

Sports IQ Explorer: An Interactive Sports Quiz Web Application

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Abstract- Sports IQ Explorer is an interactive quiz web application developed to assess and enhance users' knowledge across a wide range of sports. A key feature of the platform is its structured categorization into two main sections: Indoor Sports and Outdoor Sports, each containing several individual sports. This organized approach allows users to easily explore and focus on the type of sport they are most interested in. Each sport offers multiple levels, and as users move through these levels, the questions become progressively more difficult, providing a gradual and challenging learning experience. After completing a quiz level for a selected sport, users are presented with interesting and informative facts related to that sport. This fact-sharing adds educational value and encourages deeper understanding. Following the facts, a scoreboard displays instant feedback — including the user's score, performance summary, correct answers, and explanations — along with an option to retry the quiz. This seamless flow from sport selection to quiz, fact-sharing, and feedback creates a unique and engaging experience, combining fun with learning for all sports enthusiasts.

Keywords Sports Quiz, Interactive Learning, Gamification, Trivia, Web Application, Indoor Sports, Outdoor Sports.

I. INTRODUCTION

Sports play a vital role in the lives of individuals, promoting physical fitness, discipline, and teamwork. Beyond physical engagement, understanding the rules, history, and intricacies of various sports can enrich the experience of fans, players, and learners alike. However, educational tools that support learning about sports are often either too simplistic or fail to engage users meaningfully. With the rise of digital education and gamification, interactive learning platforms have proven highly effective in improving knowledge retention and user motivation. This trend is especially relevant in sports education, where interactive quizzes and fact-based learning can make complex information more digestible and

enjoyable. Sports IQ Explorer is a web-based quiz application designed to fill this gap by offering a structured, level-based, and fun approach to learning about sports. The platform categorizes quizzes into Indoor and Outdoor Sports, each containing multiple levels of difficulty. Users begin at the basic level and progress through increasingly challenging questions, promoting continuous learning. After each level, users receive fact-based trivia to enhance their understanding of the selected sport. In addition to quizzes, the platform features a scoreboard, performance summaries, and a retry mechanism, enabling users to review and improve their performance. This makes Sports IQ Explorer not only a testing platform but also an educational and engaging tool suitable for students, sports enthusiasts, and general users

seeking to expand their knowledge in a fun and interactive way.

II. PROBLEM STATEMENT

In the current digital era, there is a significant lack of engaging and wellstructured educational platforms dedicated to sports knowledge. Existing quiz-based applications generally offer broad trivia questions without proper categorization or a progressive learning structure, limiting the user's ability to focus on specific sports or improve systematically. Moreover, these platforms often do not incorporate essential educational features such as level-based difficulty progression, informative feedback, or opportunities to retry and reinforce learning. As a result, they fail to sustain user engagement and do not effectively promote knowledge retention. There is a clear need for an interactive, subject-specific quiz system that not only evaluates users' knowledge but also enriches their understanding through educational facts and gamified elements. Such a system can significantly boost motivation, learning outcomes, and long-term user engagement in the domain of sports education.

III. LITERATURE REVIEW

Quiz-based learning has been widely recognized for its effectiveness in enhancing memory retention and comprehension through active recall and repetition. The integration of gamification—the application of game-like elements in non-game contexts—has been extensively adopted in educational tools to increase user motivation and engagement [1]. For instance, in-lecture quiz platforms such as Kahoot! have been shown to significantly boost student participation and improve learning outcomes in online classroom settings [1]. Despite the popularity of platforms like Kahoot! and QuizUp, these systems primarily offer general trivia and lack structured content tailored to specific domains such as sports. Moreover, they often omit essential features like topic based categorization, level-based difficulty progression, and informative feedback with retry options—components that are crucial for effective knowledge

