

NFL Gridiron Guru - The Ultimate Team NFL Matchup Engine

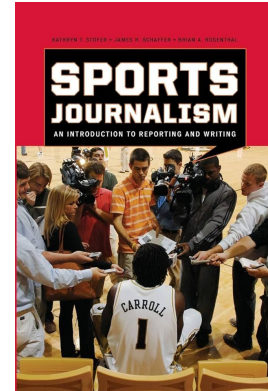
NFL Game Search Tool for Detailed Insights

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Project Overview

Objective: To create a search tool that allows users to query past NFL games for detailed insights such as scores, total yards, and other metrics

Target Audience: NFL fans, journalists, and fantasy sports players seeking detailed game statistics



Data Collection and Sources

- FiveThirtyEight NFL ELO dataset for team ratings and historical outcomes
- Pro Football Reference for game details like total yards and turnovers
- ESPN API for current game data and unstructured text commentary



Algorithm and Approach

Core Algorithm: BM25 for ranking games by relevance to the query

BM25 - Calculates scores based on term frequency and inverse document frequency, considering factors like team names, game stats, and keywords.

Example: Defining “Excitement” in Games

- High scores and close margins
- Significant game events (turnovers, high yardage)
- Fan engagement metrics or key words indicating excitement in game descriptions

Implementation Strategy

Data Processing:

Pipeline Creation: Scripts clean, standardize, and store data from APIs

Text Cleaning: Removes irrelevant characters, HTML tags, and inconsistencies in data

BM25 Scoring and Query Matching:

- Assign weights to different fields

Example: Yardage and Big Plays - Metrics like total yards or big plays are given higher weights for terms like “high-scoring” or “offensive performance”

- Tests to Ensures Query Results Meet Expectations

Relevance Testing: Run queries against BM25 to check top ranked games match expected results

Test Case Setup: Define several test cases based on common and unique user queries

Unique Query Capabilities of Gridiron Guru

Flexible and Specific Query Handling:

Users can ask high specific questions like:

- “Closest games for the Arizona Cardinals”
- “Most exciting games for the Seattle Seahawks”
- “Biggest blowouts for the Houston Texans”

User Benefits:

- Allows fans to explore NFL history with more specificity and relevance than traditional search engines
- Our customized ranking and filtering allows for more tailored user results

