COMPREHENSIVE CRICKET LEAGUE ANALYTICS AND DATA VISUALIZATION

This project report is submitted to
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in the partial fulfilment of the requirement for the award of the degree of

Bachelor of Technology in Computer Technology

by

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CERTIFICATE

This is to certify that the project report entitled **'Comprehensive Cricket League Analytics And Data Visualization'** carried out by Ms. Shravani Chakinarapuwar (CT22081), Mr. Rudraksh Mahurpwar (CT22027), Mr. Ashwajit Surkar (CT22053), Ms. Kesar Tandulkar (CT22083) and Mr. Akash Shelke (CTD22115) of B.Tech. third year of Computer Technology, during the academic year 2024-2025, in the partial fulfilment of the requirement for the award of the degree of **Bachelor of Technology (Computer Technology)** offered by the **Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.**

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ABSTRACT

Cricket has evolved into a data-driven sport, with teams, analysts, and fans relying on statistical insights to evaluate performance, strategize gameplay, and enhance decision-making. Comprehensive Cricket League Analytics And Data Visualization, developed using Power BI, to provide an interactive, dynamic, and visually appealing analysis of cricket statistics. The dashboard integrates structured datasets from Kaggle and Cricsheets, covering match details, ball-by-ball events, player statistics, and team performances.

The system follows a structured workflow involving data collection, pre-processing, transformation, and visualization. Power Query is used for data cleaning and structuring, while DAX (Data Analysis Expressions) enables advanced calculations such as net run rate, win percentage, and batting strike rates. The dashboard offers multiple interactive features, including filters, slicers, drill-through reports, and tooltips, allowing users to explore team and player performances across different IPL seasons.

Through various analytical layers, the project uncovers key insights into win trends, impact of toss decisions, highest-scoring matches, best batting and bowling performances, and more. The implementation of dynamic visualizations ensures that users can seamlessly navigate across team-based, player-based, and match-based insights. The findings from the dashboard empower data-driven decision-making for teams, analysts, and cricket enthusiasts.

The project sets the foundation for future enhancements, including real-time match data integration, predictive analytics for match outcomes, and expansion to other cricket leagues. By leveraging business intelligence tools, this project demonstrates how cricket analytics can be transformed into an engaging and insightful experience.

KEYWORDS: Cricket analytics, Data visualization, Power BI, IPL performance, team performance, DAX, match analysis, win trends, batting strike rates.

CONTENTS

ABBREVIATIONS

Abbreviations	Description
IPL	Indian Premier League
CSV	Comma Separated Values (Data File Format)
API	Application Programming Interface
ETL	Extract, Transform Load (Data Processing Workflow)
BI	Business Intelligence
KPI	Key Performance Indicator
GUI	Graphical User Interface
UI/UX	User Interface/User Experience
DAX	Data Analysis Expressions (Power BI Formula Language)
VAR	Variable in DAX for Storing Intermediate Calculation
DF	DataFrame (Data Structure in Pandas)
NaN	Not a Number (Missing Values in Data)
SQL	Structured Query Language

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CHAPTER 1
INTRODUCTION

1.1 Preamble

Cricket is a sport rich in history, passion, and statistical depth, captivating millions around the world. Over the years, the game has not only evolved in terms of playing techniques and strategies but also in how it is analysed and understood. With the advent of data analytics, cricket has transitioned into a sport where every run, wicket, partnership, and even minute player action is meticulously analysed to gain deeper insights into individual performance and team strategies. The shift towards data-driven decision-making has become integral to the modern approach to the game, enhancing how coaches, analysts, and players strategize and perform. What was once driven by instinct and experience has now become an era of precise calculations, predictions, and strategies based on data.

The increasing complexity and volume of cricket data have led to a heightened demand for advanced analytical tools that can handle vast datasets and translate them into actionable insights. This evolution has created a need for more sophisticated platforms that go beyond traditional scorecards and match reports. While conventional cricket statistics offer basic insights, they fail to provide the depth and interactivity needed for detailed analysis. Traditional formats tend to present data in static tables or charts, making it challenging for users to compare performances, detect emerging patterns, or forecast future outcomes with confidence.

Despite the availability of vast amounts of cricket data from various sources, much of it remains underutilized or ignored due to the lack of effective and efficient visualization platforms. Current analytics solutions often focus on simple reporting, missing out on providing in-depth tools that allow users to actively engage with the data, explore trends, and make informed decisions. This gap in advanced visualization and analysis tools in cricket limits the potential to fully harness the power of data in enhancing team strategies and individual player performance.

Comprehensive Cricket League Data Analytics and Visualization, aims to address this challenge by leveraging the capabilities of Power BI to create an interactive and user-friendly dashboard system. The goal is to create an integrated platform that not only organizes and visualizes raw cricket data but also empowers users to explore it in a

dynamic and insightful manner. By integrating multiple datasets, efficiently cleaning and structuring data, and applying advanced analytical techniques, the dashboard will allow users to interact with cricket statistics seamlessly. Users will be able to analyse player consistency, team form, match results, and much more, with the flexibility to filter, drill down, and compare key metrics in real-time.

The system will offer an enhanced understanding of key performance indicators (KPIs) such as batting and bowling averages, strike rates, economy rates, and win-loss records. These metrics will be presented in an interactive format, allowing for deeper exploration of the data and offering insights that were previously inaccessible or difficult to interpret. The project is designed not only to enhance the analytical capabilities of cricket teams, coaches, and analysts but also to provide fans and enthusiasts with a deeper, more engaging experience of the sport.

The system is designed for scalability, allowing it to adapt to different cricket leagues and evolving data needs. It will support future enhancements, such as real-time data feeds and advanced predictive analytics, to improve decision-making. The goal is to revolutionize how cricket statistics are explored and understood.

In an era where big data and advanced analytics are reshaping the way sports are understood, cricket stands to benefit immensely from sophisticated visualization tools. This project represents a step forward in bridging the gap between raw cricket data and meaningful, actionable insights. By transforming complex datasets into visually appealing, easily interpretable, and interactive dashboards, this system will set a new standard in cricket analytics, offering a comprehensive and insightful approach to understanding the sport at every level.

1.2 Motivation

This project was motivated by the need for transforming complex raw data into clear actionable insights using Power BI enabling more informed decision making through interactive and visually compelling reports and dashboards.

1.3 Aim

To create an interactive, comprehensive, and user-friendly cricket analytics dashboard using Power BI.

1.4 Objectives

- To develop an interactive, visually engaging cricket analytics dashboard.
- To provide detailed insights into player and team performance using KPIs and historical data.
- To enable intuitive navigation with filters, slicers, and drill-down features.
- To use data analysis to identify trends and support strategic decisions with comparative charts.
- To ensure scalability for integrating additional leagues and live data sources.

1.5 Organization of Report

This report begins with a title page containing the project title, author names, and submission date, followed by an abstract summarizing the project's objectives, methodology, and key findings. Chapter one introduces the project, highlighting the importance of interactive data visualization in cricket analytics. Chapter two reviews existing research on cricket analytics and the use of business intelligence tools like Power BI for performance evaluation. Chapter three discusses the tools and technologies used, including data sources, Python, Power BI, CSV, and DAX. Chapter four outlines the system's architecture, covering data collection, pre-processing, and the four dashboards created for analysis. Chapter five details the implementation process, focusing on dataset structuring and interactive visualizations. Chapter six presents the results, analysing insights from the dashboards on player and team performance. Chapter seven summarizes the report, summarizing contributions and suggesting future improvements like real-time data integration and predictive analytics.

CHAPTER 2
LITERATURE REVIEW

2.1 Cricket Match & Player Performance Analytics

Dalal and Shah (2024) "Cricket Match Analytics and Prediction using Machine Learning" In this research paper, we delve into the dynamic field of cricket analytics and match result prediction, leveraging the power of machine learning to enhance strategic depth and narrative in the sport. Our primary aim is to predict cricket match outcomes during the 2nd innings, considering factors such as target, runs left, wickets fallen, and player-specific performance metrics. The models employed in our study encompass Random Forest, SVM Classifier, Logistic Regression, and Naive Bayes. A key innovation in our approach involves the formulation of a custom formula termed 'Player Consistency,' integrating traditional cricket statistics with dynamic player ratings. This novel metric captures the nuanced aspects of player performance, contributing significantly to the predictive accuracy of our models.

