Indian Premier League Database

Saketh Vemula - 2022114014
Asish Bharadwaj - 2022101100
Madireddy Ananya - 2022101102
Chanukya SVSK - 2022101120
Viswanath Vuppala - 2022101084

1 Introduction

The Indian Premier League(IPL) Database is an attempt to organize data related to the Indian Premier League, one of the most popular and richest T20 cricket leagues in the world. This Database aims to provide a centralized and reliable source of information related to IPL matches, players, teams, some cool statistics, and other relevent aspects, facilitating easy access and analysis of IPL-related data.

2 Purpose of Database

The primary purpose of the database is to serve as a reliable and efficient repository of IPL-related data. It is made to store details and accurate information about IPL matches, teams, players, match outcomes, player performance, and historical records. The database will support various applications and real-time processes, enabling users to extract valuable insights, conduct research, platform statistical analysis, and create engaging visualisations related to IPL matches and players.

3 Users of Database

The primary users of the "Indian Premier League" Database include:

1. **League Administrators**
   Officials of Board of control for Cricket in India(BCCI) and Scorekeepers personnel who can access this database as **ADMINS** for updating and inserting the post-match results onto the database.

2. **Cricket Enthusiasts**
   Fans and followers of IPL who are interested in accessing detailed statistics, player profiles, and match results.

3. **Media and Journalists**
   Journalists and media professionals who need accurate and timely IPL data for reporting, articles, and other media-related content.

4. **Team Management**
   IPL team management staff who require player performance data, team statistics, and historical records for strategic decision-making.

5. **Fantasy Cricket Platforms**
   Providers of fantasy cricket games that utilize IPL data to create engaging and realistic gaming experiences for users.

6. **Advertisers and Sponsors**
   Advertisers and sponsors looking for insights and historical data to make informed decisions about IPL-related promotional activities.

7. **Researchers**
   Academic researchers, statisticians, and analysts who require IPL data for research purposes, trend analysis, and statistical modeling.

4 Applications of the database

Some of the Applications of this database include:

1. **Match Analysis**
   Users can analyze match data, including scores, player performances, and match outcomes, to derive patterns and insights about team strategies and player capabilities.

2. **Player Performance Evaluation**
   The database can be used to assess player performances over multiple seasons, helping in scouting, team selection, and player auctions.

3. **Historical Data Retrieval**
   Users can access historical records of IPL matches, teams, and players, facilitating historical trend analysis and comparisons.

4. **Fantasy Cricket**
   Fantasy cricket platforms can utilize the database to generate realistic player values and performance metrics, enhancing the gaming experience for users.

5. **Content Creation**
   Develop and maintain a detailed timeline of events, from pre-wedding activities to the reception, ensuring everyone is on the same page regarding schedules and responsibilities.

6. **Statistical Research**
   Researchers and statisticians can perform in-depth statistical analysis, trend identification, and data mining to gain valuable insights into IPL matches and player behaviors.

5 Database Requirements

1. **Assumptions and Constraints of Mini-World**
   This Database is particularly designed for Indian Premier League. Although, it can be used for other kind of tournaments, it is specifically made for serving Cricket.
   It is assumed that Orange Cap and Purple cap is given to only a single player in a season.

2. **Entity types**
   MVP - Most Valuable Player
   MOTS - Man Of The Season
   POTM - Player Of The Match

Entity Type	Attribute	Attribute Type	Sub Attributes	Data Type
SEASON	Season_Year	Key Attribute		VARCHAR(4)
	Champions_Team_ID	Simple		VARCHAR(10)
	Runner_Up_Team_ID	Simple		VARCHAR(10)
	Emerging_Player_ID	Simple		VARCHAR(10)
	MVP_Player_ID	Simple		INT
	MOTS_Player_ID	Simple		INT
	Orange_Cap_Player_ID	Simple		INT
	Purple_Cap_Player_ID	Simple		INT
BROADCASTERS	Broadcaster_ID	Key Attribute		INT
	Broadcaster_Name	Key Attribute		VARCHAR(25)
	Contract_ID	Simple		INT
SPONSORS	Sponsor_ID	Key Attribute		INT
	Sponsor_Name	Key Attribute		VARCHAR(25)
	Contract_ID	Simple		INT
MATCH	Match_ID	Key Attribute		INT
	Team1_ID	Simple		INT
	Team2_ID	Simple		INT
	Match_Date	Simple		DATE
	Match_Session	Simple		TIME
	POTM_Player_ID	Simple		INT

