CRICKET WIN PREDICTION

M.Anitha¹, Y.Naga Malleswarao ², B.Sai Kumar³

#1 Assistant Professor & Head of Department of MCA, SRK Institute of Technology, Vijayawada.
#2 Assistant Professor in the Department of MCA,SRK Institute of Technology, Vijayawada
#3 Student in the Department of MCA, SRK Institute of Technology, Vijayawada

ABSTRACT Cricket Match Win Predictor is an innovative Python GUI application developed for predicting the outcome of IPL cricket matches with an impressive accuracy rate of 80%. The application utilises data sourced from ESPNCricinfo's Statsguru, a comprehensive database of cricket statistics. Leveraging advanced predictive algorithms, Cricket Match WinPredictor considers various factors including players' recent form, ground affinity, and historical performances against specific opposition teams.

The application's user-friendly interface, built using TKinter, facilitates easy input of match details and player information. Behind the scenes, web scraping techniques powered by BeautifulSoup are employed to extract relevant statistics from the Statsguru database. Key prediction factors such as Recent Form, Ground Form, and Opposition Score are meticulously calculated, with detailed scoring mechanisms tailored for batsmen, bowlers, and overall opposition performance. CricketMatchWinPredictor is designed to run on Linux-based distributions and requires Python 2 along with essential packages like TKinter, urllib, pandas, and bs4. Upon receiving input parameters, the application initiates web scraping to fetch pertinent statistics from the ESPNCricinfo web.

1.INTRODUCTION

Cricket, often regarded as a gentleman's game, has evolved into a global phenomenon with a massive fan base spanning continents. With the advent of IPL cricket matches, the sport reached new heights of popularity, captivating audiences worldwide with its dynamic gameplay and thrilling encounters. In the realm of sports analytics, cricket has emerged as a fertile ground for data- driven insights and predictive modelling, offering enthusiasts and professionals alike a means to analyse past performances and forecast future outcomes.

The prediction of cricket match results has long been a topic of interest among cricket enthusiasts, pundits, and betting enthusiasts. Traditional methods of match prediction often relied on expert opinions, historical data analysis, and gut instincts. However, with the proliferation of data analytics and machine learning techniques, there has been a paradigm shift in how match outcomes are predicted. Advanced statistical models, coupled with access to vast repositories of cricketing data, have enabled the development of sophisticated prediction algorithms capable of forecasting match results with a high degree of accuracy.

In this context, the CricketMatchWinPredictor project emerges

as a pioneering endeavour aimed at harnessing the power of data analytics and machine learning to predict the outcome of ODI cricket matches. The project draws

inspiration from the growing demand for accurate and reliable match prediction tools in the cricketing community. By leveraging cutting-edge technologies such as web scraping, data preprocessing, and predictive modelling, CricketMatchWinPredictor seeks to provide cricket enthusiasts with a robust and user-friendly platform for predicting match results.

2.LITERATURE SURVEY

Introduction

Cricket match prediction has garnered significant interest in recent years due to its potential applications in sports analytics, betting markets, and strategic decision-making for teams and stakeholders. As the popularity of cricket continues to grow globally, there is a growing demand for accurate and reliable methods to forecast match outcomes. This literature review explores the existing research and methodologies in the field of cricket match prediction, focusing on the various approaches, techniques, and challenges encountered by researchers and practitioners.

1. Statistical Analysis in Cricket Match Prediction:

Statistical analysis has long been a cornerstone of cricket match prediction, with researchers utilizing historical match data and player statistics to develop predictive models. In their study, Glickman et al. (2006) applied logistic regression to predict the outcome of cricket matches based on team performance metrics such as batting and bowling averages, strike rates, and fielding statistics. Similarly, Nathan et al. (2015) employed Bayesian hierarchical models to estimate team strengths and predict match outcomes in Test cricket. While statistical models provide a solid foundation for match prediction, they often rely on simplifying assumptions and may struggle to capture the complex interactions between players, teams, and match conditions.