Raju and Kumar (2023) "Cricket Player Analytics using DAX" Cricket is a hugely popular sport, the popularity of the shorter forms of cricket, and particularly T20 cricket, is undoubtedly increasing apparently complicated the process of player selection. Visual Insights of players performance help in find out the best players. Data Analysis Expressions and Data Visualization has the potential to revolutionize the pruning process by creating the insights from huge datasets. The goal of the project is to create dashboards using Data Analysis Expressions and Microsoft power bi to determine the player analytics on website that can be easily available for everyone. The project is divided in to five dashboards. The first module focuses on selecting a team from total players. The second dashboards comprise of entire matches summary that exist in the dataset. The third dashboard provides the players who could have the potential to hold the winning possibilities over 90 percent. The fourth dashboard provides the analytics of every player. The final dashboard generates analytics based on the user requirements.

Harshitha et al. (2022) "Performance Analysis of a Cricketer by Data Visualization" Indian Premier League is a very competitive tournament where team selection is a very tricky and tedious procedure. Analysis of sports data and prediction of each player's performance helps in filtering the best players. A novel method employing the techniques of data analytics and data visualization is used in this research paper to extract individual

player performance from huge statistics and datasets. An application is created to bridge the space between selecting team, coaches, and team management and to give a better interpretation on player steadiness, scoring and further capabilities.

Herridge and Turner (2020) "Monitoring Changes in Power, Speed, Agility, and Endurance in Elite Cricketers during the Off-Season Period" This study aims to monitor changes in physical attributes among elite cricketers over a 20-week off-season. Fourteen male cricketers underwent a physical testing battery in weeks 1 and 18, including intermittent recovery tests, vertical jumps, agility, and sprint tests. Significant improvements were observed in all tests except pro-agility, indicating effective physical development during the off-season.

Awan et al. (2021) "Cricket Match Analytics Using the Big Data Approach" Cricket is one of the most liked, played, encouraged, and exciting sports in today's time that requires a proper advancement with machine learning and artificial intelligence (AI) to attain more accuracy. With the increasing number of matches with time, the data related to cricket matches and the individual player are increasing rapidly. Moreover, the need of using big data analytics and the opportunities of utilizing this big data effectively in many beneficial ways are also increasing, such as the selection process of players in the team, predicting the winner of the match, and many more future predictions using some machine learning models or big data techniques. We applied the machine learning linear regression model to predict the team scores without big data and the big data framework Spark ML.

2.2 Dashboard Design & Visualization Tools for Cricket Data

Yadav and Tiwari (2024) Cricket Data Analysis Using Power BI Our project aims at the dynamic realm of cricket data analysis using the powerful tool, Power BI. Unleashing the potential of statistical insights and visualizations, we navigate through key performance indicators, player analytics, and match trends. Cricket data analysis offers a treasure trove of statistical data that can provide valuable insights into player performance, team strategies, and historical trends. The "Cricket Analysis Using Power BI" project aims to leverage the power of data analytics and visualization to offer cricket enthusiasts, analysts, and teams a comprehensive platform for in-depth cricket analysis.

Shruti and Raj (2023) "Beyond Boundaries: A Comprehensive Cricket Analytics Dashboard" This research delves into the intricate intricacies of cricket, employing advanced tools like Power BI and Streamlit to analyse T-20 Cricket World Cup and IPL data. It begins with web scraping data from ESPN Cricinfo and then rigorously cleans and pre-processes it. Data modelling in Power BI's DAX is central to the project, enabling nuanced insights and an interactive dashboard for match statistics, player performance, and team strategies. The Streamlit interface makes the findings accessible to a broad audience. This project redefines cricket data analysis and decision-making by harmoniously merging advanced analytics with a user-friendly interface, setting a new standard in sports analytics and unlocking fresh insights in the world of cricket.

CHAPTER 3

PROPOSED APPROACH AND SYSTEM ARCHITECTURE

3.1 Proposed Approach

The Comprehensive Cricket League Data Analytics and Visualization project uses a structured approach to analyse IPL data, employing data-driven methods to collect, process, and visualize cricket statistics. The goal is to transform raw data into an interactive Power BI dashboard that offers detailed match, player, and team analytics for analysts, teams, and fans.

1. **Data Collection Phase** This phase involves gathering raw cricket match data from sources like Kaggle, manual data entry, and official IPL statistics. The collected data includes match results, player performances, team statistics, and historical records, forming the foundation for analysis.

2. **Data Cleaning and Pre-processing Phase** Once collected, the data undergoes cleaning and pre-processing to ensure accuracy, consistency, and completeness. This phase includes handling missing values, removing duplicates, standardizing formats, and correcting errors in match details, player statistics, and team performances.

3. **Data Structuring and Modelling Phase** After cleaning, the data is structured into a relational format that facilitates efficient querying and visualization. Logical relationships are established between datasets, and key performance metrics such as batting averages, economy rates, and win percentages are calculated.

4. **Dashboard Design and Visualization Phase** The processed data is imported into Power BI, where it is visualized through interactive charts, graphs, and tables. This phase ensures that insights are presented in a user-friendly format, enabling real-time filtering, drill-downs, and trend analysis.

5. **Insights and Reporting Phase** The final phase focuses on generating meaningful reports and insights based on user-defined parameters. Custom reports are created to analyse player performance, match trends, and team progress, allowing stakeholders to derive actionable conclusions from the dashboard.

This methodology ensures that IPL data is processed and structured efficiently before being integrated into Power BI, enhancing the dashboard's ability to deliver valuable insights through dynamic filtering, drill-down capabilities, and interactive reporting.

3.2 Steps Involved in the Proposed Approach

The development of the IPL dashboard involves a systematic approach to collect, clean, model, and visualize data to generate actionable insights. By utilizing a structured data pipeline, the dashboard aims to offer stakeholders a comprehensive understanding of player and team performances, trends, and key metrics across multiple seasons.
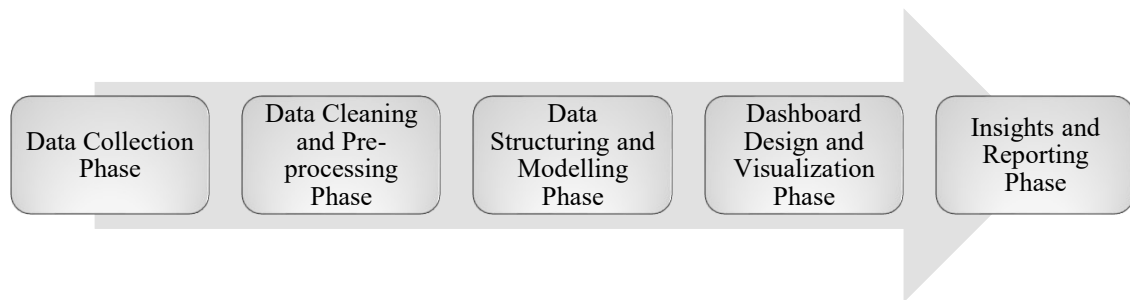
Fig. 3.1 Steps Involved in the Process

Data Collection

The first step in developing the IPL dashboard is collecting a comprehensive set of match data from reliable sources to ensure accuracy. This data is gathered from publicly available cricket datasets on platforms like Kaggle, Cricsheet, official IPL statistics, and manual entries for additional stats. Stored in CSV or Excel formats, it includes match details such as date, venue, teams, toss results, and match outcomes, as well as player performances and team statistics.

Data Cleaning and Pre-processing

Data collected from various sources often contains missing values, inconsistencies, and formatting errors, making cleaning and pre-processing essential for accuracy. This phase involves handling missing values, removing duplicates, and standardizing formats like team names, player names, and dates for consistency. Errors, such as incorrect player statistics or misreported match results, are corrected. Additionally, data transformation techniques are applied, converting categorical data like player roles into numerical values for enhanced analysis.