	Result	Simple		VARCHAR(25)
	Winning_Team_ID	Simple		INT
	Win_Type	Simple		VARCHAR(10)
	Win_Margin	Simple		INT
TEAM	Team_ID	Key Attribute		VARCHAR(10)
	Team_Name	Key Attribute		VARCHAR(10)
	Owner_Name	Simple		VARCHAR(25)
	Title(s)	Multi-Valued		YEAR
	Captain_Player_ID	Simple		VARCHAR(10)
	Vice_Captain_Player_ID	Simple		VARCHAR(10)
	Home_Ground_ID	Simple		INT
PLAYER	Player_ID	Key Attribute		INT
	Player_Name	Composite	First Name	VARCHAR(25)
			Last Name	VARCHAR(25)
	Date_of_Birth	Simple		DATE
	Age	Derived		INT
	Runs	Simple		INT
	Wickets	Simple		INT
	Batting_Hand	Simple		VARCHAR(10)
	Bowling_Hand	Simple		VARCHAR(10)
	Highest_Score	Simple		INT
	Average	Simple		DOUBLE
	Strike_Rate	Simple		DOUBLE
	100s	Simple		INT
	50s	Simple		INT
	4s	Simple		INT
	6s	Simple		INT
	Overs_Bowled	Simple		INT
	Best_Bowled_Innings	Simple		VARCHAR(10)
	Economy	Simple		DOUBLE
	5W	Simple		INT
	Country	Simple		VARCHAR(25)
STAFF	Team_ID	Primary Key		INT
	Staff_Name	Composite	First Name	VARCHAR(25)
			Last Name	VARCHAR(25)
	Staff_Role	Simple		VARCHAR(25)
UMPIRE	Umpire_ID	Key Attribute		INT
	Umpire_Name	Composite	First Name	VARCHAR(25)
			Last Name	VARCHAR(25)
	Country	Simple		VARCHAR(25)
	Experience	Simple		INT
TOSS	Match_ID	Primary Key		INT
	Team_ID	Simple		INT
	Toss_Decision	Simple		VARCHAR(10)
	Toss_Outcome	Simple		VARCHAR(10)
VENUE	Venue_ID	Key Attribute		INT
	Venue_Name	Key Attribute		VARCHAR(100)
	City	Key Attribute		VARCHAR(25)
	Capacity	Simple		INT
	Country	Simple		VARCHAR(25)
BATSMAN_STATS	Match_ID	Primary Key		INT
	Player_ID	Simple		INT
	Runs_Scored	Simple		INT
	Balls_Played	Simple		INT
	4s	Simple		INT
	6s	Simple		INT
	Strike_Rate	Derived		DOUBLE
BOWLER_STATS	Match_ID	Primary Key		INT
	Player_ID	Simple		DOUBLE
	Overs	Simple		DOUBLE

	Maiden_Overs	Simple		INT
	Runs	Simple		INT
	Wickets	Simple		INT
	Economy	Derived		DOUBLE

3. **Weak Entity types**

   STAFF:
   Staff is a weak entity type as it doesn't have any any key attribute which can uniquely define an entity in it. It needs to have a Primary key with Identifying Relation with TEAM Strong Entity Type.

   TOSS:
   TOSS is a weak entity type. It has MATCH_ID as a primary key with Identifying Relationship to Strong Entity Type MATCH.

   BATSMAN_STATS and BOWLER_STATS:
   Both theses entity types are weak entity as they don't have any attribute which can uniquely identify the Entity. It must have Identifying Relationship with MATCH through MATCH_STATS. They both have MATCH_ID as primary key.