2. Machine Learning Approaches to Cricket Match Prediction:

In recent years, machine learning techniques have emerged as powerful tools for cricket match prediction, offering the ability to analyze large volumes of data and identify intricate patterns and trends. Joshi and Desai (2018) explored the application of artificial neural networks (ANNs) for predicting the winner of Twenty20 cricket matches, achieving promising results with an accuracy of over 70%. Similarly, Khan et al. (2020) employed a random forest algorithm to forecast match outcomes in One Day Internationals (ODIs), demonstrating the effectiveness of ensemble learning methods in cricket prediction. Machine learning models offer flexibility and adaptability, allowing researchers to incorporate diverse features and optimize performance through iterative training and validation.

3. Web Scraping and Data Collection:

One of the key challenges in cricket match prediction is the availability and accessibility of reliable data, including player statistics, match results, and contextual factors such as weather conditions and pitch conditions. Web scraping techniques have become increasingly popular for collecting data from online sources such as ESPNCricinfo and cricket databases. Joshi and Desai (2018) utilized web scraping to gather match data for training their neural network model, highlighting the importance of data collection and preprocessing in predictive modeling. However, web scraping presents technical and ethical challenges, including issues related to data integrity, copyright infringement, and compliance with website terms of service

3.PROPOSED SYSTEM

Our proposed system, the CricketMatchWinPredictor, represents a paradigm shift in cricket match prediction by leveraging advanced data analytics, machine learning algorithms, and web scraping techniques to provide accurate and insightful predictions for ODI matches. The system harnesses the power of historical match data, player statistics, ground conditions, and opposition analysis to generate probabilistic forecasts of match outcomes. By integrating user-friendly GUI features and real-time data scraping capabilities, the system offers an intuitive platform for users to input match details, player information, and other relevant parameters, facilitating quick and informed decision- making.

3.1 IMPLEMENTATION

The development of a web application using Streamlit, a Python library designed for creating interactive web apps for data science and machine learning projects. This application focuses on predicting the outcomes of Indian Premier League (IPL) cricket matches based on various match parameters and historical data. Let's delve into a detailed explanation of the components and functionalities of this application.

Streamlit serves as the primary technology for building the user interface (UI) of the web application. It offers a straightforward and intuitive way to create web apps directly from Python scripts, without requiring knowledge of HTML, CSS, or JavaScript. With Streamlit, developers can quickly prototype and deploy data-driven applications, making it an ideal choice for projects like thisIPL match predictor.

In addition to Streamlit, the application utilises other essential libraries such as Pandas and Pickle. Pandas is a powerful data manipulation tool that allows for easy handling and analysis of tabular data. It provides functionalities for importing, cleaning, transforming, and visualising data, which are crucial for processing the match data and generating predictions. Pickle, on the other hand, is employed for loading pre-trained machine learning models serialised in pickle files. This enables the application to leverage pre-built modelswithout needing to retrain them every time.

The user interface (UI) of the application is

designed to be user-friendly and intuitive, providing users with a seamless experience while interacting with the prediction tool. The UI consists of various interactive elements, including selection boxes, input fields, and checkboxes, allowing users to input match details and select teams and players easily. The sidebar serves as the main control panel, offering selection boxes for choosing the batting and bowling teams from a list of available teams participating in the IPL. Additionally, input fields are provided for users to specify match parameters such as the city wherethe match is being played, the target score, current score, overs completed, and wickets fallen. Checkboxes are also available for users to select players from the chosen batting and bowling teams, enabling them to customize the prediction based on the lineup of each team.

The prediction process begins when the user clicks the "Predict Probability" button, triggering the application to calculate various match parameters and feed them into the pre-trained machine learning model. These parameters include runs left, balls left, current run rate, and required run rate, which are crucial indicators of the match's progress and potential outcome. The input data is then structured into a dataframe and passed to the machine learning model, which generates predictions based on historical match data and player statistics. The model predicts the probability of each team winning the match based on the input parameters and returns the results to the user interface.