Data Modelling and Integration

Data modelling is crucial for structuring the IPL dataset for efficient querying and visualization. The model uses fact tables for match results and performances, and dimension tables for player, team, venue, and season details. Relationships are established using unique keys like Player ID, Match ID, and Team ID, enabling advanced filtering and trend analysis. This structure allows the Power BI dashboard to dynamically generate insights, compare performances, and calculate metrics like run rates, bowling economy, and win probabilities.

Dashboard Design and Visualization

The IPL dashboard design focuses on presenting match and player statistics in an interactive, user-friendly way using Power BI. It includes sections for team comparisons, player rankings, match summaries, and season performance tracking. Interactive slicers and filters allow users to customize views based on teams, players, or seasons. Drill-down capabilities provide deeper insights into individual performances and match data. Visualizations like bar charts, line graphs, and leaderboards facilitate easy comparison of metrics. The layout is clean and intuitive, with consistent color coding and tooltips for added clarity. Users can explore trends, compare performances, and track progress across seasons. The dashboard is designed to provide meaningful insights at a glance.

Insights and Reporting

The final phase of the proposed approach involves extracting meaningful insights from the IPL dashboard and generating automated reports for different stakeholders. Power BI enables users to create customized reports, export them in multiple formats (PDF, Excel), and automate report scheduling for timely delivery.

Key insights derived from the dashboard include

- Player consistency analysis across multiple seasons.
- Team performance trends based on batting and bowling statistics.
- Impact of toss decisions on match outcomes.
- Win/loss patterns at different venues and against specific opponents.
- Emerging player trends based on recent performances.

The insights generated can be tailored to meet the needs of team strategists, analysts, and fans, empowering them to make informed decisions. By leveraging historical IPL data, reports provide valuable context for better understanding and engagement with the game.

3.3 Data Modelling

Data modelling is a crucial process that organizes raw data into a logical, relational format, ensuring efficient querying and seamless integration in Power BI. For the IPL dashboard, a well-structured data model enables dynamic filtering, performance tracking, and actionable insights. Using a star schema, the model includes fact tables (storing match results, runs, wickets, and player performance) and dimension tables (containing team details, player profiles, match venues, and seasons). These tables are linked by unique keys like Player ID, Team ID, and Match ID, allowing for efficient data retrieval and comparative analysis across seasons.

.In addition, calculated columns and measures are created using DAX functions to enhance analysis, including metrics like strike rates, batting averages, economy rates, and win probabilities. These dynamic calculations offer deeper insights into individual and team performance. The relational structure ensures optimized performance, scalability, and flexibility, allowing the Power BI dashboard to handle large datasets and provide real-time insights. By organizing data efficiently, the model supports detailed, comparative analysis and adapts easily as new data is added over time.

Establish Relationships	Create DAX Measures	Define Calculated Columns	Optimized Data Model
• Create Connection between fact and dimension table	• Calculate key statistics like batting average	• Add insights such as match impact scores	• Enhance the data model
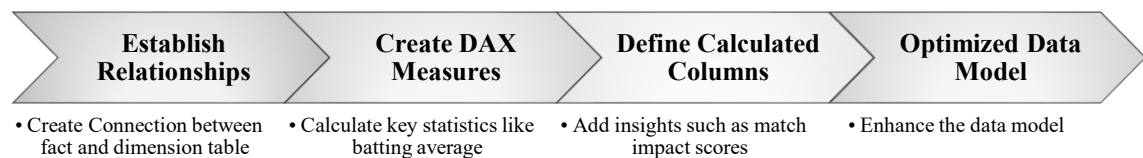
Fig. 3.2 Data Modelling and Analysis

DAX (Data Analysis Expressions) Usage

DAX (Data Analysis Expressions) is a formula language in Power BI used to create calculated columns, measures, and custom aggregations. In an IPL dashboard, DAX powers advanced metrics like batting strike rates, bowling economy rates, and win probabilities, providing insights into player and team performances for informed decision-making.

- **SUMX()** Computes aggregate values like total runs scored by a player or total points accumulated by a team over a season.
- **AVERAGEX()** Calculates batting average, bowling economy, and overall player efficiency.

- **RANKX()** Ranks players based on key performance indicators such as strike rate, total runs, and wickets taken.
- **CALCULATE()** Applies specific filters to datasets, allowing customized analysis such as calculating team performance at specific venues.
- **IF() and SWITCH()** Implements conditional logic to categorize player performances, team rankings, and match outcomes.

Key DAX functions in the IPL dashboard include CALCULATE for dynamic filtering, SUMX for data aggregation, AVERAGE for performance metrics, and COUNTROWS/DISTINCTCOUNT for analysing player consistency. SWITCH provides conditional logic for tailored insights, enabling real-time, data-driven decision-making.

Data Visualization and Various Charts Used

Data visualization is crucial for transforming numerical data into meaningful insights. The IPL dashboard employs various interactive visualizations in Power BI to present team and player performance statistics effectively. Each chart type is carefully selected based on the nature of the data and the type of analysis required.

- **Bar Charts** Used for comparing individual and team performances, such as total runs scored and wickets taken. It provides a clear visual representation of rankings and performance metrics.
- **Pie Charts** Illustrates the proportion of match results, win percentage distributions, toss outcomes, boundaries. This helps in understanding factors like home vs. away match performance and the impact of toss decisions.
- **Line Graphs** Tracks performance trends over multiple seasons, such as a batsman's form progression, team consistency, or bowling effectiveness.
- **Stacked Area Charts** Displays cumulative trends over time, such as total wins/losses per team or runs scored across different phases of a match.
- **Tables and Matrix Visuals** Provides detailed numerical insights, including match-by-match statistics, player-wise performance, and season-wise team standings. These tables allow in-depth data exploration with filtering options.

With Power BI's interactive features, users can apply filters, drill down into specific match details, and analyse performances dynamically. This ensures a comprehensive and data-driven approach to IPL analytics.

3.4 System Architecture

Essential DAX functions in the IPL dashboard, like CALCULATE, SUMX, AVERAGE, COUNTROWS, and SWITCH, enable dynamic filtering, data aggregation, and performance analysis. CALCULATE allows for conditional analysis, SUMX aggregates data, AVERAGE computes metrics, COUNTROWS and DISTINCTCOUNT assess player participation, and SWITCH enables conditional logic. These functions enhance analytical capabilities, providing valuable insights into player and team performance, supporting data-driven decisions for better strategic planning and execution.

Layers of the Dashboard

Data Source Layer This layer plays a critical role in gathering match data from a variety of external sources, ensuring a comprehensive and accurate dataset for analysis. The data is collected from reliable platforms such as Kaggle datasets, manual data entries, and publicly available IPL statistics, ensuring a wide range of match details. These sources provide data in commonly used formats like CSV and Excel, which are easily compatible with Power BI for efficient import and processing. Given the variety of IPL data available across different datasets, it is crucial to standardize formats and ensure consistency in data collection. By maintaining consistency across data sources, it becomes possible to enhance the accuracy and reliability of the dataset, which ultimately supports better insights and decision-making. Proper data integration is essential to ensure that the dataset is up-to-date, error-free, and ready for deeper analysis.

Data Processing Layer The data processing layer is responsible for refining and structuring the collected data before it is visualized. It includes multiple steps such as data cleaning, transformation, and structuring to maintain accuracy. Missing values, duplicate entries, and formatting inconsistencies are handled in this phase. The processed data is then structured into relational tables, linking player performances, team records, and match results for efficient querying and trend analysis.

Visualization and Dashboard Layer The visualization layer is dedicated to user engagement, enabling analysts, strategists, and enthusiasts to explore different sections of the dashboard. It provides dynamic filtering, drill-down options, and custom reporting, ensuring an intuitive and seamless analytical experience. Users can export customized reports, compare seasons, and assess team strategies using the dashboard's interactive features.

