

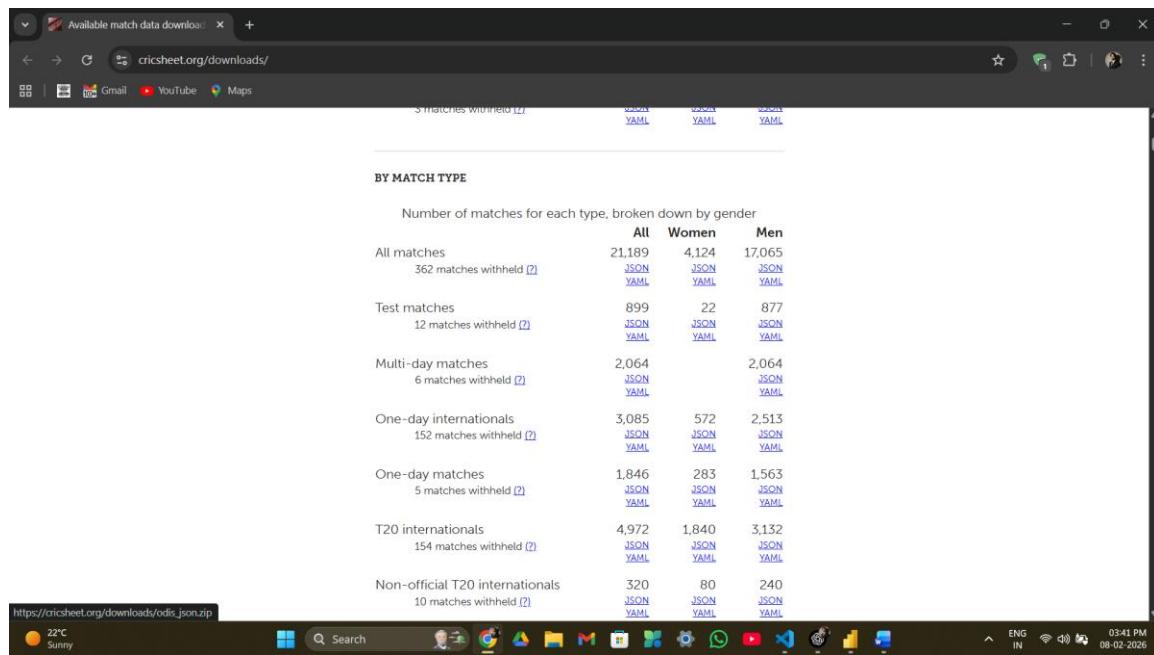
Cricsheet Match Data Analysis Using Python, MySQL & Power BI

1. Introduction

Cricket is one of the most data-rich sports in the world, generating vast amounts of match statistics, player performances, and ball-by-ball records. With the rise of data analytics, sports organizations and analysts increasingly rely on structured data insights to evaluate player performance, team strategies, and match outcomes.

This project focuses on analyzing historical cricket match data sourced from the Cricsheet dataset. The dataset contains detailed JSON records of matches across multiple formats including Test, ODI, T20, and IPL.

Using modern data analytics tools such as Python, MySQL, and Power BI, this project transforms raw cricket data into meaningful insights through data preprocessing, database modeling, SQL analytics, and interactive dashboards.



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1   "meta": {
2     "data_version": "1.0.0",
3     "created": "2013-02-20",
4     "revision": 1
5   },
6   "info": {
7     "balls_per_over": 6,
8     "city": "Brisbane",
9     "dates": [
10       "2006-01-09"
11     ],
12     "gender": "male",
13     "match_type": "T20",
14     "match_type_number": 4,
15     "officials": {
16       "match_referees": [
17         "RG Archer"
18       ],
19       "tv_umpires": [
20         "NS McNamara"
21       ],
22       "umpires": [
23         "BNJ Oxenford",
24         "RL Parry"
25       ]
26     },
27     "outcome": {
28       "by": {
29         "runs": 95
30       },
31       "winner": "Australia"
32     }
33   }
```

2. Problem Statement

Cricket match data is available in semi-structured JSON format, making it difficult to analyze directly. The lack of structured storage and visualization limits the ability to extract insights such as top player performances, team win patterns, and venue trends.