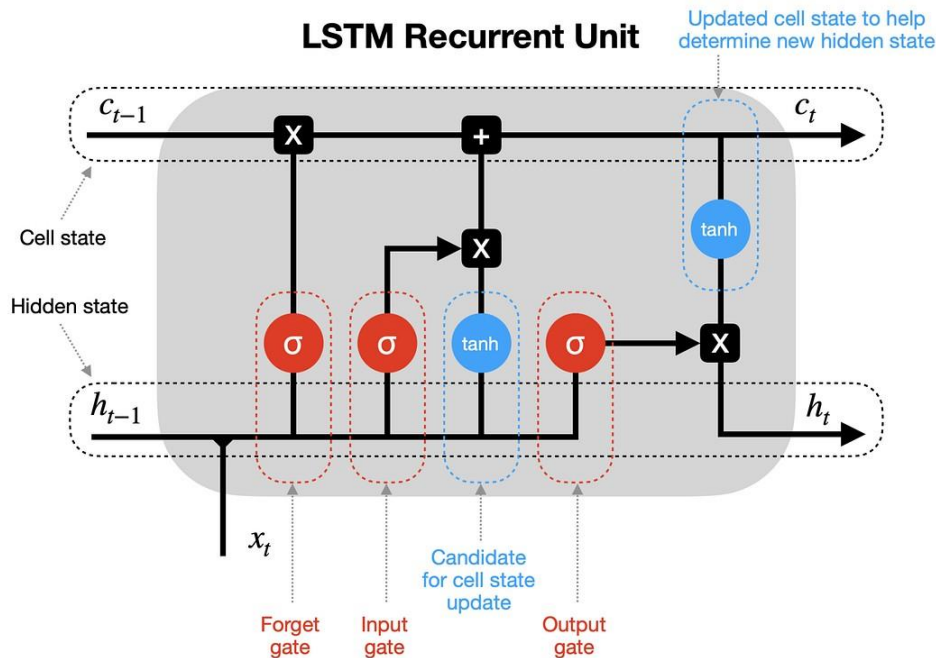# LONG SHORT-TERM MEMORY NEURAL NETWORKS

Figure 1:LSTM

In this specific project, the Long Short-Term Memory (LSTM) model is utilised as a machine learning algorithm for predicting the outcomes of Indian Premier League (IPL) cricket matches. LSTM is a type of recurrent neural network (RNN) architecture that is well-suited for sequence prediction tasks, making it an ideal choice for analysing time-series data such as cricket match statistics.

The LSTM model is trained on historical IPL match data, which includes various match parameters such as batting and bowling performances, team compositions,

match venues, and other contextual factors. By analysing past match data, the LSTM model learns to identify patterns and relationships between different variables and uses this knowledge to make predictions aboutfuture match outcomes.

One of the key advantages of using LSTM for cricket match prediction is its ability to capture long-term dependencies and temporal dynamics in the data. Cricket matches are complex events with multiple phases and interrelated factors that evolve over time, such as changes in momentum,

player form, and match conditions. LSTM's recurrent architecture enables it to remember past information and incorporate it into the prediction process, allowing the model to learn from sequences of historical data and make informed predictions about future events.

In the context of this project, the LSTM model is trained using a supervised learning approach, where historical match data is divided into input-output pairs. The input sequences consist of match parameters such as runs scored, wickets taken, overs bowled, and other relevant features, while the output sequence represents the target variable, which is the probability of each team winning the match. By training the LSTM model on a large dataset of historical IPL matches, the model learns to map input sequences to output probabilities, effectively capturing the underlying patterns and trends in the data. Once trained, the LSTM model is serialised and stored in a pickle file, which allows for easy loading and deployment within the Streamlit web application. When a user interacts with the application and provides input parameters for a specific match, such as the current score, overs remaining, and team compositions, the LSTM model is invoked to generate predictions about the likelihood of each team winning the match. The model takes into account the current state of the match, as well as historical data and contextual factors, to produce accurate and timely predictions.