User Interaction Layer The final layer focuses on user engagement, offering a highly interactive and intuitive experience for analysts, strategists, and cricket enthusiasts. With dynamic filtering, drill-down capabilities, and custom reporting, users can easily explore different sections of the dashboard to gain insights into match trends, player performance, and team strategies. The dashboard allows for seamless comparison of data across seasons and provides tools to evaluate team tactics in depth. Additionally, users can export customized reports in various formats, ensuring that insights are easily shared and further analysed. This layer ensures a flexible and user-friendly experience, empowering users to make data-driven decisions with confidence.
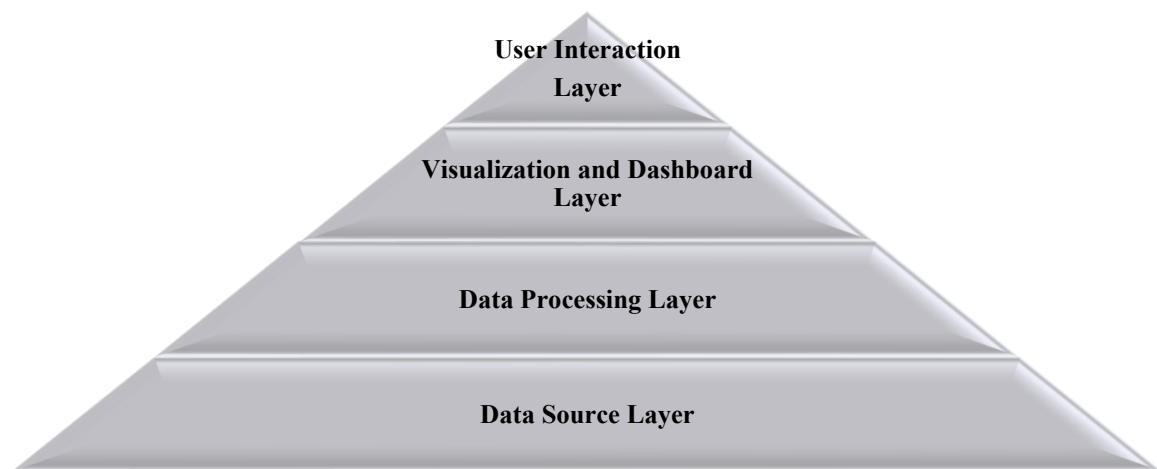

Fig. 3.3 Layers of the Dashboard

CHAPTER 4
TOOLS AND TECHNOLOGIES

4.1 CSV

CSV files provide a lightweight and structured format that can be efficiently processed by Power BI. They are widely used due to their compatibility with multiple data processing tools and their ability to handle large volumes of tabular data. Since Power BI supports direct integration with CSV files, they ensure seamless data import and allow for efficient updates when new datasets are introduced. Their simplicity and ease of access make them a preferred choice for managing pre-processed cricket data before final visualization.

4.2 Python

Python is a widely used programming language in data science and analytics, making it an essential tool for this project, particularly in data pre-processing, cleaning, and feature engineering before importing data into Power BI. It automates repetitive tasks such as handling missing values, filtering irrelevant records, and merging multiple datasets. With its vast ecosystem of libraries, Python supports efficient data handling and transformation, ensuring that the data is structured, optimized, and error-free before analysis. Additionally, Python enables the implementation of data pipelines, streamlining the processing and making it scalable for future enhancements.

Pandas

Pandas is a key Python library for data manipulation and pre-processing in this project. It helps clean and structure raw cricket data by selecting relevant columns, filtering IPL match records, and merging datasets like match details and player stats into one organized dataset. After pre-processing, the data is exported as optimized CSV files for Power BI analysis. This approach ensures efficient data handling, improving performance and accuracy, while enabling meaningful visualizations and insights from large datasets.

4.3 Power Query

Power Query in Power BI automates the extraction, cleaning, and transformation of cricket data from sources like Kaggle and Cricsheets. It streamlines data preparation, ensuring it's structured for efficient analysis and visualization. The tool allows for seamless integration with various data sources, ensuring consistency and accuracy across

datasets. Additionally, Power Query enables the creation of reusable queries, enhancing efficiency in data processing for future projects.

Features of Power Query

- **Multiple Data Sources**: Supports Excel, CSV, and APIs for seamless integration.
- **Automated Cleaning**: Removes duplicates, fixes missing values, and corrects inconsistencies.
- **Data Merging**: Combines match stats, player performance, and tournament details.
- **Advanced Transformations**: Supports pivoting, unpivoting, and grouping for analysis.
- **Filtering & Sorting**: Extracts relevant data for optimized dashboard performance.
- **Step Tracking**: Keeps a record of applied transformations for easy modifications.

Fig. 4.1Power Query Data Workflow

Application of Power Query in This Project

- **Data Import & Integration** Combines multiple CSV files into a unified dataset with match records, team performance, and player stats.
- **Data Cleaning** Removes duplicates, fixes missing values, and corrects formatting issues in team and player names.
- **Dataset Merging** Links match details, player performance, and series stats to create a structured relational model.
- **Calculated Columns** Generates metrics like match-wise run rate, player consistency scores, and team form indicators.
- **Data Optimization** Reduces redundancy and filters out irrelevant data to enhance Power BI dashboard performance.
- **Automation** Updates datasets automatically when new cricket data is added, eliminating manual intervention.

Power Query ensures that the data used in Power BI dashboards is clean, structured, and optimized for analysis. By automating repetitive data processing tasks, it helps streamline the workflow and improves the efficiency of the cricket analytics system.

4.4 DAX

Data Analysis Expressions, commonly known as DAX, is a formula language used in Power BI for creating custom calculations, aggregations, and key performance indicators. DAX allows for advanced data manipulation beyond basic Excel-style calculations, enabling users to generate dynamic insights based on user interactions with filters, slicers, and drill-through features. In this project, DAX is extensively used to compute key cricket statistics such as batting averages, bowling economy rates, and team performance metrics.

Features of DAX

- Enables the creation of calculated columns, measures, and tables that dynamically update based on the selected filters in Power BI.
- Provides advanced aggregation functions such as sum, average, min, max, and count for generating statistics like total runs scored, total wickets taken, and highest individual scores.
- Supports time intelligence functions for comparing performance trends across different seasons, calculating cumulative statistics, and analyzing match performance over time.
- Allows ranking and sorting of players and teams based on key metrics such as top scorers, best bowlers, and highest win percentages.
- Implements logical conditions using if statements, allowing for conditional formatting and data categorization in dashboards.
- Optimized for performance, enabling efficient calculations on large datasets without affecting dashboard responsiveness.

Application of DAX in the project

- Calculating batting averages, strike rates, and total runs scored for each player across different seasons and tournaments.
- Computing bowling economy rates, total wickets taken, and best bowling figures for each bowler based on historical match data.
- Creating dynamic team performance comparisons by aggregating win-loss records, head-to-head matchups, and point table rankings.
- Implementing rolling averages and cumulative totals to track player form and performance consistency over time.

- Applying conditional formatting in Power BI dashboards to highlight standout performances, such as high strike rate innings or economical bowling spells.
- Using ranking functions to identify the top ten batsmen in a given series based on predefined metrics.
- Implementing custom time-based calculations to evaluate player performance in different match phases such as power plays, middle overs, and death overs

DAX enhances the analytical capabilities of Power BI by enabling dynamic calculations that adapt to user selections. By leveraging DAX formulas, this project provides interactive and insightful cricket analytics that can be customized based on match conditions, player trends, and historical performance data.

4.5 Power BI

Power BI is a comprehensive business intelligence and data visualization tool used for creating interactive reports and dashboards. It transforms raw cricket data into structured insights through customizable visualizations, drill-down capabilities, and real-time filtering options. Power BI is the central tool in this project, allowing users to explore cricket statistics dynamically and make data-driven decisions based on match analysis.

Features of Power BI

- Seamless integration with multiple data sources including Excel, CSV, APIs, and databases, ensuring easy access to structured cricket datasets.
- Interactive dashboards that allow users to apply filters, slicers, and drill-through options to explore specific match, player, and team performance metrics.
- Advanced visualization tools including bar charts, line graphs, heat maps, KPI cards, and custom visuals for enhanced data representation.
- Real-time data refresh capabilities, ensuring that dashboards remain up to date whenever new match data is added to the dataset.
- AI-powered insights and trend analysis features that help in detecting performance patterns, anomalies, and predictive forecasting based on historical cricket data.
- Export and sharing options, allowing users to download reports in PDF or PowerPoint format or publish dashboards online for wider accessibility.