4. **Relation Types**
   CR - Cardinalty Ratio
   DEG - Degree
   BAT_S - BATSMAN_STATS
   BOWL_S - BOWLER_STATS
   B - BROADCASTERS
   S - SPONSORS
   T - TEAMS
   P - PLAYERS
   x - 1:N:M:O:P

Relationship Type	DEG	Entities	CR	Constraints
MATCH_STATS	3	Match has MATCH_STATS bat_s and bowl_S	1:N:M	BAT_S (2,11) : BOWL_S (5, 11) MATCH (1, 1) : BAT_S (1, 11) MATCH (1, 1) : BOWL_S (1, 11)
PLAYED_BY	2	Match PLAYED_BY Team	1:2	MATCH (2,2) TEAM (14,17)
SUPPORT_STAFF	2	Team has SUPPORT_STAFF Staff	1:N	TEAM (1,N) STAFF (1,1)
SQUAD	2	Team has SQUAD consisting Players	1:N	TEAM (18,25) PLAYER (0, 1)
UMPIRED	2	Match UMPIRED by Umpires	1:3	MATCH (3, 3) UMPIRES (1, N)
TOSS_DECISION	2	Match has TOSS_DECISION as Toss	1:1	MATCH (1,1) TOSS (1, 1)
PLAYED_AT	2	Match PLAYED_AT Venue	1:1	MATCH (1,1) VENUE (7, 11)
MATCHES	2	Season has MATCHES Match	1:	SEASON (74, 74) MATCH (1, 1)
SPONSORS	2	Season has SPONSORS Sponsor	1:N	SEASON (1,N) SPONSOR (1, N)
BROADCAST_BY	2	Season is BROADCAST_BY Broadcasters	1:N	SEASON (1,N) BROADCASTERS (1, N)
HEAD_TO_HEAD	2	Team HEAD_TO_HEAD Team	1:N	TEAM (1,1) TEAM (1, 1)
BROUGHT_TO_YOU_BY	5	Season BROUGHT_TO_YOU_BY B, S, T, P	x	SEASON(1, N):B(1, N):S(1, N):T(1, 1) SEASON(1, N):S(1, N):T(10, 10):P(180, 250) SEASON(1, N):B(1, N):T(10, 10):P(180, 250) SEASON(1, N):B(1, N):S(1, N):P(18, 25) B(1, N):S(1, N):T(10, 10):P(180, 250)

5. **Relationship types with degree > 2**
   The Relationship Type **MATCH_STATS** has degree 3. It conveys the following: A MATCH has

MATCH_STATS BATSMAN_STATS and BOWLER_STATS.

6. **Recursive Relationship Type**
   The Relationship Type **HEAD_TO_HEAD** is a recursive Relationship between TEAM and TEAM. Team1 LEAD Team2 and Team2 TRAIL Team1.

7. **Relationship types with degree > 3**
   BROUGHT_TO_YOU_BY is a 5 degree relationship type which relates all the Broadcasters, Sponsors, Teams and Players in the database to a particular Season.

6 Functional Requirements

The contents of the database are accessible to each end user unless they are obtainable only through those query types that are of type **[ADMIN]**, in which case, it can be accessed only by League Administrators like BCCI, Official scorers or score keepers.

6.1 Modifications

1. **INSERT [ADMIN]**
   (a) **insert_season:** Inserts details of season into the database.
   (b) **insert_broadcasters:** Inserts a broadcaster into the database.
   (c) **insert_sponsors:** Inserts a sponsor into the database.
   (d) **insert_match:** Insert all the details of a match into the database.
   (e) **insert_team:** Insert newly formed teams (if any) into the database.
   (f) **insert_player:** Insert a player into the database.
   (g) **insert_staff:** Insert a Support staff of the team into the database.
   (h) **insert_umpire:** Insert the details of umpire into the database.
   (i) **insert_toss:** Insert the toss results and decisions for each match into the database.
   (j) **insert_venue:** Insert the venue details for a match into the database.
   (k) **insert_Batsman_score:** Insert statistics of batsmen into the database.
   (l) **insert_Bowler_stats:** Insert statistics of bowler performance into the database.