acquisition and user satisfaction. Srinayana and Praveenchandar [2] proposed an online quiz system focused on user engagement, enjoyment, and performance. Their work emphasizes a shift away from competitive ranking systems towards more user-centric design approaches. Key insights from their study, such as the importance of user interface (UI) enhancements, quiz diversity, and gamification mechanics, inform the development of Sports IQ Explorer—a system designed with structured level progression, trivia fact-sharing, retry mechanisms, and instant performance feedback to maintain motivation and foster meaningful learning. Additional research supports the value of multimedia integration, progressive question difficulty, and contextually rich content in improving user satisfaction and long-term retention [1]. In alignment with these findings, Sports IQ Explorer incorporates educational trivia after each quiz level and increasingly challenging questions to reinforce users' conceptual understanding beyond mere rote memorization. Sarinho et al. [3] introduced AskME, a multiplatform quiz system architecture utilizing the Model-View-Controller (MVC) design pattern. Their feature-based architectural approach enables scalability and reusability—principles mirrored in the design of Sports IQ Explorer. By adopting a modular structure, the system supports both educational depth and platform flexibility.

Tsin et al. [4] developed NutriSportEx™, a web-based sports nutrition application for Malaysian athletes, aimed at enhancing knowledge, attitudes, and practices (KAP) through interactive design. Although their focus was on sports nutrition rather than general sports knowledge, the study underscores the value of interactivity, scoring mechanisms, and feedback—core elements reflected in the architecture of Sports IQ Explorer. Cheong et al. [5] examined the use of gamified multiple-choice quizzes to evaluate learning, engagement, and enjoyment. Their study found that 77.63% of participants completed the quiz, with 60.53% reporting improved learning effectiveness. While the results were based on self-reports and involved a limited sample, they highlight the educational potential of gamification. These findings support the inclusion of features

such as level progression, scoring, and immediate feedback in Sports IQ Explorer to create an effective and enjoyable learning experience. Collins et al. [6] emphasized the significance of test-enhanced learning and the use of deeper quiz content in educational applications. Their research demonstrated that quizzes featuring application-based questions led to significantly improve performance in follow-up assessments compared to those emphasizing simple recall. This validates the design of Sports IQ Explorer, wherein higher quiz levels are crafted to transcend memorization and build conceptual understanding. The system's postquiz fact-sharing further reinforces information retention. Souza et al. [7],

in a systematic mapping study on gamification in education, identified key mechanics—such as level-based progression, real-time feedback, and content unlocking—as effective strategies to enhance user engagement and learning outcomes. These insights directly inform the design of Sports IQ Explorer, which includes progressive levels, a dynamic scoreboard, instant feedback, and educational trivia. Tejawani and Soni [8] proposed an AI-driven multi-module sports quiz system incorporating intelligent scoring and personalized feedback. Their model utilizes adaptive difficulty levels and modular quiz components to customize learning experiences for individual users. These innovations are reflected in Sports IQ Explorer, which features real-time feedback, difficulty scaling, and a visually intuitive interface tailored to diverse user preferences. Additionally, a complementary system named AskSport [9] was developed using natural language processing (NLP) for sports-related question answering (QA). Unlike structured quiz platforms, AskSport allows users to submit free-text queries and retrieves the top three relevant responses along with supporting documentation. Deployed on Hugging Face, this QA-based approach complements quiz-based learning by delivering context-aware, fact-based answers. Together, AskSport and Sports IQ Explorer constitute a comprehensive learning ecosystem that combines gamified quizzes and intelligent Q&A systems for enhanced sports education.