The problem addressed in this project is:

- To collect, process, store, analyze, and visualize cricket match data in a structured format to generate meaningful analytical insights.

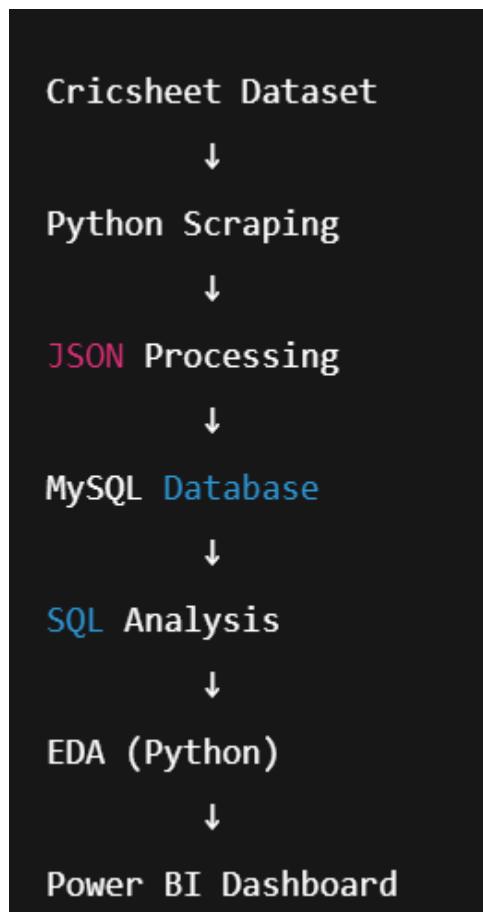
3. Objectives

The key objectives of this project are:

- To scrape cricket match datasets from Cricsheet.
- To preprocess JSON match data using Python.
- To design a relational database for structured storage.
- To perform SQL analytics queries.
- To conduct Exploratory Data Analysis (EDA).
- To build interactive Power BI dashboards.
- To derive insights on teams, players, and match outcomes.

4. Tools & Technologies

Tool	Purpose
Python	Data scraping & preprocessing
Selenium	Automated dataset extraction
Pandas	Data transformation
MySQL	Relational database storage
SQLAlchemy	Python-DB connection
Power BI	Dashboard visualization
VS Code	Development environment



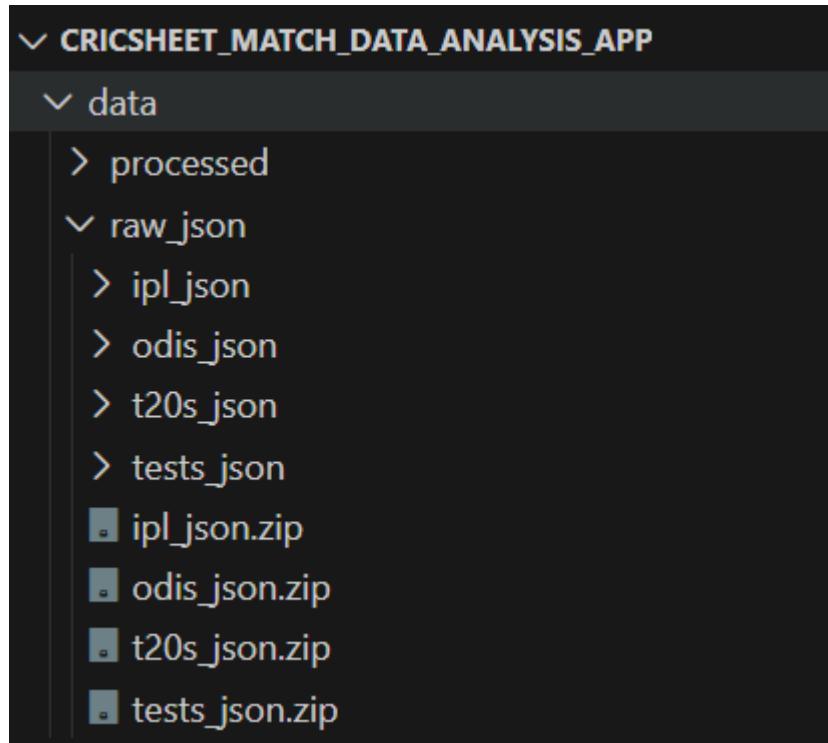
5. Data Collection

The dataset was collected from the Cricsheet website, which provides historical cricket match data in JSON format.