Application of Power BI in the project

- Overview dashboard displays a high-level summary of the league, including top run scorers, wicket-takers, and team standings.

- Team and Player performance Compares player and team performances across tournaments and provides in-depth team stats with recent match results.

- Match dashboard highlights key in-game stats like batting partnerships, best bowling spells, and economy rates.

- Interactive Feature Includes drill-through functionality, interactive slicers, and KPI indicators to filter data and analyse essential statistics.

- User Experience Customizes report layouts, colours, and themes to create a visually appealing and intuitive interface.

Power BI serves as the foundation of this project by providing a structured and user-friendly platform for cricket analytics. By combining interactive data exploration, real-time filtering Power BI enables users to analyse match performance at a granular level. It enhances decision-making by making statistical trends more accessible and easier to interpret for analysts, players, and cricket enthusiasts.
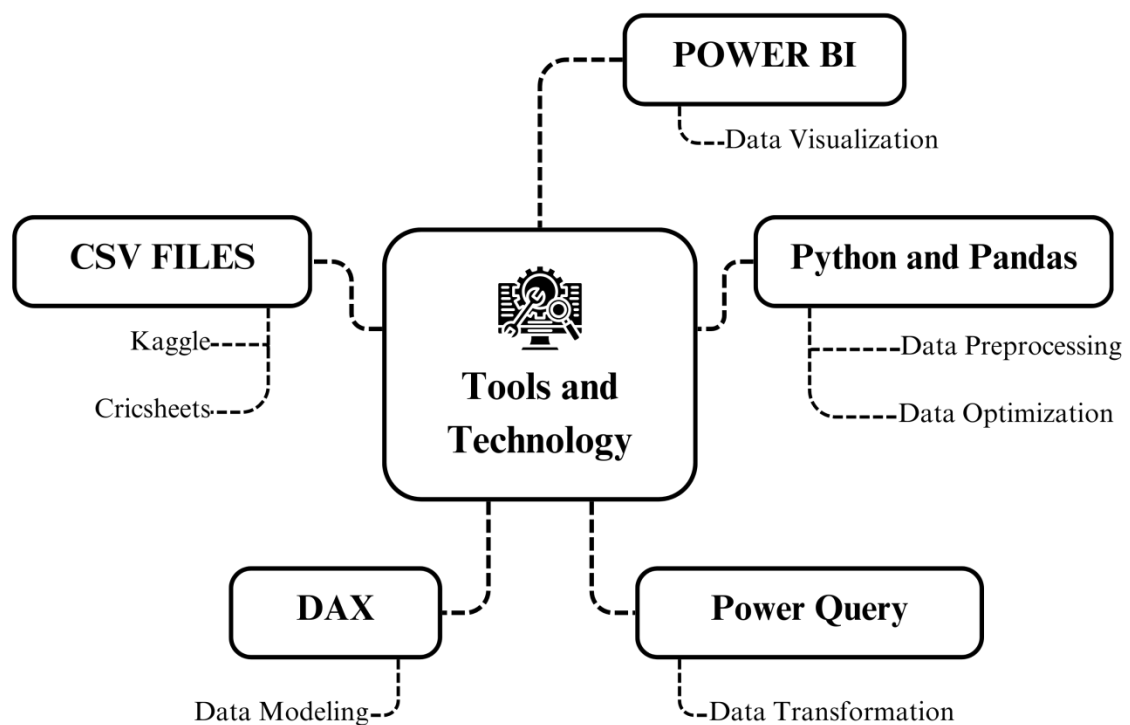

Fig. 4.2 Tools and Technologies

CHAPTER 5

IMPLEMENTATION

This chapter describes the step-by-step implementation of the IPL Power BI dashboard, covering data integration, modelling, DAX calculations, visualization techniques, and interactivity. The goal of this implementation is to transform raw IPL data into a structured, interactive, and insightful dashboard.

5.1 Dataset Integration in Power BI

Overview of Data Integration

The IPL Cricket Analytics Dashboard integrates multiple datasets from Kaggle and Cricsheet, transforming raw cricket data into structured, interactive visualizations in Power BI. The integration process involves data collection, pre-processing, transformation, modelling, and visualization, ensuring a seamless flow from raw CSV files to meaningful insights.

Sources of Cricket Data

Cricket data for this project is sourced from multiple platforms, including Kaggle and Cricsheet, which provide detailed historical match statistics and ball-by-ball event records. Each source offers structured cricket datasets, but they come with challenges related to data completeness, accuracy, and formatting.

1. **Kaggle** (Primary Source for IPL Data) Kaggle was chosen as a primary data source for this project due to its extensive collection of structured datasets, ensuring reliable and well-organized cricket data for analysis. Kaggle provides season-wise IPL datasets in CSV format, making it easy to integrate with Power BI for visualization and analysis.

The Kaggle datasets provide detailed match records, player statistics, and team performance metrics, offering insights into batting, bowling, and match outcomes. The data acquisition process involved searching for relevant IPL datasets, verifying completeness, and pre-processing before importing into Power BI. The dataset used includes.

- **Match details** Season-wise match results, toss decisions, win margins, and venues.

- **Player statistics** Batting and bowling performances, total runs, wickets, and strike rates.

- **Team performance** Win/loss records, head-to-head comparisons, and season trends.

Kaggle's structured cricket data was supplemented with Cricsheet's ball-by-ball match data for greater accuracy and detail. Integrating these datasets with Power BI enables comprehensive, interactive analysis of IPL matches, allowing users to explore trends, player performances, and team strategies.

2. **Cricsheet** (Ball-by-Ball Data Source) Cricsheet is a crucial data source for in-depth cricket analytics, offering detailed ball-by-ball match data. Unlike Kaggle's structured statistics, Cricsheet provides delivery-level events, enabling deeper insights into batting, bowling, and team performance trends.

The Cricsheet dataset, including runs, extras, dismissals, and bowler-batsman interactions, is key to calculating advanced cricket metrics like strike rates, economy rates, and power play efficiency. Analysing this data helps evaluate player performance and team strategies, revealing strengths and weaknesses for better tactical planning.

- **Batting Analysis** Strike rates, fastest 50s, partnerships, and performance under pressure.

- **Bowling Insights** Economy rates, dot ball percentages, wicket-taking ability, and bowling impact in different match phases.

- **Match Trends** Power play vs. death over performances, toss impact analysis, and run rate progression.

Since Cricsheet provides granular match-level data, it was integrated with Kaggle's structured datasets to create a comprehensive IPL analytics model in Power BI. This combination allows the dashboard to offer in-depth performance tracking, strategic analysis, and interactive visualizations, making it a powerful tool for cricket analysts and fans.

3. **CSV File Format** In IPL Cricket Analytics Dashboard, the Comma-Separated Values (CSV) format was selected as the primary data storage format for this project due to its simplicity, efficiency, and broad compatibility with data processing tools like Power BI. CSV files store structured cricket data in plain text, making them well-suited for handling large datasets such as match statistics, player records, and ball-by-ball details. The format allows for easy integration with Power BI, ensuring a smooth data analysis workflow.

Each row in a CSV file represents a record, and the fields within each record are separated by commas, maintaining a straightforward tabular structure. While other delimiters, like semicolons or tabs, can be used, this project adheres to the standard comma-separated format to maintain consistency across datasets. This consistency ensures that the data can be easily processed and analysed across different tools and platforms.

CSV was chosen for its simplicity, efficiency, and compatibility with Power BI. It stores structured cricket data in plain text, making it ideal for large datasets like match statistics and player records. The format ensures easy integration, efficient analysis, and seamless pre-processing for IPL analytics.

Data Pre-processing and Cleaning

CSV was chosen for this project due to its simplicity, efficiency, and broad compatibility with tools like Power BI. This plain-text format stores structured cricket data in a readable, tabular structure, making it ideal for large datasets such as match statistics, player records, and ball-by-ball details. Its lightweight nature ensures easy integration, seamless pre-processing, and efficient analysis. With each row representing a record and fields separated by commas, CSV files provide consistency and flexibility, allowing for smooth data exchange across platforms. The format's human-readable design and scalability support accurate data processing, modelling, and visualization, making it an essential component for in-depth IPL analytics within Power BI.