Key Challenges and Solutions

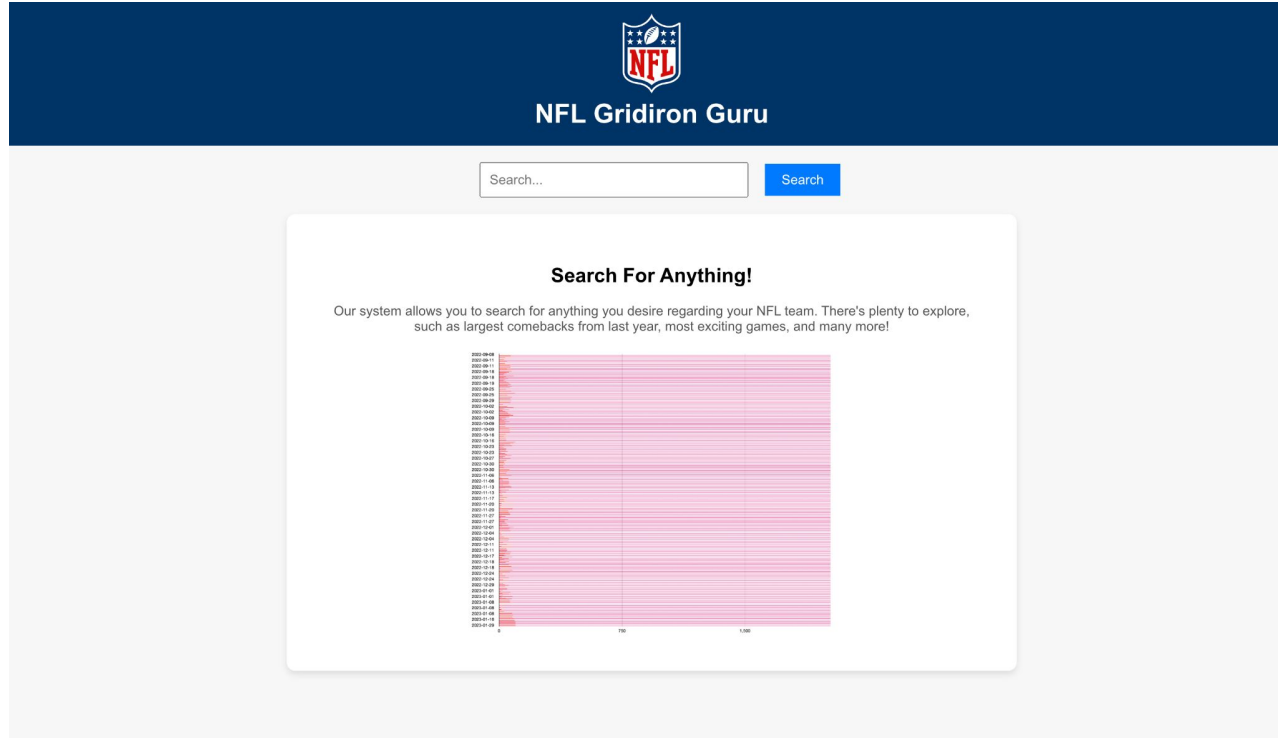
Challenges:

- Data cleaning and normalization
- Optimizing BM25 to handle large datasets efficiently
- Evaluating output quality and relevance


Solutions:

- Robust data cleaning pipelines (ie: Removing unnecessary details from data, ensuring correct formatting, and normalizing team names and player statistics across different sources)
- BM25 Fine Tuning (ie: Adjusting term frequency scaling and document length normalization and testing different weighting schemes for different fields)

Gridiron Guru Homepage UI



Example Query Result for “most exciting cardinals games”



NFL Gridiron Guru

Search

Matchup: Arizona Cardinals at Cincinnati Bengals

[ESPN](#)

Show Details

Matchup: Baltimore Ravens at Arizona Cardinals

[ESPN](#)

Show Details

Matchup: Arizona Cardinals at Tennessee Titans

[ESPN](#)

Show Details

Matchup: Arizona Cardinals at Carolina Panthers

[ESPN](#)

Matchup: Arizona Cardinals at Cincinnati Bengals

[ESPN](#)

Hide Details

1st Downs:

Arizona Cardinals: 23
Cincinnati Bengals: 16

1st downs from penalties:

Arizona Cardinals: 3
Cincinnati Bengals: 1

3rd down efficiency:

Arizona Cardinals: 6-11
Cincinnati Bengals: 8-16

4th down efficiency:

Arizona Cardinals: 0-0
Cincinnati Bengals: 0-0

Comp/Att:

Arizona Cardinals: 20/32
Cincinnati Bengals: 22/33

Defensive / Special Teams TDs:

Arizona Cardinals: 0
Cincinnati Bengals: 0

Fumbles lost:

Arizona Cardinals: 0
Cincinnati Bengals: 1

Interceptions thrown:

Arizona Cardinals: 0
Cincinnati Bengals: 0

Passing:

Arizona Cardinals: 198
Cincinnati Bengals: 277

Passing 1st downs:

Arizona Cardinals: 11
Cincinnati Bengals: 11

Penalties:

Arizona Cardinals: 2-20
Cincinnati Bengals: 11-104

Possession:

Arizona Cardinals: 27:47
Cincinnati Bengals: 32:13

Red Zone (Made-Att):

Arizona Cardinals: 5-6
Cincinnati Bengals: 1-2

Rushing:

Arizona Cardinals: 112