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PREDICTINGTHEACCURACY OFPLAYERSINTHECRICKETUSING MACHINE LEARNING ALGORITHMS

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ABSTRACT

Cricket is a widely followed sport, and the performance evaluation of players is crucial for team selection, strategy formulation,andtalentscouting.Traditionalevaluationmethodsrelyonhistoricalstatisticsandexpertjudgment,whichmay not fully capture a player's potential. In order to more accurately forecast and assess cricket players' performance, this study suggests a framework based on machine learning. To assess important performance measures including batting average, bowling economy, strike rate, and fielding efficiency, the research delves into several machine learning methods, including regression models, decision trees, ensemble learning techniques, and deep learning approaches.. The dataset consists of historical match data, player attributes, and contextual factors such as pitch conditions, weather, and opposition strength. Feature engineering techniques and model optimization strategies are applied to enhance predictive accuracy. Experimental results demonstrate that the proposed approach provides reliable performance predictions, outperforming traditional statistical methods.Thisworkcontributestosportsanalyticsbyofferingdata-driveninsightstocoaches,analysts,andselectors,thereby improving decision-making in cricket.

1. INTRODUCTION

Data analytics are becoming more important in cricket, one of the most watched sports in the world, for making strategic decisions, evaluating performances, and selecting players. There are a lot of biases and inefficiencies in the way that traditional methods of evaluating player performance rely on subjective expert judgments and historical records. These approaches also don't take into consideration the ever-changing nature of match circumstances like pitch type, weather, and opponent strength. Machine learning (ML) methods provide a data-driven strategy for improved evaluation and prediction of cricket players' performances, made possible by the rise of AI and sophisticated analytics. In contrast to more conventional statistical approaches, machine learning models can sift through mountains of data, both historical and real-time, in search of previously unseen connections and patterns. Models like this use KPIs like batting average, bowling economy, strike rate, and fielding efficiency to foretell how a player will perform in upcoming games. On top of that, ML algorithms may take into account things like format of the contest, circumstances of the site, and fitness levels of the players to enhance the accuracy of predictions. The overarching goal of this study is to create a machine learning system that can accurately anticipate and assess cricket players' performances. In order to find the best prediction model, we investigate several ML methods, such as decision trees, ensemble techniques, regression models, and deep learning approaches. For optimal performance, the research used sophisticated feature engineering methods and hyperparameter tweaking. By providing a data-driven, objective method for evaluating players, scouting for talent, and making long-term plans, this study adds to the field of sports analytics. Here is how the remainder of the paper is organized: Section 2 delves into the relevant research on machine learning and cricket analytics. Data gathering, preprocessing, feature selection, and model execution are all detailed in Section 3. The analysis and results of the experiments are presented in Section 4, which compares the predicted accuracy of various models. Key results and possible areas for future study are presented in Section 5, which ends the work.

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2. EXISTINGSYSTEM

The current system for predicting cricket player performance relies on past records and expert opinions, which can be biased and inaccurate. Traditional statistical models cannot adapt to real-time factors like pitch conditions, weather, or opposition strength. This makes it difficult for teams to predict player performance accurately during matches. Machine learning offers a better approach by analyzing large amounts of data and adjusting predictions in real time for more precise player evaluations.

DISADVANTAGESOFEXISTINGSYSTEM

- **LimitedAccuracy**–Traditionalmethodsrelyonpast statistics and do not consider real-time factors like pitch conditions, weather, and opposition strength, making predictions less reliable.
- **Lack of Adaptability** – Existing models cannot update predictions dynamically based on live match data, reducingtheirusefulnessforreal-timedecision-making.
- **Bias in Expert Opinions** – Player evaluations often depend on subjective judgments, leading to inconsistencies and potential biases in performance assessment.

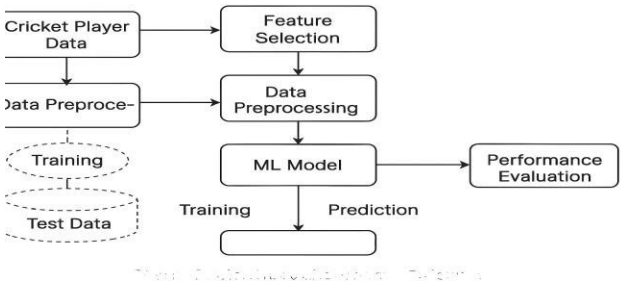
3. PROPOSEDSYSTEM

The proposed system uses machine learning algorithms to predict cricket players' performance with greater accuracy by analyzing historical data and real-time factors. It considers multiple parameters such as player statistics,pitchconditions,weather,oppositionstrength, andmatchformatstogeneratemorereliablepredictions. Advanced techniques like feature engineering, hyperparameter tuning, and deep learning models enhance prediction accuracy and adaptability. The systemcontinuouslyupdatespredictionsusingreal-time data, helping teams make better decisions for player selection, strategy formulation, and in-match adjustments.

ADVANTAGESPROPOSEDSYSTEM

- I**Higher Accuracy** – Machine learning models analyze multiple factors, including real-time data, to provide more precise player performance predictions.
- **Real-Time Adaptability** – The system updates predictions dynamically based on live match conditions, improving decision-making during games.
- **Data-Driven Decision Making** – Eliminates bias from expert opinions by relying on statistical patterns and historical data analysis.
- **Comprehensive Analysis** – Considers various factors suchaspitchconditions,weather,oppositionstrength,and match format for better insights.

4. SYSTEMARCHITECTURE



Thesystemarchitectureforpredictingtheaccuracyofplayersin cricket using machine learning follows a structured pipeline, beginning with data collection. Cricket player statistics are gathered from various sources such as Kaggle datasets, ESPN Cricinfo, Cricbuzz APIs, and ICC records. This data includes matchhistory,battingandbowlingrecords,strikerates,average runs, wickets, player fitness levels, and even real-time game updates. Once collected, the raw data undergoespreprocessing, wheremissingvaluesarehandled,inconsistenciesarecorrected, andtransformationslikenormalizationandcategoricalencoding are applied. Feature selection techniques such as Principal ComponentAnalysis(PCA)andcorrelation-basedfilteringhelp in identifying the most relevant attributes for accurate predictions. Feature engineering plays a crucial role in enhancing model accuracy by extracting key insights like player form, home vs. away performance, opponent-specific strengths, recent match trends, and match conditions. Advanced techniques such as time-series analysis and rolling averages are utilized to track performance over time. The processed and engineered data is then fed into machine learning models, where algorithms such as Random Forest, XGBoost, Decision Trees, Support Vector Machines (SVM), and Neural Networks are employed. The dataset is divided into training, validation, and test sets.

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