Match formats included:

- Test Matches
- One Day Internationals (ODI)
- T20 Internationals & Domestic T20
- Indian Premier League (IPL)

Bulk JSON archives were downloaded and extracted for processing.



6. Data Preprocessing

Raw JSON files contained nested match information such as:

- Teams
- Venue

- Toss details
- Innings
- Ball-by-ball deliveries

Python scripts were developed to:

- Extract match metadata.
- Normalize win margins.
- Handle missing values.
- Skip corrupted files.
- Flatten nested innings structures.

Over 10,000 match records were processed successfully.

The screenshot shows a Visual Studio Code interface. The Explorer sidebar displays a project structure under 'CRICS...' containing 'data', 'raw.json', 'ipl.json', 'odis.json', 't20s.json', 'tests.json', 'notebooks' (with 'EDA_Analysis.ipynb'), 'scripts' (containing 'database', 'processing' - which has 'export_for_p... 1' and 'process_deliver... 1', and 'process_match... 1'), 'scraping', 'sql', and 'venv'. A README.md file is also present. The terminal tab shows the command 'PS D:\Project\Cricket_Match_Data_Analysis_App> python scripts/processing/process_deliveries.py' and its output, which consists of numerous 'Inserted' log entries for deliveries, such as 'Inserted 4695000 deliveries...', 'Inserted 4610000 deliveries...', etc., up to 'Inserted 4771000 deliveries...'. The status bar at the bottom indicates 'Total Deliveries Inserted: 4771788'.

```
(venv) PS D:\Project\Cricket_Match_Data_Analysis_App> python scripts/processing/process_deliveries.py
Inserted 4695000 deliveries...
Inserted 4610000 deliveries...
Inserted 4615000 deliveries...
Inserted 4620000 deliveries...
Inserted 4625000 deliveries...
Inserted 4630000 deliveries...
Inserted 4635000 deliveries...
Inserted 4640000 deliveries...
Inserted 4645000 deliveries...
Inserted 4650000 deliveries...
Inserted 4660000 deliveries...
Inserted 4665000 deliveries...
Inserted 4670000 deliveries...
Inserted 4675000 deliveries...
Inserted 4680000 deliveries...
Inserted 4685000 deliveries...
Inserted 4690000 deliveries...
Inserted 4695000 deliveries...
Inserted 4700000 deliveries...
Inserted 4705000 deliveries...
Inserted 4710000 deliveries...
Inserted 4715000 deliveries...
Inserted 4720000 deliveries...
Inserted 4725000 deliveries...
Inserted 4730000 deliveries...
Inserted 4735000 deliveries...
Inserted 4740000 deliveries...
Inserted 4745000 deliveries...
Inserted 4750000 deliveries...
Inserted 4755000 deliveries...
Inserted 4760000 deliveries...
Inserted 4765000 deliveries...
Inserted 4770000 deliveries...
Total Deliveries Inserted: 4771788
```

7. Database Design

A MySQL relational database was created to store structured data.