1. **Data Cleaning using Pandas** (Python) The Pandas library was utilized to clean, filter, and structure the raw match, player, and ball-by-ball data, ensuring consistency across datasets. Duplicate records were identified and removed to eliminate redundancy, preventing discrepancies in analysis. Additionally, column names were standardized to maintain uniformity, facilitating seamless integration and accurate data mapping across different datasets.

2. **Standardization of Team and Player Names** To ensure consistency and accuracy in data analysis, all team and player names were standardized across the datasets. Abbreviations such as "MI" were replaced with full names like "Mumbai Indians," and player name variations like "V. Kohli" were unified as "Virat Kohli." This standardization helped maintain data integrity, allowed for accurate merging of datasets, and eliminated discrepancies in visualizations, ensuring smooth and reliable analysis and reporting.

3. **Handling Missing Values** To ensure data accuracy and completeness, missing values in crucial fields like match_winner, player_of_match, and batting_team were handled carefully. If the data was incomplete and could not be reliably reconstructed, key identifiers were either inferred or removed. Numerical fields such as runs, wickets, and economy rates were filled with 0 to prevent calculation errors. For categorical fields like venue, team, and toss_winner, mode-based imputation was used, filling missing values with the most frequent occurrences. This pre-processing step ensured data integrity and facilitated smooth analysis.

Data Transformation in Power Query

Data transformation is key to preparing raw data for analysis by structuring and optimizing it. Using Power Query, datasets like matches, players, and ball-by-ball data are integrated into a relational model. Key transformations, such as formatting and pre-aggregating metrics, ensure efficient processing in Power BI for accurate and interactive cricket analytics.

1. **Merging and Structuring** The merging and structuring process integrated multiple datasets, including matches, players, teams, and ball-by-ball data, into a relational model in Power Query. Key relationships were established using primary and foreign keys, ensuring seamless data connectivity for accurate analysis. Lookup tables were created to avoid redundancy, and unnecessary columns were removed to enhance efficiency. This structured approach enabled scalable, high-performance reporting in Power BI, allowing for detailed team, player, and match-level insights.

2. **Data Formatting** To ensure consistency and accuracy in analysis, data formatting was applied across all datasets in Power Query. Date-time fields were standardized to maintain uniformity in match timelines, while numerical values were optimized for calculations by converting them into appropriate data types. Categorical variables, such as team names, player roles, and venue details, were cleaned and reformatted for consistency. Additionally, unnecessary columns were removed to reduce data load and improve processing speed. These formatting adjustments ensured better data integrity, improved query performance, and seamless visualization in Power BI.

3. **Pre-Aggregation** To improve Power BI performance and reduce computation time, key statistical metrics were pre-aggregated in Power Query. Essential statistics like total runs, wickets, boundaries, strike rates, and economy rates were calculated before loading the data into Power BI. By summarizing high-volume datasets, such as ball-

by-ball data into match- and season-level aggregates, real-time calculations were minimized. This resulted in faster report loading and smoother interactivity, optimizing query performance and ensuring an efficient, seamless user experience in the analytics dashboard.

The data transformation process in Power Query optimized datasets for efficient analysis in Power BI. By merging datasets into a relational model and ensuring consistent data formatting, performance was improved. Pre-aggregating key metrics reduced computational load, enhancing data integrity, efficiency, and visualization responsiveness, resulting in a high-performance cricket analytics dashboard.

5.2 Data Modelling and Relationships

Importance of Data Modelling

Data modelling in Power BI is essential for structuring cricket data, using a star schema with fact and dimension tables. Fact tables store numerical data like runs and wickets, while dimension tables hold categorical information such as player names and teams. This structure enables efficient querying and interactive analysis, providing quick insights into IPL matches and player performances.

1. Fact Tables (Match Events and Performance Data)

These tables contain numerical data related to matches, players, and teams.

- **matches_details** (Match-level statistics)

Stores match-specific details like match ID, season, teams, venue, match winner, toss winner, and win margin. Linked to teams and players for in-depth analysis.

- **all_matches** (Ball-by-ball Data)

Includes every delivery bowled, runs scored, wickets taken, and extras conceded. Crucial for calculating batting strike rates, economy rates, and bowling performance.

2. Dimension Tables (Categorical Data for Filtering and Relationships)

Dimension tables store textual data, enabling filtering and data relationships.

- **teams_table** (Franchise Metadata)

Stores team names, short names, home venues, and captains. Used for team-wise filtering and comparisons.

- **players_table** (Player Information)

Includes player names, team associations, roles (batsman, bowler, all-rounder), and playing styles. Helps analyze player career trajectories and role-specific performance.
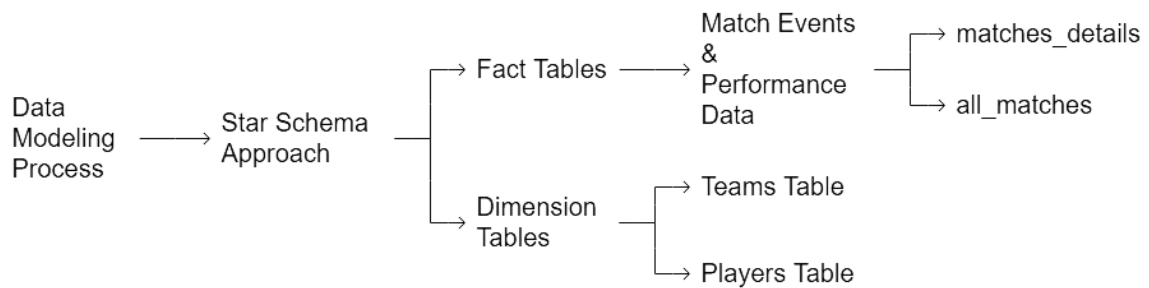
Fig. 5.1 Data Models

Establishing Relationships

Primary Relationships in Power BI

1. Matches and Ball-by-Ball Data

- **One-to-Many Relationship** matches_details.match_id → all_matches.match_id

Each match has multiple deliveries recorded in the ball-by-ball data. This link enables match-wise performance tracking at the granular level.

2. Matches and Teams

- **One-to-Many Relationship** teams_table.team_id → matches_details.team1_id and matches_details.team2_id

Allows team-wise analysis for win/loss trends, head-to-head comparisons, and season-wise performances. Enables filters to show team-based statistics dynamically.

3. Players and Ball-by-Ball Data

- **One-to-Many Relationship** players_table.player_id → all_matches.striker_id and all_matches.bowler_id

Helps analyze player batting and bowling performances over multiple matches. Enables player-vs-player head-to-head analysis.

4. Matches and Seasons

- **One-to-Many Relationship** seasons_table.season_id → matches_details.season_id

Allows season-based filtering to analyze trends across multiple IPL years. Enables visualization of performance evolution over time.

5. Extras and Ball-by-Ball Data

- **One-to-Many Relationship** matches_details.match_id → extras_table.match_id

Enables analysis of extra runs conceded, which is crucial for evaluating bowling discipline.