IV. PROPOSED SYSTEM

The proposed system, titled Sports IQ Explorer, is an interactive web application developed to assess and enhance users' knowledge across a wide range of sports. The platform is systematically categorized into two major sections: Indoor Sports and Outdoor Sports, each further divided into specific sports such as badminton, chess, cricket, football, and more. This structure allows users to explore and engage with sports that interest them most. Each sport includes multiple quiz levels, with questions that progressively increase in difficulty as the user advances, fostering a gradual and challenging learning experience. Upon completion of each quiz level, the system presents users with informative and engaging facts related to the sport, encouraging deeper understanding and retention. Following the facts, a dynamic scoreboard provides instant feedback, including the user's score, a performance summary, correct answers, and detailed explanations. Users are also given the option to retry the quiz to improve their performance. The platform is designed for scalability, enabling future expansion with additional sports, new quiz content, and feature enhancements. Overall, Sports IQ Explorer aims to create a smart, engaging, and educational environment that blends fun with learning for sports enthusiasts of all ages.

V. SYSTEM DESIGN AND ARCHITECTURE

The architecture of the Sports IQ Explorer is designed with a modular and layered approach to ensure scalability, maintainability, and a clear separation of concerns. It is composed of three main components: the Frontend, Backend, and Database (see Fig. 1).

A. Frontend

The frontend is implemented using HTML, CSS, and JavaScript to create a responsive and interactive user interface. HTML is used for structuring content, CSS provides styling and layout, and JavaScript handles client-side interactivity such as dynamic quiz rendering, card flipping animations for facts, and navigation. Users can select sports

categories, attempt quizzes, and view instant feedback seamlessly within this interface.

B. Backend

The backend is developed using Python and the Django framework, which adheres to the Model-View-Template (MVT) architectural pattern. It handles business logic, request routing, session and user authentication, quiz evaluation, and score calculation. It also manages the delivery of sport-specific facts after quiz completion and processes data to generate the performance summary and scoreboard.

C. Database

The system uses MySQL as its relational database to store persistent data, including user profiles, quiz questions, answer options, correct answers, quiz levels, and related sport facts. Django's Object-Relational Mapping (ORM) ensures smooth integration with the database and allows for efficient data manipulation without directly writing SQL queries. This architecture supports the full functionality described in the abstract—from sport categorization and level-wise quizzes to fact delivery and scoreboard feedback. The modular design also allows for future enhancements, such as adding new sports, difficulty levels, and gamified features.

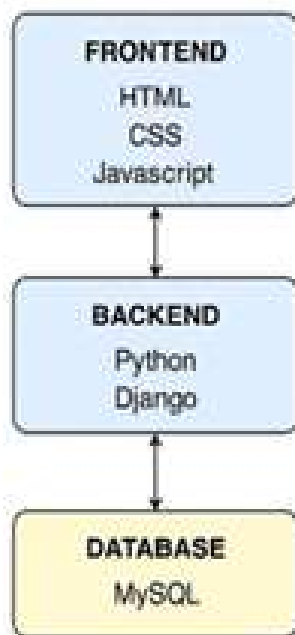


Fig. 1: System Architecture of Sports IQ Explorer.

VI. METHODOLOGY

The development of the Sports IQ Explorer web application was carried out using an iterative software engineering process model, primarily influenced by Agile development principles. The methodology followed phases including requirement analysis, modular system design, incremental development, testing, and user feedback integration. Requirement gathering involved identifying core functionalities such as user login/registration, sport category selection, quiz handling with multiple levels, timed questions, and a feedback mechanism. Each functional requirement was mapped to a specific module to facilitate modular implementation and testing. The system design adopted a modular architecture to support scalability and maintainability. Modules were logically divided into user interface components, quiz logic, session management, feedback engine, and database interaction layer. Testing was performed at multiple stages—unit testing for individual components, integration testing for module interactions, and system testing with user feedback—to ensure reliability and correctness.

VII. IMPLEMENTATION

A. Technology Stack

The frontend of the platform was developed using HTML5, CSS, and JavaScript to offer a responsive and user-friendly interface. The backend logic was implemented using Python, with the Django framework serving as the core web development platform. Django provided built-in support for session management, URL routing, and form handling, which was essential for managing quiz states and user interactions. MySQL was used for backend data storage, enabling structured and efficient querying of quiz questions, user scores, and sport-specific trivia. The relational model of MySQL ensured data integrity and quick retrieval of question sets and facts for each quiz level. The Django admin interface used for managing quiz

content is illustrated in Fig. 2.



