

BASKETBALL LEARNING AND NBA PLAYER PERFORMANCE ANALYTICS WEB PORTAL

Tamizhisai M^{*1}, Sandhiya H^{*2}, Dr. Padma. R, M.sc., M.Phil., PGDHRM, SET, Ph.D.^{*3}

^{*1,2}Department Of Information Technology, VISTAS, India.

^{*3}Assistant Professor, Department Of Information Technology, VISTAS, India.

ABSTRACT

Basketball is one of the most popular sports in the world and is widely followed by people of all age groups. The game requires speed, strategy, teamwork, and analytical thinking. However, beginners often face difficulty in understanding basketball rules, gameplay techniques, player positions, and statistical analysis. Most existing platforms either focus only on teaching the basics of basketball or only on providing statistical analysis of players. There are very few systems that combine both learning and analytics in a single platform.

This project presents a Basketball Learning and NBA Player Performance Analytics Web Portal developed using web technologies such as HTML, CSS, JavaScript, JSON, and Chart.js. The proposed system combines educational content with player analytics to provide a complete learning and analytical environment for users. The learning module helps beginners understand basketball concepts such as rules, court layout, scoring system, and referee signals. The player profile module displays detailed information about popular NBA players. The analytics module evaluates player performance using metrics such as Points Per Game (PPG), Assists Per Game (APG), and Rebounds Per Game (RPG).

The system also uses charts and visual representations to simplify statistical data and improve analytical understanding. The portal is designed with a responsive and user-friendly interface, allowing users to navigate easily between modules. The results indicate that the proposed system effectively improves both basketball learning and player performance analysis.

Keywords: Basketball, Sports Analytics, NBA, Player Performance, Data Visualization, Web Portal.

I. INTRODUCTION

Basketball is one of the fastest-growing sports globally and has gained significant popularity through professional leagues such as the NBA. The game involves strategic gameplay, teamwork, physical fitness, and quick decision-making abilities. Due to the complexity of the game, beginners often find it difficult to understand various aspects such as rules, gameplay structure, player roles, and statistical metrics.

At the same time, sports analytics has become an important component in modern basketball. Coaches, analysts, and fans use statistical data to evaluate player performance and understand team strategies. Metrics such as scoring average, assists, rebounds, and efficiency ratings are commonly used in professional analysis. However, most analytics platforms present these statistics in a complex format, making them difficult for beginners to understand.

The proposed Basketball Learning and NBA Player Performance Analytics Web Portal aims to bridge this gap by integrating learning and analytics into a single platform. The system provides educational content for beginners and also enables users to analyze player performance through visual charts and graphs.

The project is developed using HTML for structure, CSS for styling, JavaScript for functionality, JSON for data handling, and Chart.js for data visualization. The system is lightweight, responsive, and accessible through a web browser.

II. LITERATURE SURVEY

Sports analytics has become increasingly important in modern basketball. Professional organizations use analytics to improve team strategies, evaluate player performance, and optimize game decisions. Existing studies show that statistical analysis plays a major role in understanding player efficiency and predicting game outcomes.

Many basketball learning platforms provide educational content related to rules and gameplay. However, these systems usually lack analytical features. Similarly, analytics platforms provide detailed statistical data but often fail to explain the significance of those statistics in a beginner- friendly manner.

Research also highlights the importance of data visualization in simplifying complex information. Visualization tools such as graphs and charts improve user comprehension and help identify trends more effectively. Existing systems often lack integration between educational content and analytics, which creates a gap for users who wish to learn and analyze simultaneously.

The proposed system addresses these limitations by combining learning and analytics into a single web-based application.

III. OBJECTIVES

The primary objective of the project is to develop a web-based system that combines basketball learning and player performance analytics into a single platform. The system is designed to help beginners understand basketball concepts while also providing analytical insights into player performance.

The project aims to provide structured learning content about basketball rules, court layout, scoring systems, and referee signals. Another objective is to develop a player profile module that displays detailed information about NBA players. The project also focuses on implementing an analytics module that uses statistical metrics such as PPG, APG, and RPG to analyze player performance.

The system also aims to simplify complex data through charts and visualizations, thereby improving user understanding and analytical capability. In addition, the project is designed with a user-friendly and responsive interface to ensure accessibility across different devices

IV. EXISTING SYSTEM

Existing systems related to basketball generally focus either on educational content or on player analytics. Learning platforms provide text- based explanations about basketball rules and gameplay but often lack interactivity and visual support. Analytics platforms provide detailed player statistics and dashboards, but these systems are generally designed for analysts and experienced users.

Many existing platforms present data in large tables and complex visual structures, making it difficult for beginners to understand. In addition, users often need to switch between multiple platforms to access educational content and analytics separately.

Another limitation of existing systems is the lack of user-friendly visualization. Although charts are used in some platforms, they are often too advanced for new users. Existing systems also lack personalization and beginner-oriented explanations.

V. PROPOSED SYSTEM

The proposed Basketball Learning and NBA Player Performance Analytics Web Portal integrates learning and analytics into a single platform. The system is designed with a modular architecture that includes learning, player profile, and analytics modules.

The learning module provides information about basketball basics such as court structure, rules, scoring system, and referee signals. The player profile module displays player details including name, team, achievements, and playing style. The analytics module analyzes player performance using visual charts and statistical data.