Relationship Diagram in Power BI (Conceptual View)

The data model for this project consists of several interconnected tables that offer a comprehensive view of cricket match data. The Seasons Table links to the Matches Details table in a one-to-many relationship, with each season containing multiple match details. The Matches Details table also connects to the All Matches table, capturing information on every match played. The Teams Table is connected to Matches Details, enabling team performance analysis, while the Venues Table provides insights into match locations. The Players Table is linked to the All Matches table, offering player statistics for each match, and the Extras Table relates to the All Matches table, capturing extra runs or penalties. These interconnected tables create a robust system for analysing cricket match data and player/team performance.
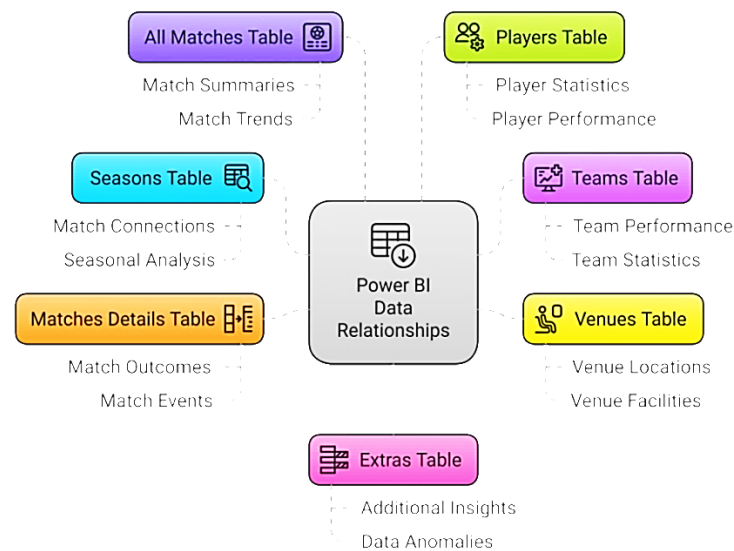

Fig. 5.2 Power BI Data Relationships

Importance of Data Relationships

- **Dynamic Filtering** Selecting a team/player/season updates all related visuals automatically.
- **Performance Optimization** Predefined relationships eliminate unnecessary joins in DAX calculations.
- **Scalability** Additional datasets (e.g., new leagues, real-time match data) can be added easily.
- **Drill-Through Insights** Users can click on a player, team, or season to view detailed statistics.

5.3 DAX Measures and Calculations

Introduction to DAX

The data modelling process in Power BI efficiently structures cricket data for seamless filtering, querying, and visualization. Using a star schema, fact tables store numerical data like runs and wickets, while dimension tables hold categorical information such as player names, teams, and match details. This structure supports fast querying and interactive analysis, enabling users to easily gain insights into IPL matches and player performances.

Key DAX Measures

1. **Total Wins Calculation** Counts the number of matches won by a specific team.

Total Wins = COUNTROWS(FILTER(Matches,Matches[Match_Winner] = Selected_Team))

2. **Win Percentage Calculation**: Calculates the percentage of matches won by a team.

Win Percentage = DIVIDE([Total Wins], COUNT(Matches[match_id]), 0) * 100

3. **Run Rate Calculation**: Measures a team's scoring rate.

Run Rate = DIVIDE(SUM(BallbyBall[Runs]), COUNT(BallbyBall[Overs]), 0)

4. **Strike Rate Calculation**: Determines a batsman's efficiency in scoring runs.

Strike Rate=DIVIDE(SUM(BallbyBall[Runs]),COUNT(BallbyBall[Deliveries]))*100

5. **Economy Rate Calculation**: Calculates the bowling economy of a bowler.

Economy Rate = DIVIDE(SUM(BallbyBall[Runs]), COUNT(BallbyBall[Overs]))

These DAX measures allow the dashboard to display dynamic KPI cards, comparative metrics, and ranking tables.

5.4 Building Dashboard Visuals

Power BI offers a wide range of visualization techniques to effectively analyze IPL data, providing clarity in trends, comparisons, and rankings. KPI cards deliver quick insights into key metrics like total matches, runs, and wickets, while bar and column charts are ideal for comparing team performances and player statistics. Line charts track scoring trends across seasons, and pie charts highlight proportions like win distributions. Heat maps visualize performance intensity across different venues. These diverse visualizations enable users to identify patterns, make informed decisions, and gain a deeper understanding of IPL data for more effective strategic planning and analysis.

Key Dashboard Visuals

The IPL Cricket Analytics project incorporates multiple interactive dashboards, each providing crucial insights into different aspects of the tournament. The key visuals across the dashboards include:

1. **Overview Dashboard Visuals**

   - **KPI Cards** Displays total matches played, total runs, total wickets, total boundaries, and other key performance indicators.

   - **Run Rate Trend Line** Shows the variation in run rates over IPL seasons.

   - **Win Percentage Chart** Highlights the most successful teams based on win percentage.

   - **Wins vs. Losses Table** Compares the number of matches won and lost by different teams.

   - **Season Winners Table** Lists the IPL champions across different years.

2. **Series Dashboard Visuals**

   - **Performance KPI Cards** Includes top run-scorer, most sixes, most fours, and best bowling figures for the season.

   - **Fastest 50 & Fastest 100 Tables** Displays players who achieved the fastest fifties and centuries.

   - **Points Table** Summarizes the wins, losses, and net run rate of each team in the season.

   - **Batting and Bowling Statistics** Showcases the top batsmen and bowlers based on key metrics.

3. **Match Dashboard Visuals:**

   - **Venue and Match Details** Displays the stadium, toss winner, match winner, and player of the match.

   - **Run Rate and Strike Rate Charts** Compares performance across different phases of the match (Power play, Middle Overs, Death Overs).

   - **Cumulative Runs vs. Balls Chart** Tracks the progression of runs scored throughout the innings.

   - **Bowling Stats Table** Lists key bowling metrics such as overs bowled, runs conceded, and maiden overs.

   - **Ball-by-Ball Visualization** Displays wicket types and runs scored per ball.

4. **Team Dashboard Visuals**

- **Overall Team Performance** Shows total matches played, wins, losses, win percentage, and highest/lowest team totals.

- **Top Performers KPI Cards** Highlights the top batsmen and bowlers of the team.

- **Match-wise Performance Chart** Displays runs scored, wickets taken, and key events in each match.

- **Team Composition Breakdown** Provides insights into batting and bowling contributions.

Each of these visuals enhances the analytical depth of the project, providing a detailed view of team and player performances throughout the tournament. By using various visualization types like bar charts, line graphs, and heat maps, the dashboard enables users to explore trends and compare performances across different seasons, venues, and match types. This helps in making data-driven decisions and gaining deeper insights into IPL matches.

5.5 Interactive Features

Power BI's interactivity plays a crucial role in enhancing data exploration and storytelling, making the dashboard more engaging and insightful. Interactive features empower users to analyse IPL data dynamically, enabling deeper insights and a more personalized experience. This section outlines key interactive elements integrated into the IPL analytics dashboard.

Key Interactive Features

1. Filters and Slicers

- Filters and slicers allow users to refine the data displayed in the dashboard, enabling customized analysis. The key filtering mechanisms include:

- **Team and Player Filters** Users can select specific teams or players to analyze performance across different seasons.

- **Season-wise Slicers** This feature allows users to filter data based on different IPL seasons, facilitating year-wise comparisons and trend analysis.

2. Drill-Through Functionality

- Drill-through functionality enhances detailed data exploration by enabling users to navigate from a high-level overview to more granular insights. The two key drill-through features are:

- **Team Drill-Through** Clicking on a team name redirects users to a detailed breakdown of its match statistics, including wins, losses, and performance metrics.

- **Player Drill-Through** Clicking on a player's name provides an in-depth view of their performance across multiple seasons, including batting and bowling statistics.

3. Hover Effects and Tooltips

- Hover effects and tooltips provide additional context and insights without cluttering the main dashboard visuals. These include:

- **Enhanced Tooltips** When hovering over visual elements, users can view supplementary data, such as player-vs-player matchups, historical records, and season-wise performance trends.

- **Dynamic Data Insights** Tooltips allow quick access to critical statistics, improving the analytical depth without overwhelming the primary dashboard layout.

These interactive elements significantly enhance user engagement, making data exploration intuitive, efficient, and insightful. By leveraging Power BI's interactive capabilities, the IPL analytics dashboard ensures a seamless and informative user experience.

CHAPTER 6
RESULTS AND DISCUSSION

6.1 Application Flow

The IPL Cricket Analytics Dashboard is designed to offer a comprehensive and intuitive way for users to explore and analyse cricket data. It features four main dashboards: the League Dashboard, which provides an overall summary of the IPL across seasons; the Series Dashboard, focusing on specific seasons; the Team Dashboard, offering a deep dive into individual team performance; and the Match Dashboard, which provides detailed analysis of specific matches, including ball-by-ball tracking.

Users typically start with the League Dashboard, where they can explore broad tournament-wide insights such as team performances, key batting and bowling statistics, and championship records. From there, they can filter data to focus on specific seasons using the Series Dashboard, which displays season-wise details like the points table, top players, and notable performances.

