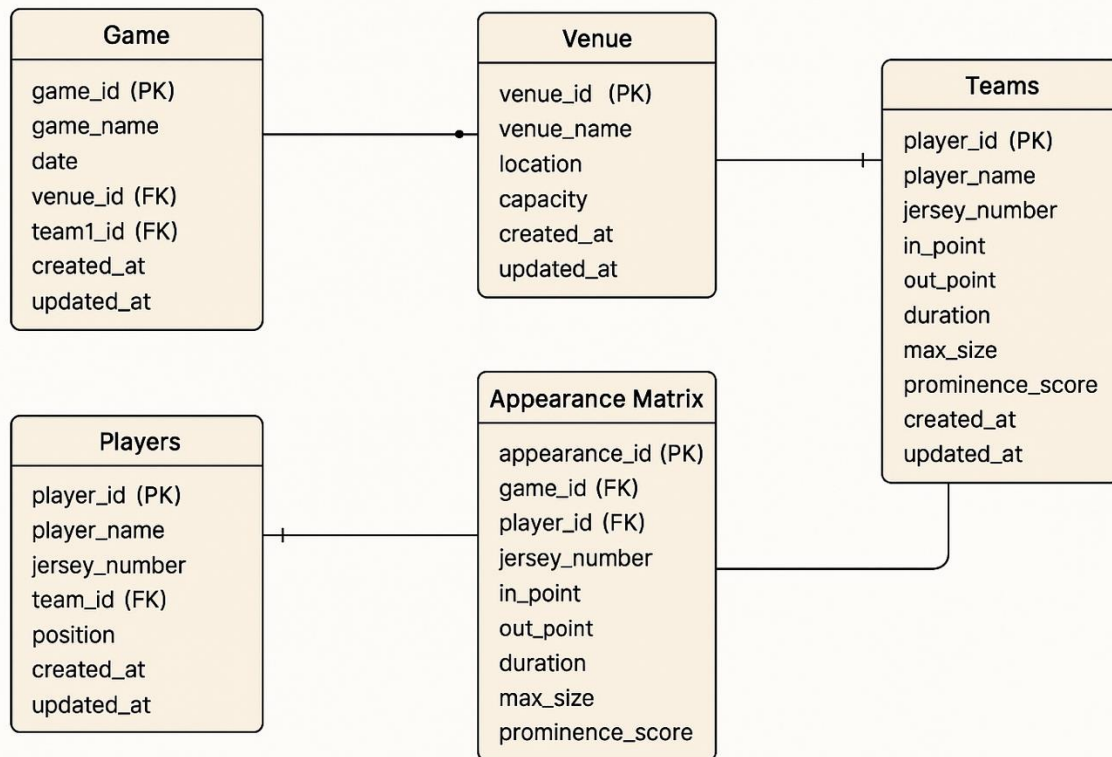


Purpose:

The goal is to efficiently manage and analyze video data for sports games, specifically focusing on player detection through jersey numbers. The database will store details about games, venues, teams, players, and the results of AI-based player appearance analysis.



Database Structure:

The database consists of five main tables:

Game: Information about each game.

Venue: Details about where the game took place.

Teams: Information about each team participating in the game.

Players: Player profiles, including their jersey numbers.

Appearance Matrix: Tracks each player's on-screen presence and prominence.

1. Game Table:

The Game table records basic information about each game, including the game name,

date, and the teams involved. It also links to the Venue table to specify where the game was played.

Fields:

game_id: Unique ID for each game.

game_name: A descriptive name for the game.

date: The date the game took place.

venue_id: Links to the venue where the game was held.

team1_id/team2_id: Identifies the two competing teams.

created_at/updated_at: Timestamps for record keeping.

2. Venue Table:

The Venue table contains details about the locations where games are played. This helps track which games occurred at specific venues.

Fields:

venue_id: Unique ID for each venue.

venue_name: The official name of the venue.

location: Where the venue is situated (city, province/state).

capacity: How many people the venue can accommodate.

created_at/updated_at: Timestamps for record keeping.

3. Teams Table:

The Teams table lists all the teams that might participate in the games. It includes the team name and league information.

Fields:

team_id: Unique ID for each team.

team_name: The name of the team (e.g., Calgary Flames).

league: Which league the team belongs to (e.g., NHL).

created_at/updated_at: Timestamps for record keeping.

4. Players Table:

The Players table contains profiles for each player, including their name, jersey number, and the team they play for. This helps link player appearances to specific teams.

Fields:

player_id: Unique ID for each player.

player_name: Full name of the player (e.g., Rasmus Andersson).

jersey_number: The number on the player's jersey.

team_id: Identifies which team the player belongs to.

position: The player's position (e.g., defenseman).

created_at/updated_at: Timestamps for record keeping.

Appearance Matrix Table:

The Appearance Matrix is the core of the analysis, capturing how long a player appeared on the screen and how prominent they were. This table helps in identifying player visibility in a given game.

Fields:

appearance_id: Unique ID for each player appearance entry.

game_id: Which game the player was detected in.

player_id: Which player was detected.

jersey_number: Jersey number detected in the video.

in_point: The first frame where the player appears.

out_point: The last frame where the player appears.

duration: How long the player was visible (in seconds).

max_size: The largest size of the jersey number detected on screen as a percentage.

prominence_score: Calculated as:

Prominence Score=Duration×Average Size

created_at/updated_at: Timestamps for record keeping.

How It All Comes Together:

When a game is recorded and processed, the system first logs the game details in the Game table and links it to the Venue.

The Teams table stores the names of the competing teams.

The Players table lists each player along with their team and jersey number.

As the video processing detects players, it logs the data in the Appearance Matrix. This includes how long a player was visible and how prominent they were based on the screen size.

Analysts can then query the database to see which players appeared the most, how prominent they were, and compare player visibility between teams.

Example Use Case:

If the system detects player "Rasmus Andersson" wearing jersey number 4 on the screen from frame 100 to frame 500, it records:

In-Point: 100

Out-Point: 500

Duration: $(500 - 100) / \text{FPS}$ (e.g., 30)

Max Size: Percentage of the screen occupied by the number.

Prominence Score: Product of the duration and average size.

This structured data allows us to calculate player visibility statistics and generate insights like:

Which player had the longest screen time?

Which players were the most prominent based on visibility and duration?

How did the visibility compare between the two teams?

[Final Thoughts:](#)

This database structure is designed to be flexible and scalable. It ensures that player detection data is linked to specific games and teams, making it easy to generate reports and perform analysis. With the combination of structured player data and AI-generated appearance metrics, we can gain valuable insights into player performance and screen presence.