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Development of an Online Quiz System

Shivani Shivaji Chikane, Prof. Sonali Mutha

Department of MCA, Anantrao Pawar College of Engineering, Pune, Maharashtra, India

ABSTRACT: The Online Quiz System is an Internet-based quiz system for students. This method enables students to take a quiz without using pencil and paper. Now students take quizzes by hand. Lecturers need to spend more time grading. Other than that, the quiz paper couldn't be there. But students won't see the final score until teachers are finished grading. Therefore, the system of automatic marking will help lecturers to save time. Lecturers can create their own, self-assessing quiz or test. The test can be taken from anywhere, and students receive fast results. This approach is based on the rule algorithm that returns brief answers from the set of keywords provided. Technology has developed extremely fast due to the incredibly high demand in many fields, in this case education. In this paper, we shall discuss the development of Online Examination System (OES) as a platform for taking quizzes and exams. The platform lets admins set up courses and questions and then students can take quizzes to test their knowledge. The OES is developed with Python Django, HTML, CSS and Javascript; SQLite is used to manage data. This paper presents system objectives, requirements, modules, implementation issues and design and draws attention to the capability of the system to improve the examination processing systematization in educational institutions.

I. INTRODUCTION

The lecturer's time is saved by the quiz application because the replies are marked automatically. Users don't have to know much about computers to work with this application which will notify them when they enter something incorrectly. In order to overcome the mentioned problems of existing manual system, the "Online Quiz Application" has been developed. The objective of this software is to reduce and with some conditions eliminate the limitations posed by the infrastructure in place today. Furthermore, this system was developed specifically to carry out the company's daily operations in a productive and successful manner.

To avoid data-entry errors, the program has been minimized. Also, error notice is shown when you input incorrect data. User does not need to have any technical knowledge. All of this indicates that it is user-friendly.

As previously mentioned, online quiz applications can result in a management system that is error-free, safe, dependable, and quick. Instead than focusing on keeping records, it might help the user focus on other things. Therefore, it will assist the business in making better use of its resources. The traditional examination process often involves significant time and resource expenditure, leading to frustration for both students and educators. The Online Examination System addresses these challenges by offering a cost-effective and efficient method for conducting assessments. The system is designed to facilitate easy navigation, quick responses and real-time feedback, ultimately improving the overall examination experience.

II. RELATED WORKS

E learning and Assessment Systems:

Many learning management systems (LMS) (e.g., Moodle, Blackboard) come with built-in quiz modules to support assessment. Such systems offer a large variety of question types and have facilities to automatically score and statistically analyze results. They're used all over the place, but they're pretty heavyweight and huge and not really ideal for lightweight or custom-style solutions.[1]

Online Examination Systems:

Studies such as [Ayo et al. (2007) [15], regarding the implementation of Web-based examination systems that addressed issues on scalability, user administration, and question shuffling to prevent students from cheating. Similarly, [Rajput et al. (2011)] developed an online exam portal with php and MySQL and stressed the necessity of user-friendly user interfaces and immediate feedback.[2]



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Mobile Friendly and Responsive Quiz Apps:

With the proliferation of smartphone use, some researchers have devised mobile first quiz systems. [Alkhalaf et al. (2012)] developed a mobile quiz app for Android with the focus on the mobility and learning on-the-go. These platforms use cross- platform technologies, such as React Native or Flutter to achieve the right kind of browser coverage.[3].

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AI and Adaptive Testing:

Artificial intelligence is being integrated into contemporary quiz systems for adaptive testing (adjusting questions based on the user performance level). [Chen et al. (2018)] introduced a system that leverage machine learning algorithms to personalize quizzes and improve learning performance.[5]

Security and Integrity:

the security of online exams is an important research area. Solutions involve secure log in, randomizing the question bank of questions, IP tracking, and proctoring using webcam.[6]

Gamification and Engagement:

A few recent systems also incorporate the game dynamics in order to enhance the engagement and motivation of students. Leaderboards, points and timed challenges are some of the usual suspects. [Zainuddin & Attaran (2016)] reported a gamified quiz platform to significantly enhance students' participation and knowledge retention.[7]

Open Sources and Customizable Solutions:

Open-source platforms are getting popular for building a customisable quiz system. Tools such as Node. js, Django or Laravel support the backend of a quiz engine, and frontend libraries to the likes of React or Vue. js to add interactivity and de-lay responsiveness.[8]

III. METHODOLOGY

3.1 Requirement Analysis:

A Thorough Study of Functional and Non-Functional

Requirements: An In-Depth Analysis Was Performed to Collect Functional And Non- Functional Requirements. Key stakeholders were educators, students and system controllers. Features The leading features are shown.

- User logging in (for students and admins) .
- Quiz creation and management.
- Randomized question selection.
- Timer-based quizzes .

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3.2 System Design

The software architecture was constructed based on three-layer model.