Tables Created

1. Matches Table

Stores match-level information:

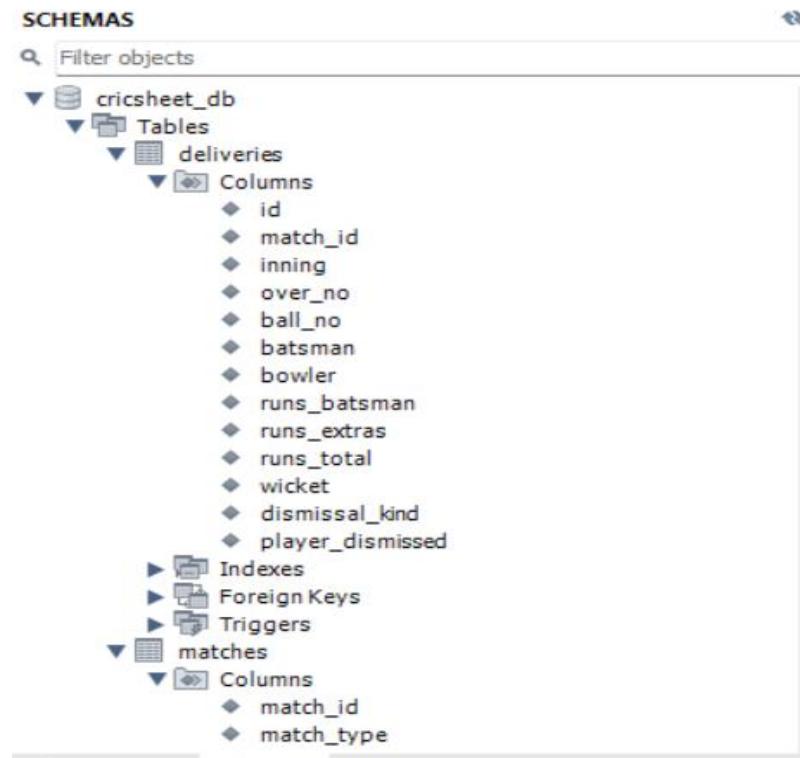
- Match ID
- Teams
- Venue
- Toss decision
- Winner
- Win margin

2. Deliveries Table

Stores ball-by-ball data:

- Batsman
- Bowler
- Runs scored
- Extras
- Wickets
- Over & ball number

Over 4.7 million delivery records were inserted.

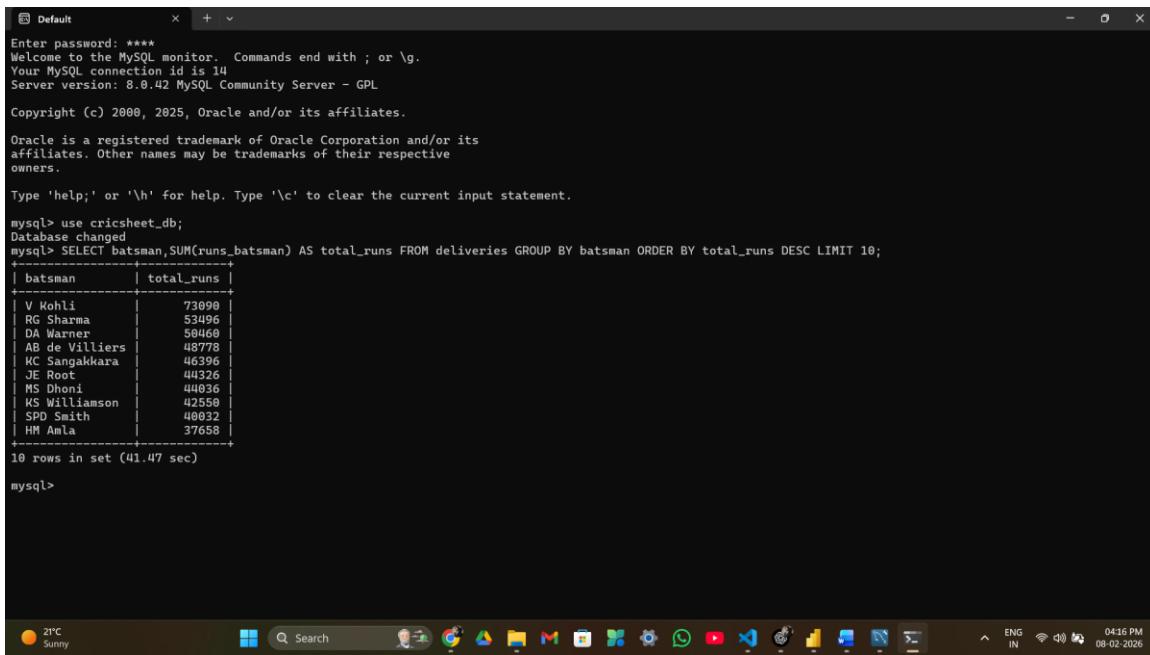


8. SQL Data Analysis

A total of 20 analytical SQL queries were executed to derive insights such as:

- Top run scorers
- Leading wicket takers
- Strike rates
- Economy rates
- Team win counts
- Toss impact
- Venue performance

These queries transformed raw match data into meaningful statistical insights.