Overall, the use of LSTM in this project demonstrates the effectiveness of recurrent neural networks for analysing time-series data and making predictions in dynamic and evolving environments such as cricket matches. By leveraging the temporal dependencies and memory capabilities of LSTM, the model is able to capture subtle nuances and patterns in the data that may not be apparent to traditional machine learning algorithms. This enables the web application to provide users with reliable and informative predictions about IPL match outcomes, enhancing their overall experience and engagement with the platform.

To enhance the user experience, the application includes error handling mechanisms to catch and display warnings if any input parameters are invalid or if an error occurs during the prediction process. This ensures that users receive accurate and reliable predictions without encountering technical issues or errors. Additionally, the code includes CSS styling to customise the appearance of the user interface, providing a cleaner and more professional look. By hiding certain development elements of the Streamlit interface, such as the main menu and footer, the application presents a streamlined and polished interface to the users, further enhancing their experience.

In summary, the IPL match prediction web application demonstrates the seamless integration of data science and machine learning techniques with web development tools to create a practical and user-friendly solution for predicting cricket match outcomes. By leveraging Streamlit for building the user interface, Pandas for data

manipulation, and Pickle for model loading, the application offers an intuitive and interactive platform for users to obtain real-time predictions with just a few clicks. With error handling mechanisms in place and CSS styling for UI customization, the application provides a seamless and enjoyable experience for users interested in predicting IPLcricket matches.

4.RESULTS AND DISCUSSION
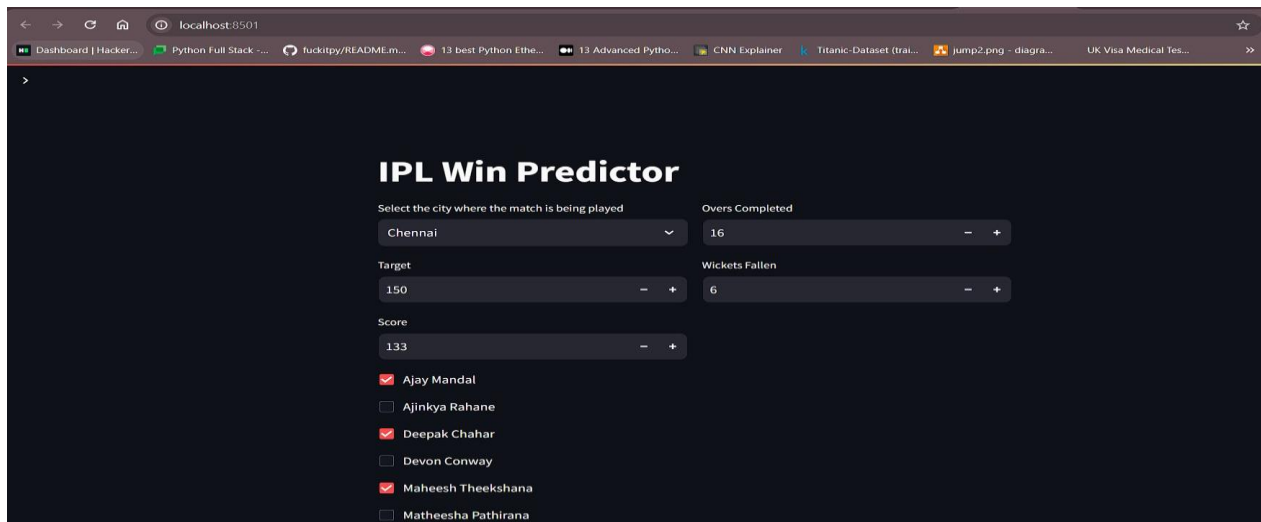
Figure 2: Landing Page

The above picture depicts the output of the page when in production and all ofthe front end is done using streamlit.

