

NBA4U: Personalized Player Stats and Performance Grading Application

CS4991 Capstone Report, 2025

Weta Aninye
Computer Science
The University of Virginia
School of Engineering and Applied Science
Charlottesville, Virginia USA
Mdn8ut@virginia.edu

ABSTRACT

NBA fans often find it challenging to stay updated on player statistics and performances due to the vast amount of data and limited time to watch games. NBA4U solves this problem by offering a web application where users can input a current NBA player's name to receive real-time stats and a personalized letter grade based on recent performances. Developed using Python, Django, and an external API for stats retrieval, the application utilizes custom algorithms to analyze and evaluate player data. This project bridges the gap between sports analytics and accessibility, providing an easy-to-use tool for casual fans. I designed the application to enhance user engagement with the NBA community by offering insightful and interactive features. Future improvements include expanding the grading system to factor in team performance and integrating advanced data visualization tools for a more dynamic user experience.

1. INTRODUCTION

The National Basketball Association (NBA) has a vast following, with millions of fans seeking up-to-date player statistics and performance evaluations. However, keeping track of individual player performances across multiple games can be overwhelming due to the sheer volume of data available. Fans often rely on sports analytics websites or social media discussions to gauge player

effectiveness, but these sources can be fragmented or opinion based. I designed NBA4U to address this challenge by providing users with real-time player statistics and personalized performance evaluations.

Using Python and Django as the core technologies, NBA4U integrates an external API to fetch player data and employs custom algorithms to assess and grade player performance. By delivering insightful analytics in an accessible format, NBA4U enhances fan engagement and deepens their understanding of player trends. The application simplifies access to essential performance metrics and introduces an intuitive grading system, allowing users to compare players easily.

2. RELATED WORKS

Several existing platforms provide NBA player statistics and analytics, each with its strengths and limitations.

NBA.com and ESPN are two widely used platforms for retrieving real-time player statistics and game summaries. These sites provide official statistics, news, and expert analysis. However, they do not offer personalized performance grading or

advanced insights tailored to individual fan preferences. Basketball-Reference is another comprehensive database that allows users to explore historical and real-time statistics, player comparisons, and advanced analytics. While highly detailed, its interface is data-heavy and may not be easily digestible for casual fans. Unlike NBA4U, it lacks an automated grading system to evaluate performance based on recent trends.

FiveThirtyEight's RAPTOR (Robust Algorithm using Player Tracking and On/Off Ratings) is an advanced statistical model used to evaluate NBA player contributions. It incorporates play-by-play data and advanced metrics to predict team and player performance. While highly sophisticated, it is primarily geared toward in-depth analysis by analysts rather than casual fans seeking quick and intuitive insights.

NBA4U differentiates itself by bridging the gap between complex analytics and user-friendly design, offering an easy-to-use platform that provides both real-time stats and a customized grading system. By integrating key elements from these platforms with a more intuitive approach, NBA4U enhances accessibility for NBA enthusiasts.

3. PROCESS DESIGN

The development of NBA4U followed a structured approach to ensure an effective and user-friendly experience. The application was built using Python and Django as the core backend technologies, leveraging Django's Model-View-Controller (MVC) framework for efficient data organization and request handling. A PostgreSQL database was used to store user preferences and cached player statistics to improve response times. One of the key components of NBA4U is its

integration with an external NBA statistics API, which allows the application to retrieve real-time player performance metrics such as points per game (PPG), rebounds per game (RPG), assists per game (APG), and field goal percentage (FG%). These statistics are dynamically processed and presented to users in an intuitive format.

A central feature of the application is the performance grading system, which assigns letter grades (A+ to F) to players based on their recent performances. The grading algorithm considers a player's last five games, season averages, key performance indicators such as efficiency and scoring, and adjustments based on opponent difficulty. By combining these factors, NBA4U provides a balanced and fair assessment of player performance. The front-end was developed using HTML, CSS, JavaScript, and Bootstrap to ensure a responsive and user-friendly interface. Users can input a player's name into a search field, triggering the system to fetch and display real-time statistics and performance grades.

Throughout the development process, several challenges emerged. Initial API request delays caused data latency, which was mitigated using caching techniques. The grading system also required adjustments to ensure fair evaluation for different player roles, such as defensive specialists and role players. Additionally, early UI designs needed refinement based on user feedback to improve navigation and readability. By addressing these challenges through iterative testing and optimization, NBA4U evolved into a more polished and functional prototype.

4. RESULTS

The initial prototype of NBA4U has demonstrated promising results, successfully integrating real-time NBA data retrieval with a functional performance grading system. Early testing confirmed that player statistics are retrieved accurately, and the grading algorithm aligns well with expert analyses. Users found the interface intuitive and easy to navigate, allowing them to quickly access relevant player insights. The application effectively reduces the time required to search for and interpret player statistics, consolidating key performance metrics into a single, user-friendly platform.

Looking ahead, NBA4U has the potential to significantly enhance fan engagement by providing personalized performance insights in real-time. If fully developed and deployed, the application could introduce additional features such as historical performance comparisons, team impact assessments, and predictive analytics using machine learning models. Future improvements may also include a mobile-friendly design and expanded customization options, allowing users to filter statistics based on their preferences. By continuing to refine and expand its capabilities, NBA4U aims to become a valuable tool for NBA fans seeking deeper insights into player performances without the need for complex data analysis.

5. CONCLUSION

NBA4U provides an innovative solution to the overwhelming volume of NBA data by offering fans a simple, personalized way to track player performance in real time. By combining real-time statistics with an intuitive grading system, the application delivers a unique and engaging user experience that bridges the gap between complex analytics and everyday fandom. This project highlights how accessible technology can make data-driven insights more available to casual users, enhancing their connection to the game. The use of Python, Django, and external APIs showcases the power of full-stack development in creating impactful, real-world applications. NBA4U stands out for its ability to simplify and personalize sports analytics, making it an essential tool for modern NBA enthusiasts.

6. FUTURE WORK

Future development of NBA4U will focus on expanding the grading algorithm to include team-level performance metrics and defensive statistics, ensuring a more holistic view of a player's impact. Additional features such as historical performance comparisons, injury status tracking, and player trending charts will provide deeper context and predictive insights. Integrating machine learning models to project future performance and outcomes is also a promising direction. A mobile-responsive version is in development to allow users to access insights on the go. With continued refinement, NBA4U has the potential to grow into a widely adopted platform for fans, fantasy league participants, and even sports journalists seeking quick and reliable player evaluations.

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