The screenshot shows a terminal window titled 'Default' running a MySQL session. The session starts with standard MySQL welcome messages and a copyright notice. The user then runs a query to select the top 10 batsmen by total runs from the 'deliveries' table in the 'cricsheet_db' database. The output is a table with two columns: 'batsman' and 'total_runs'. The results show the top 10 players with their respective run totals. The MySQL prompt 'mysql>' appears at the bottom of the window.

batsman	total_runs
V Kohli	73699
RG Sharma	53496
DA Warner	50469
AB de Villiers	48778
KC Sangakkara	46396
JC Root	44326
MS Dhoni	44036
KS Williamson	42559
SPD Smith	40032
HM Amla	37658

10 rows in set (41.47 sec)

mysql>

9. Exploratory Data Analysis

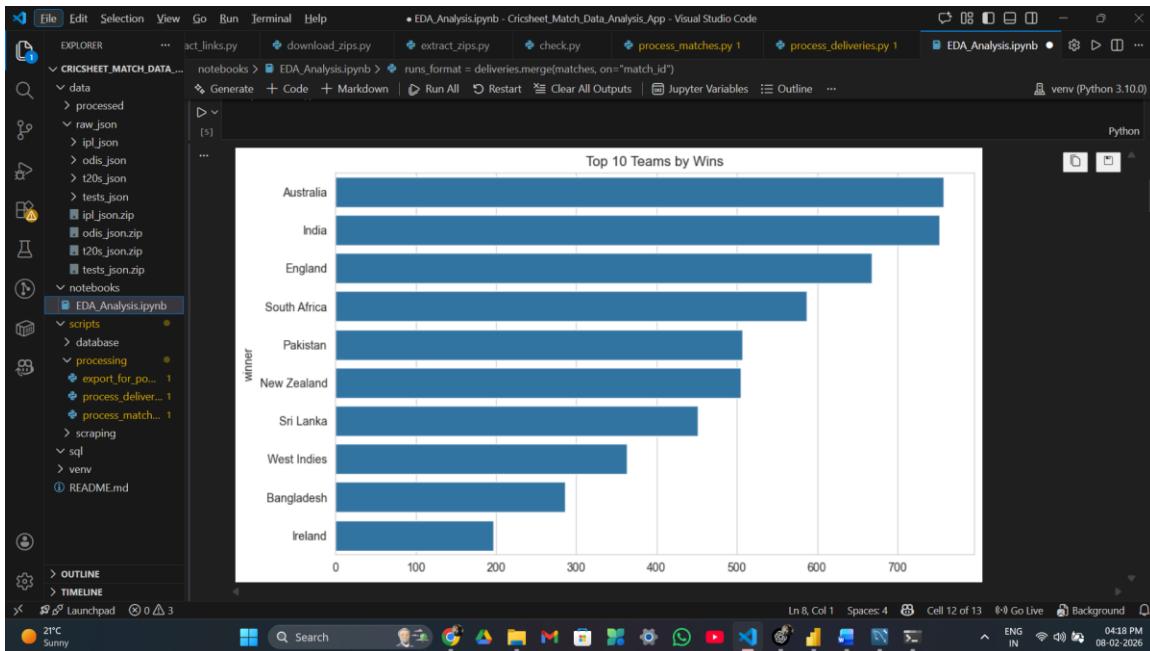