The proposed system uses JSON for storing player data and JavaScript for dynamic content handling. Chart.js is used to generate graphs and charts for visual analytics. The system is lightweight, interactive, and easy to use

VI. SYSTEM DESIGN

The system follows a client-side web architecture consisting of user interface, application logic, data handling, and visualization components. The interface is developed using HTML and CSS, while JavaScript handles dynamic functionality.

The system architecture can be represented as follows:

User → Interface → JavaScript → JSON Data → Chart.js → Output

The Learn Basketball module is responsible for displaying educational content related to basketball. The Player Profile module displays information about NBA players and their achievements. The Analytics module processes statistical data and displays visual charts.

The interface is designed using responsive layouts, card structures, and smooth navigation techniques to improve usability. JSON is used for lightweight data storage and easy integration with JavaScript.

VII. IMPLEMENTATION

The implementation phase converts the system design into a working application. HTML is used to create the structure of the web pages, including navigation bars, cards, content sections, and layouts. CSS is used to enhance the appearance of the system through color themes, spacing, responsiveness, and animations.

JavaScript plays a major role in implementing the functionality of the system. It handles user interaction, dynamic content loading, and chart generation. JSON files are used to store player information such as player name, team, and performance metrics.

The analytics module uses Chart.js to generate charts representing player statistics. These visualizations help users compare player performance effectively.

Sample HTML Structure:

```
<html>
<head>
<title>NBA Analytics Hub</title>
<link rel="stylesheet" href="style.css">
</head>
<body>
<nav>
<h2>NBA Analytics Hub</h2>
</nav>
</body>
</html>
```

Sample CSS Code:

```
body{margin:0;font-family:Verdana;background:#0b1220;}
```

.card{padding:20px;border-radius:20px;} Sample JavaScript Code:

```
const players=[{name:"Stephen Curry",ppg:29},{name:"LeBron James",ppg:27}];
```

The modules are integrated together to form a complete and interactive web portal.

VIII. RESULTS AND DISCUSSION

The developed system successfully integrates basketball learning and player analytics into a single platform. The learning module provides a clear understanding of basketball concepts for beginners. The player profile module presents player information in a visually organized format.

The analytics module effectively visualizes player statistics using charts. Metrics such as Points Per Game, Assists Per Game, and Rebounds Per Game are represented graphically, enabling users to compare players easily.

The system demonstrates good performance, responsive design, and smooth navigation. The use of visual elements improves user engagement and understanding. The results indicate that the proposed system achieves its objectives effectively.

IX. ADVANTAGES

The proposed system offers several advantages compared to existing systems. One of the major advantages is the integration of learning and analytics into a single platform. This eliminates the need for users to switch between multiple applications.

The system is beginner-friendly and presents information in a simplified manner. Charts and graphs improve understanding of player statistics and make data interpretation easier. The responsive interface ensures accessibility across multiple devices.

The modular architecture also allows easy scalability and future enhancements. The use of lightweight technologies improves system performance and reduces complexity.

X. FUTURE SCOPE

The system can be enhanced further by integrating real-time NBA data using APIs. This will enable users to analyze live player statistics and current game performance.

Advanced analytics features such as shooting percentages, defensive ratings, and player efficiency metrics can also be added. Machine learning algorithms may be implemented in the future to predict player performance and match outcomes.

The project can also be extended into a mobile application with personalized dashboards and user authentication features. Interactive learning content such as animations and video tutorials can further improve the educational experience.

XI. CONCLUSION

The Basketball Learning and NBA Player Performance Analytics Web Portal has been successfully developed as a web-based application that integrates basketball learning and player analytics into a unified platform. The system provides educational content for beginners while also enabling performance analysis through visual charts and statistical metrics.

The learning module simplifies basketball concepts and improves user understanding. The analytics module effectively visualizes player performance data, making statistical interpretation easier for users. The project demonstrates the effective use of modern web technologies such as HTML, CSS, JavaScript, JSON, and Chart.js.

Overall, the system achieves its objectives and provides an interactive, efficient, and user-friendly platform for basketball learning and analytics.

XII. REFERENCES

- [1] NBA Official Website, "Player statistics and game information," Available: <https://www.nba.com>
- [2] ESPN Sports, "Basketball analytics and player statistics," Available: <https://www.espn.com>
- [3] W3Schools, "HTML, CSS and JavaScript Tutorials," Available: <https://www.w3schools.com>
- [4] MDN Web Docs, "JavaScript Documentation," Available: <https://developer.mozilla.org>
- [5] Chart.js Documentation, "Data Visualization Library," Available: <https://www.chartjs.org>
- [6] J. Brown, Basketball Fundamentals and Techniques, Sports Publications, 2018.
- [7] A. Smith, Introduction to Sports Analytics, Academic Press, 2019.
- [8] R. Wilson, Web Development with HTML, CSS, and JavaScript, Pearson Education, 2020.
- [9] S. Kumar, "Web-Based Learning Systems: Design and Implementation," International Journal of Computer Applications, vol. 15, no. 4, pp. 50–60, 2019.
- [10] K. Lee, "Visualization Techniques for Sports Data," Journal of Data Science and Analytics, vol. 8, no. 3, pp. 200–210,