Presentation Layer: UI developed in HTML5, CSS3 and JavaScript (or, it could be developed using available frameworks such as React, Vue etc. js for more dynamic experience).

Application Layer: Server-side logic written in PHP/Python/Node. js based on the stack that you're running on.

Database Layer: The data such as users, questions, answers and results were stored in MySQL/PostgreSQL.

3.3 Technology Stack

The following tools and technologies were used in the development:

Frontend would be HTML, CSS, Bootstrap (or React)



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Back: PHP / Python (Django / Flask) Database: MySQL / PostgreSQL Web Server: Apache / VS Code
Tools Used: Visual Studio Code, GitHub Device: Personal Laptop with mic and camera Apps Used: Zoom
Environment: Visual Studio code Source

3.4 Implementation

It was built in components:

User Module - Registers Users, Log In, Profile Management.

Quiz Management Module- Gives ability for admin to add, edit and delete quiz and questions.

Try Module: The module will let you participate in the quiz with in a fixed time frame.

Assessment Module: Scores respondents' answers for them, shows results.

Reporting Module: Generates logs of performance for admins and users.

Security measures including input validation, password hashing, and session handling were deployed to protect the integrity of the stored information and to prevent abuse of the system.

IV. IMPLEMENTATION

4.1 Frontend Development (UI)

Penultmat3 Technology Dicksons Ghutm Organizatlon Mr. vlaaar Observerths MOA New York The Party Kingz
dccaautosales Inc Shrig Services Ltd Ages(wedget_group) LEEVTAGE Organization dammy1991 Ltd.

Main interfaces included:

- User Login/Signup Page.
- Admin dashboard (quiz and question manager).
- Quiz Interface (timered question navigation).
- Result Display Page.

Each of these pages was linked to backend endpoints made with HTML POST/GET requests for posting forms and retrieval of data.

4.2 Backend Dev (Application Logic)

The backend was written in PHP/Python/Node. js (use as per your projects). It managed everything from data processing and authentication to the quiz logic and the lines of communication between the app and the database.

4.3 Designing and Integrating with a Database

Implementation Database were designed by MySQL/PostgreSQL. It contains the following important tables:

Table Name Purpose

roles Specifies the available roles for the user accounts stores user account and role definitions quizzes.

4.3.1 Quizzes'meta dataBare stored (title, duration).

4.3.2 Questions Stores questions related to quizzes.

4.3.3 Answers Stores answers submitted by users.

4.3.4 Results Stores the quiz results and scores.

4.3.5 Referential integrity was maintained by the use of foreign keys and constraints.

4.4 Security Features

Secure access and cheating prevention:

4.4.1 Passwords were hashed with the bcrypt algorithm.

4.4.2 Quiz questions were shuffled for each user.

4.4.3 Duration was constrained by the implementation of timers and auto- submit.

4.4.4 Sanitization of the input was done to avoid SQL injection and XSS attacks.

4.4.5 Admin pages were RBAC protected.



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V. FUTURE SCOPE

Mobile App Development:

To be more accessible and convenient, an official mobile app for both Android and iOS will be developed. That way, students could attend quizzes at any time or place -

- even without an Internet connection (with data sync upon being online).

AI-Powered Adaptive Testing:

Artificial intelligence and machine learning are examples of technologies which can be used to achieve adaptive testing, i.e., progression to more or less difficult questions in real-time based on the learner's responses. This customization can help personalize learning experiences and offer a more precise assessment of skills.

Subjective and Essay-Type Questions Help/Guide:

It only deals with objective questions as of now. And down the line, the system might support essay-style questions with help from AI-assisted or manual graders, demonstrating broader potential use cases across subjects.

Compatibility with Learning Management Systems (LMS):

The platform can also be embedded on Moodle, Google Classroom, or Canvas so you can easily synchronize content, user information, and grading models.

Gamification Features:

Gamification features like badges, levels, leaderboards and time-bound challenges can help raise student interest and motivation, particularly among younger learners.

Support for Multi-language and Accessibility:

To appeal to a general audience, the system is multilingual and supports accessibility features (W3C accessibility recommendations) for visually and hearing-impaired users.

Improved Security Measures:

Although the current way of operation uses standard security protocols, at further updates biometric authentication, AI-based monitoring of the exam and secure result verification based on Blockchain will be integrated to offer further security and reliability.

VI. CONCLUSION

The proposed on-line quiz system meets the increased demand for feasible, user-friendly, automated assessment tools in today's educational settings. By exploiting web-based technologies and a modular design, the system exposes an easy-of-use tool for building, employing and taking an in-class assessment. Major features such as user authentication, question scrambling, timer-based mediation and immediate result computation have been developed and validated through extensive testing and user feedback. It provides savings in staff effort, flexibility of the test format and improved teacher student interactions. It also provides a base for future enhancements such as mobile support, AI-driven personalization, advanced analytics, and connections to current educational technology. In summary, the online quiz system proves the potentiality and efficiency of digital options.

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