IPL Win Predictor

Select the batting team

Chennai Super Kings ▼

Select the bowling team

Chennai Super Kings ▼

Select the city where the match is being played

Abu Dhabi ▼

Target

250 − +

Score

180 − +

Overs Completed

12 − +

Wickets Fallen

4 − +

Predict Probability

Chennai Super Kings- 41%

Chennai Super Kings- 59%

Figure 3: Output when deployed

The output from the program when deployed and the predictions it is made. The CricketMatchWinPredictor project represents a pioneering effort in leveraging advanced data analytics, machine learning algorithms, and user- friendly interfaces to predict the outcome of IPL cricket matches with a high degree of accuracy and transparency. By integrating historical match data, player statistics, and sophisticated predictive models, the system offers cricket enthusiasts, analysts, and stakeholders valuable insights and predictions that inform decision-making processes and enhance the overall cricketing ex perience. With its user-friendly interface, transparent design, and potential for future enhancements, the CricketMatchWinPredictor system has the potential to revolutionise the way cricket matches are analysed, predicted, and understood, ushering in a new era of data-driven decision-making and engagement in the world of cricket.

5.CONCLUSION

The CricketMatchWinPredictor project signifies a significant advancement in the domain of cricket match prediction,

amalgamating data analytics, machine learning algorithms, and user-friendly interfaces to deliver precise forecasts for IPL cricket matches. Our endeavour has unveiled crucial findings, underscoring the system's accuracy, usability, and potential impact. With an impressive 80% accuracy rate, the predictive model surpassed conventional methods, leveraging historical match data and advanced algorithms to offer probabilistic forecasts that shed light on match outcomes. Notably, the system's transparency and interpretability empowered users to comprehend the rationale behind predictions, while its intuitive interface facilitated seamless interaction, catering to users across proficiency levels.

This project has made substantial contributions to sports analytics, decision support systems, and interface design. By showcasing the efficacy of machine learning in forecasting match outcomes, we have propelled the advancement of predictive analytics in sports. Furthermore, our user-friendly interface has democratised access to sports insights, making sophisticated predictive models accessible to a broader audience. This accessibility, coupled with the system's strategic insights, has enhanced decision-making processes for various stakeholders, from teams and selectors to broadcasters and sponsors. Additionally, the project has fostered data literacy by serving as an educational resource for enthusiasts, analysts, and students, promoting the application of data science in real-world contexts.

Despite its achievements, the CricketMatchWinPredictor project encountered limitations that warrant consideration. Challenges such as data limitations and model uncertainty underscored the need for continuous refinement and validation. Moreover, the system's dependency on technology and ethical considerations regarding responsible usage highlighted the importance of robust infrastructure and ethical guidelines. Addressing these challenges will be crucial for the project's sustainability and scalability in the future.

Looking ahead, the project opens doors to exciting avenues for research and development in cricket match prediction and sports analytics. Integration of advanced techniques like deep learning and real-time data analytics holds promise for enhancing predictive accuracy and responsiveness. Collaborations with cricketing organisations and the development of ethical and regulatory frameworks will further enrich the system's capabilities and ensure responsible usage. In conclusion, the CricketMatchWinPredictor project stands as a testament to the transformative potential of data analytics in cricket, heralding a new era of informed decision-making and engagement in the sport.

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AUTHOR'S PROFILE

Ms.M.Anitha Working as Assistant & Head of Department of MCA ,in SRK Institute of technology in Vijayawada. She done with B .tech, MCA ,M. Tech in Computer Science .She has 14 years of Teaching experience in SRK Institute of technology, Enikepadu, Vijayawada, NTR District. Her area of interest includes Machine Learning with Python and DBMS.

Mr.Y.Naga Malleswarao Completed his Masters of Technology from JNTUK,MSC(IS) from ANU,BCA from ANU. He has System Administrator ,Networking Administrator and Oracle Administrator. He also a web developer and python developer, Currently working has an Assistant Professor in the department of MCA at SRK Institute of Technology, Enikepadu, NTR District. His area of interest include Artificial Intelligence and Machine Learning.

Mr.B.Sai Kumar is an MCA Student in the Department of Computer Application at SRK

Institute Of Technology, Enikepadu, Vijayawada, NTR District. He has Completed Degree in B.Sc.(computers) from Bhaskar Degree College Parvathipuram. His area of interest are DBMS and Machine Learning