Fig. 2. Django admin panel interface for managing quiz questions and user data.

B. Design and Development

The system design began with the creation of low- fidelity wireframes and UI mockups using Figma, which guided the development of key interfaces such as the landing page, category selection screen, quiz interface, and result display module. The quiz engine retrieves sport-specific questions dynamically based on the user's selection and quiz level. Each quiz session is tracked using Django sessions, allowing question progression, time management, and score calculation to occur in real-time. The system also records incorrectly answered questions, which are presented again at the end of the level, promoting active learning. Animations and visual effects were integrated using JavaScript and CSS to enhance user engagement. Correct answers, wrong answers, and trivia facts were displayed interactively after each question using fade-in/fade-out transitions. The live quiz interface is shown in Fig. 3.



Fig. 3. Quiz interface showing dynamic question loading, answer options, and progress.

C. Result and Feedback Module

Upon the completion of each quiz level, the system provides users with real-time feedback. This includes a detailed score summary, listing correct and incorrect answers, along with explanations for each question. This feedback is limited to the current quiz session and is not permanently stored, preserving privacy and emphasizing learning over performance tracking. The module encourages users to either retry the level for better understanding or proceed to the next level, thus creating a flexible and personalized learning loop. Additionally, sport-specific trivia is shown after each level to reinforce learning with interesting facts. This implementation emphasizes the platform's goal of delivering an educational yet enjoyable quiz experience. The quiz result and feedback screen is depicted in Fig. 4.



Fig. 4. Result screen displaying score summary, feedback, and trivia facts.

VIII. RESULTS AND DISCUSSION

The Sports IQ Explorer platform was thoroughly tested to evaluate its functionality, responsiveness, and user experience. During the testing phase, the application performed efficiently across various modules including sport categorization, level-based quiz navigation, and scoreboard generation. Users were able to seamlessly select between Indoor and Outdoor sports, choose specific games, and progress through increasing levels of difficulty within each quiz. One of the most appreciated features was the structured layout and smooth transition between quiz stages. After each quiz attempt, users were presented with relevant and engaging facts related to the selected sport. This not only reinforced learning but also enhanced the educational value of the application. The real-time display of quiz results, including total score, correct answers, and explanations, contributed to user satisfaction and understanding. From a technical perspective, the system architecture built using Django (Python framework) and MySQL provided robust backend support with secure data storage and fast query execution. The frontend, developed using HTML, CSS, and JavaScript, delivered a visually clean and interactive interface that adapted well to different screen sizes. The performance of the application remained consistent during multiple testing sessions, even as the number of quiz entries increased. This highlights the scalability and stability of the platform. Overall, the system

achieved its intended goal of combining sports education with an engaging and interactive quiz experience, especially suited for students and enthusiasts aiming to expand their sports knowledge.

IX. CONCLUSION AND FUTURE SCOPE

The Sports IQ Explorer platform offers an interactive and engaging way to educate users on various sports through a structured quiz system. With its well-designed interface, categorized sports sections, progressive difficulty levels, and instant feedback combined with fact-sharing, the platform transforms traditional learning into an enjoyable experience. Developed using a robust full-stack approach—HTML, CSS, JavaScript, Python (Django), and MySQL—the system ensures responsiveness, scalability, and ease of maintenance. Looking toward the future, the platform can be enhanced in several impactful ways:

- Global Leaderboard: To foster healthy competition by ranking users based on their quiz scores across sports and levels.
- Multimedia Integration: Incorporating images and videos into questions and fact displays to enrich the user experience.
- Enhanced Admin Panel: Building upon Django's built-in admin panel by adding analytics dashboards, content insights, and advanced moderation capabilities.
- Mobile Application Version: Extending accessibility through a lightweight Android/iOS version built using Django REST Framework.

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