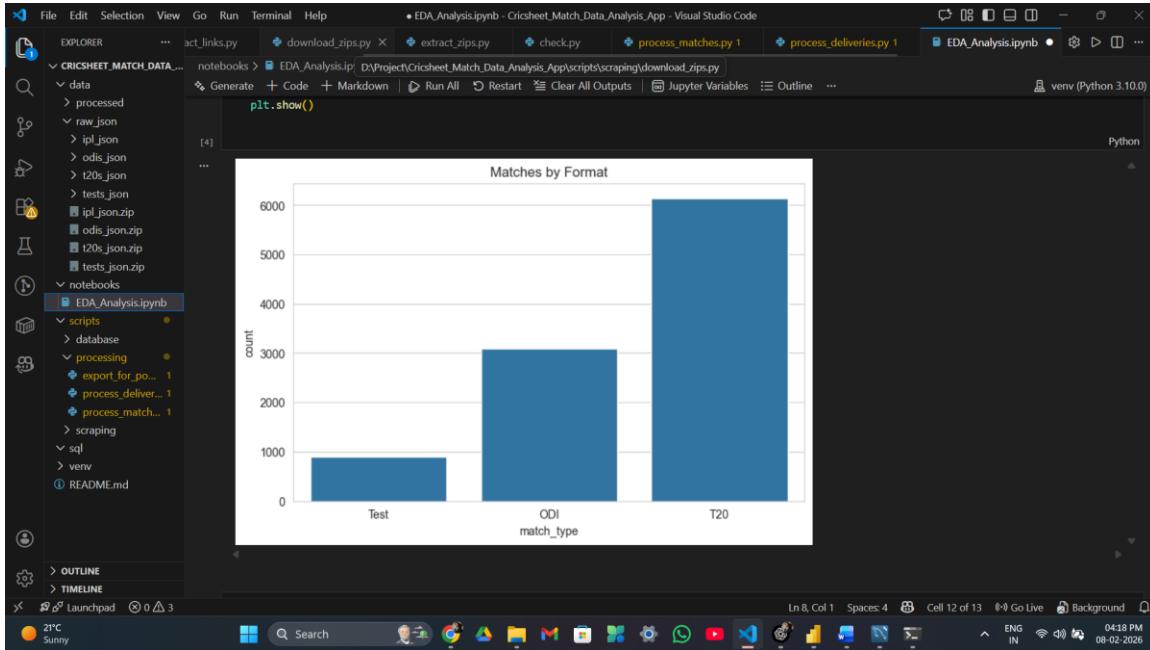
EDA was conducted using Python visualization libraries.

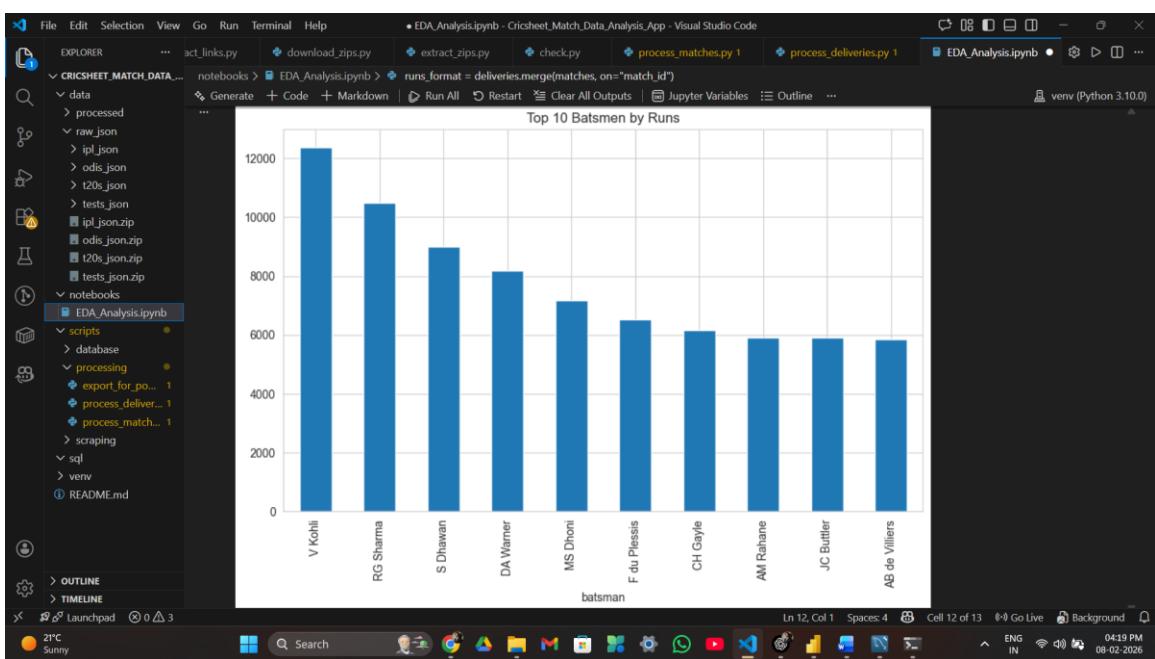
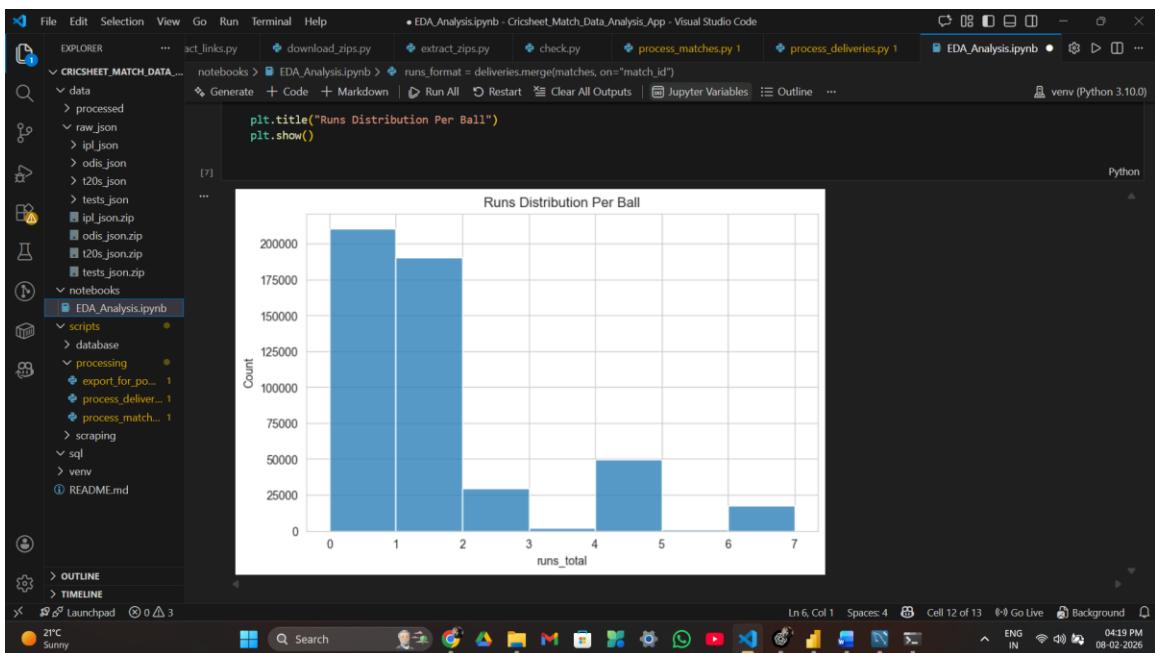
Charts created include:

- Matches by format
- Toss decision distribution
- Top batsmen by runs

- Leading wicket takers
- Venue analysis
- Win margin types

These visualizations helped identify trends and performance patterns.





