tested against the dataset.

1. Decision Tree Regressor
This model gives an Accuracy of 72.09% and an MAE of 11

2. Linear Regression
This model gives an accuracy of 52% and an MAE of 15

3. Random Forest
This model gives an accuracy of 82.24% and an MAE of 7.82

4. Neural Networks Regression
This model gives an accuracy of 76.8% and an MAE of 11

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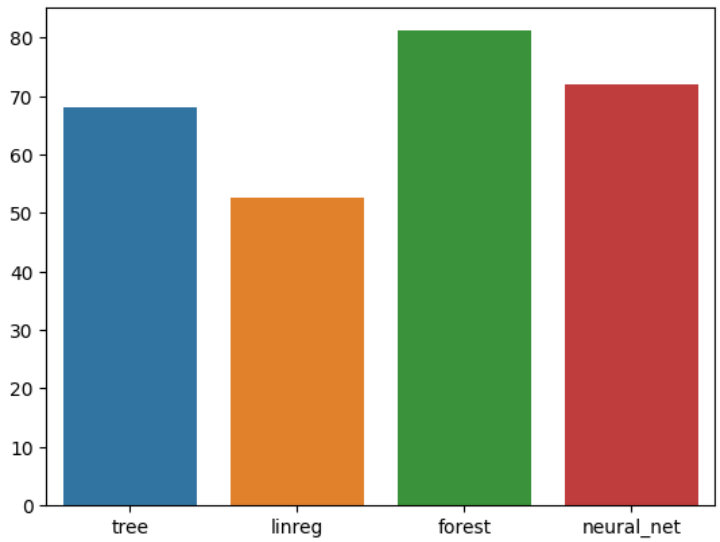

V. CONCLUSION AND FUTURE WORK

Prognostication of the IPL score as a system is one giant leap in the application of machine learning in sports analytics. This project was able to prove that historical data from the IPL and sophisticated machine learning algorithms can determine a cricket game's score. Several big constituents of it addressed for this project in development concern data collection with preprocessing, model development, web interface integration, and rigorous testing. Some of the major achievements associated with the IPL score predictor system are enumerated. The system makes efficient use of large historic data of IPL matches from Kaggle.com, processing, and feature engineering to have a very strong dataset to be trained under the model. The implementation and testing of different machine learning algorithms for the project in aspects like Decision Tree, Linear Regression, Lasso regression, Random Forest, and ANN randomly resulted in accuracy of 84% for the Random Forest. A user-friendly web-based interface using Flask has been designed for the system; the user will be able to input the details of the match and easily take out an expected Score prediction. Thorough Testing: The system has been tested rigorously with respect to its reliability, meeting specified requirements, and turning in a satisfactory user experience. The IPL Score Prediction System, all put together, is a decision support key to cricket analysts, teams, and cricket enthusiasts in general, aiding their decision-making process in different aspects and enhancing their understanding of the game.

While the IPL Score Prediction has met the primary objectives that it was set for, there are a host of areas in which future enhancement can be done for improving the accuracy, usability, and applicability of the system. Following enhancements are proposed:

1. Integration of Real-Time Data
Currently, it works on historic data. It can be improved by using real-time data in conjunction with historical data, comprising live match update, player performance during the match, and real-time weather conditions. This will help the system in changing its predictions dynamically as the match changes.

2. Advanced Feature Engineering
Advanced feature engineering techniques can be implemented for further performance improvements. Features capturing information about player form, psychological factors, context—such as a high-pressure situation or crowd support—can be added to give a holistic view that will aid in making accurate predictions.

3. Use ensemble learning
Although the Random Forest algorithm has returned very good results, the use of other ensemble learning techniques will help pool different models and probably give better results. Stacking, Boosting, and Bagging are some of the methods that might be studied to achieve a more robust predictive model.

4. Generalizing to Other Formats of Cricket
The system this project will design is based on IPL T20 matches. Expanding the model toward the prediction of more games of different formats—ODI cricket and Test matches—will give the system more scope and applicability. This

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actually would result in fine-tuning the feature set and model parameters for these formats.

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