2. **UPDATE [ADMIN]**
   (a) **update_match:** Updates the match date, winning team and other attribute/relationship details into the database.
   (b) **update_team:** Updates the titles, relationship with players when there is a change in the squad and other updatable attributes/relationship in the database.
   (c) **update_player:** Updates age, runs and other updatable attributes/relationship in the database.
   (d) **update_venue:** Updates venue in case of any change in plan for matches of an IPL season in the database.
   (e) **update_batsman_scores:** Updates runs scored and all other attributes after each match in the database.
   (f) **update_bowler_stats:** Updates all the updatable attributes after each match in the database.
   (g) **update_staff:** Updates the support staff of each team for each season in the database.

3. **DELETE [ADMIN]**
   (a) **delete_teams:** Deletes or Archives the teams which are no longer participating in IPL.
   (b) **archive_player_records:** Archives info of a player who retired from or no longer playing in IPL.
   (c) **delete_venue:** Deletes the venue which is no longer in use for IPL matches.
   (d) **delete_umpire:** Deletes the umpire records who are no longer officiating the IPL matches.
   (e) **delete_staff:** Deletes the staff info who are no longer related to any team.

6.2 Retrieval

1. **SEARCH**
   (a) **search_champion:** searches for the champion of the season using season Year in the database.
   (b) **search_broadcaster:** searches for the broadcaster for particular season using Broadcaster name in the database.
   (c) **search_sponsor:** Search for a sponsor for the IPL season using sponsor name in the database.
   (d) **search_match:** Searches for all the matches a Team played in that Season using team name in the database.
   (e) **search_venues:** Searches for venues of IPL matches based on venue name.
   (f) **search_teams:** Searches for Specific IPL team based on Team name.
   (g) **search_players:** Searches for players based on player name or team name.
   (h) **search_seasons:** Searches for the seasons based on winners or Season Years.
2. **AGGREGATE**
   (a) **Count_Sponsors:** Counts the number of sponsorships for each IPL season.
   (b) **Umpire_Stats:** Count the number of matches for which specific umpire worked in that IPL season.
   (c) **Aggregate_Venue Data:** Count the number of matches held at each venue.
   (d) **Season_Average:** Calculates the season averages for average runs scored, average wickets taken and net run rates of each team.
   (e) **Player_records:** Calculates Total runs scored, number of Centuries for a batsman and Total wickets taken, number of 5 wicket Hauls for Bowlers.
   (f) **Match_results:** counts the total number of matches won, lost and tied for a particular team in a particular IPL Season.
   (g) **Team_statistics:** Counts and provide the total number of matches played, total runs scored, total wickets taken and Team averages.
3. **SELECTION**
   (a) **List_Current_Teams:** Retrieves a list of IPL teams which are active in the current IPL season.
   (b) **List_matches_by_date:** Retrieves all the matches to be played on a specific date or a given range of dates (Including the full season).
   (c) **Match_Results:** Lists all the match results for a particular season.
   (d) **Team_Batsmen:** Lists all the batsmen including the all rounders in a particular team in a particular season in the increasing order of their position.
   (e) **Team_Bowlers:** Lists all the bowlers including the all rounders in a particular team in a particular season in the decreasing order of their wickets.
   (f) **Team_All_Rounders:** Lists all the all rounders in a particular team in a particular season in the increasing order of their position of batting.
   (g) **Venues_available:** Lists all the venues available in the decreasing order of their capacity.
4. **ANALYSIS**
   (a) **Points_Table:** Fetches and displays the teams in the decreasing order of their number of wins and then net run rates.
   (b) **Venue_analysis:** Returns the type of pitch before the match and also analyses the Average first batting score, Average second batting score, average wickets taken on that pitch, Highest team score.
   (c) **Win_Loss analysis:** Analyses the team performance for that particular season at different venues with different teams in different seasons. This enables users and team staff to have a rough idea how is team performing in home ground vs away.

7 Summary

The IPL Database is a comprehensive and reliable source of IPL-related data, catering to a diverse range of users including cricket enthusiasts, researchers, media professionals, team management, fantasy cricket platforms, advertisers, and sponsors.

By providing easy access to detailed and accurate information about IPL matches, teams, and players, the database supports various applications such as match analysis, player performance evaluation, historical data retrieval, fantasy cricket, statistical research, and content creation. It serves as a valuable resource for anyone seeking in-depth insights into the world of Indian Premier League cricket.