10. Power BI Dashboard

An interactive Power BI dashboard was developed with two pages:

Page 1 — Match Overview

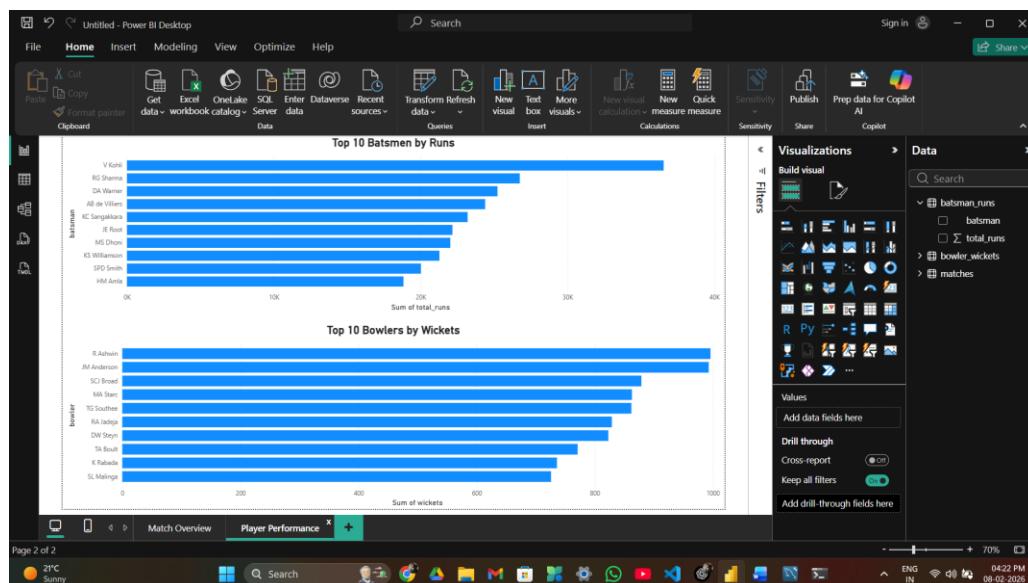
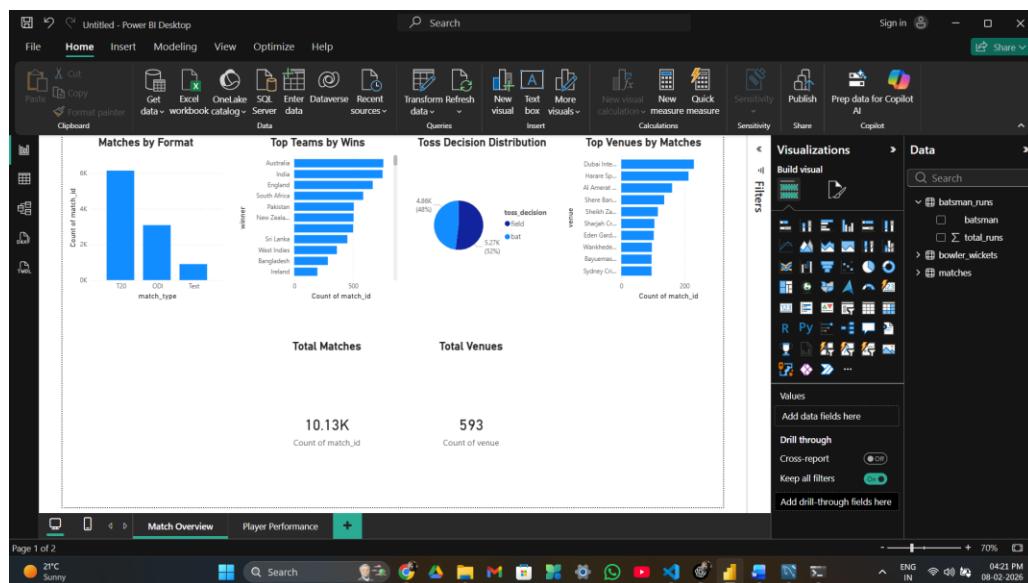
- Matches by format

- Toss decision distribution
- Team win leaderboard
- Venue analysis
- KPI cards

Page 2 — Player Performance

- Top 10 batsmen
- Top 10 bowlers

The dashboard allows dynamic exploration of cricket analytics.



11. Key Insights

Some major insights derived include:

- T20 matches dominate modern cricket datasets.
- Fielding first is a common toss decision.
- Certain teams show significantly higher win counts.
- Specific venues host a majority of matches.
- Top players contribute disproportionately to total runs and wickets.

12. Conclusion

This project successfully demonstrates an end-to-end data analytics pipeline, transforming raw cricket JSON datasets into structured insights.

Through scraping, preprocessing, database modeling, SQL analytics, and dashboard visualization, the project highlights the power of data engineering and business intelligence tools in sports analytics.

13. Future Scope

Future enhancements may include:

- Real-time match data integration.
- Player performance prediction models.
- Machine learning-based win forecasting.
- Advanced Power BI drill-through dashboards.