For those looking to analyze specific teams, the Team Dashboard allows users to examine a team's performance over time, including win percentages and head-to-head stats. The Match Dashboard breaks down individual matches with detailed statistics, such as runs progression and key moments. Interactive elements like dropdown filters, dynamic visuals, and drill-down options make the dashboard highly customizable, ensuring users can easily navigate between different levels of analysis and uncover meaningful insights from the IPL data.

6.2 League Dashboard: Comprehensive IPL Overview

The League Dashboard provides a summary of the IPL tournament, displaying key stats like total matches, runs, wickets, and team performances. The dashboard also visualizes team performance trends across seasons, including win percentages and average team run rate over the seasons. Fig. 6.1 illustrates how these metrics are presented, with interactive filters for detailed analysis of specific seasons, teams, and players.
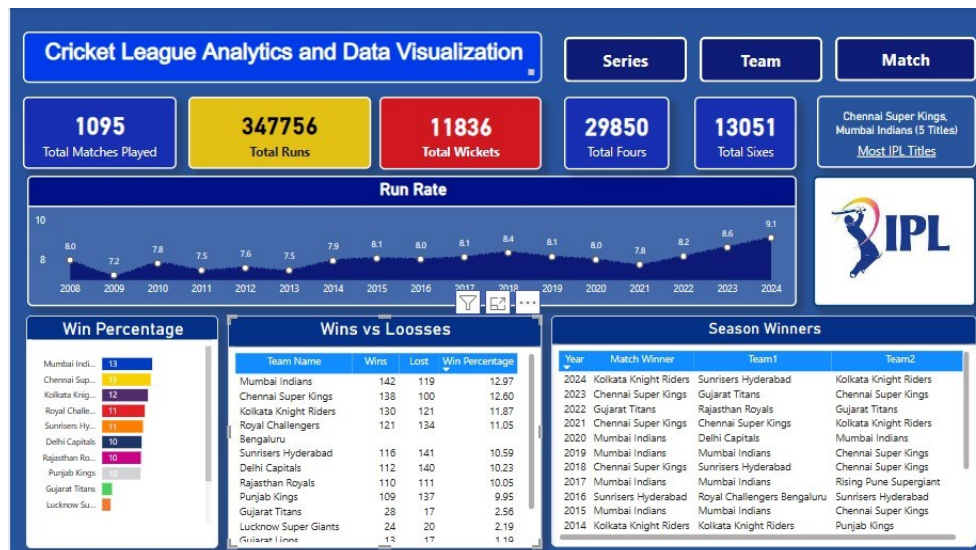
Fig. 6.1 League Dashboard

6.3 Series Dashboard: Season-Specific Performance Analysis

The Series Dashboard focuses on a specific IPL season, providing insights into team and player performances. It includes a detailed points table, ranking teams by wins, losses, net run rate, and points. Key player achievements like the Orange Cap (most runs) and Purple Cap (most wickets) are highlighted, along with top batting and bowling statistics. Team-specific insights such as highest team totals and successful chases are also featured, with the layout illustrated in Fig. 6.2 for easy data exploration.

Fig. 6.2 Series Dashboard

6.4 Team Dashboard: In-Depth Team Performance Breakdown

The Team Dashboard analyses a team's IPL performance, including matches, wins, win percentage, and titles. It features key batting and bowling stats, along with season-wise performance trends. Fig. 6.3 shows the layout for easy navigation.
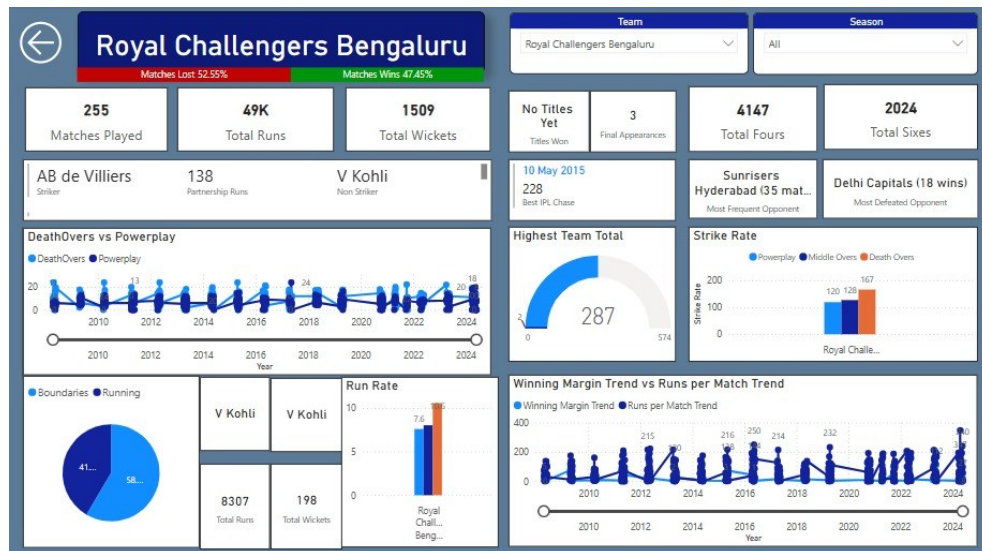

Fig. 6.3 Team Dashboard

6.5 Match Dashboard: Detailed Match Insights

The Match Dashboard provides match details like venue, toss winner, match winner, and Player of the Match. It includes ball-by-ball batting and bowling stats, along with a wicket distribution chart. Fig. 6.4 shows the layout for easy exploration.
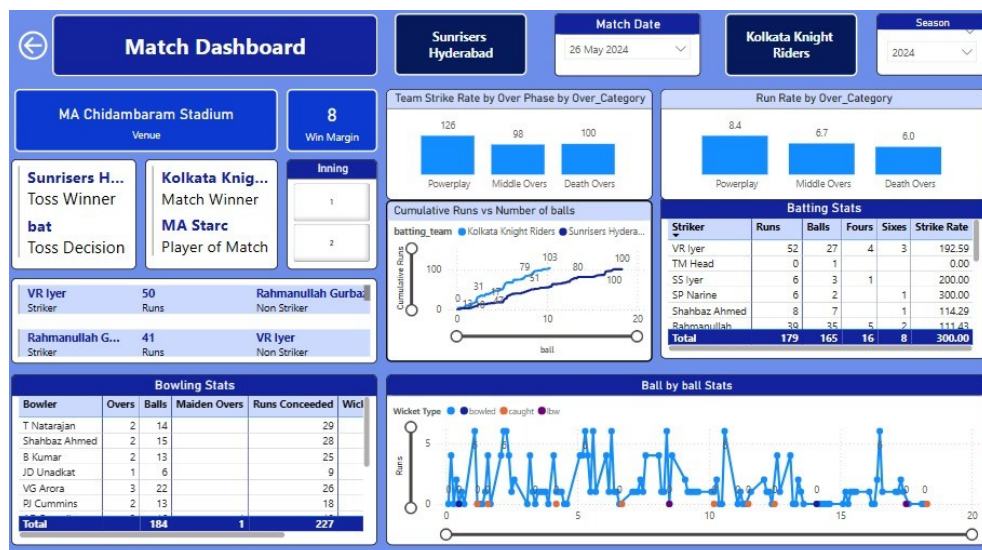

Fig. 6.4 Match Dashboard.

CHAPTER 7
CONCLUSIONS

7.1 Limitations of the Study

The IPL dashboard, while effective in analysing historical data, has key limitations. It lacks real-time updates, making it less useful for live match tracking. Additionally, it doesn't include predictive analytics or machine learning, limiting its ability to forecast player performance or match outcomes. Lastly, it's confined to IPL data, reducing its value for those interested in other cricket leagues. Expanding its scope would require significant data integration and system upgrades.

7.2 Future Scope of Work

The IPL Cricket Analytics Dashboard has significant potential for future enhancement. Key improvements include integrating real-time data streaming for live match updates, making the dashboard more interactive for users. Adding machine learning algorithms could provide predictive analytics, forecasting player performance and match outcomes. Expanding the dashboard to include data from other major tournaments, like the ICC World Cup and Big Bash League, would broaden its analysis. Additionally, optimizing the user interface, adding interactive features, and ensuring mobile compatibility would enhance accessibility and user experience.

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