

ONLINE EXAM PORTAL INTEGRATED WITH AI

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Abstract— In today's digital learning environment, conducting online examinations efficiently and securely has become essential. This paper presents an Online Exam Portal Integrated with AI that simplifies and automates the process of creating and managing online examinations using the OpenAI API. The system enables administrators and teachers to automatically generate multiple choice questions from a given topic, reducing manual effort while maintaining question diversity and quality. The portal provides a user-friendly interface for administrators and students, supports automatic evaluation, and generates performance analytics for assessment review. Questions are dynamically created based on input parameters such as topic name, question type, number of questions, and marks per question. The system also supports Excel based question uploads, allowing educators to import predefined question banks. The platform is developed using Angular for the frontend, .NET Core for the backend, and SQL Server as the database, with role-based access for Admin, Teacher, and Student. The proposed solution enhances efficiency, reliability, and scalability in online examination management.

Index Terms— Artificial intelligence, online examination system, question generation, learning management, Angular, .NET Core, SQL Server.

I. INTRODUCTION

In the modern era of digital education, online examinations have become a fundamental component of academic institutions, corporate training programs, and certification systems. However, traditional exam creation methods remain heavily dependent on manual effort, requiring educators to draft, format, and validate question papers. This process is time-consuming, repetitive, and often lacks scalability—especially when maintaining question diversity and balanced difficulty levels across multiple subjects or large student groups. To overcome these limitations, this project proposes the development of an Online Exam Portal Integrated with Artificial Intelligence (AI). The system leverages the OpenAI API to automate the generation of high-quality, topic-specific questions, including multiple-choice and descriptive formats. By processing input parameters such as topic name, number of questions, marks per question, and difficulty level, the AI model can produce accurate, balanced, and varied question sets dynamically. In addition to AI-driven question generation, the portal supports traditional features such as Excel-based question uploads, allowing educators to combine manual and AI-generated content for greater flexibility. The platform provides an interactive dashboard for administrators, teachers, and students, featuring secure authentication, easy exam scheduling, automated evaluation, and detailed performance analytics through graphical reports. By integrating AI into the online examination process, this system significantly reduces manual workload, improves efficiency, ensures question fairness and diversity, and enhances the overall digital learning experience. Ultimately, it provides a scalable and intelligent solution to meet the growing demand for efficient and secure online assessments in today's educational and corporate environments.

II. LITERATURE SURVEY

[1] D. Rao and S. K. Saha[1], This paper presents our findings on the review. We outline a generic workflow for an automatic MCQ generation system. The workflow consists of six phases. For each of these phases, we find and discuss the list of techniques adopted in the literature. We also study the evaluation techniques for assessing the quality of the system generated MCQs. Finally, we identify the areas where the current research focus should be directed toward enriching the literature.

[2] “This 2023 paper introduces a hybrid framework combining semantic-based techniques (using ontology constructs like DL/SWRL) and machine learning to automatically generate grammatically correct multiple-choice question (MCQ) stems for technical domains. The approach aims to reduce manual content creation efforts and was validated for quality by domain experts.

[3] This research presents a novel approach to automating the generation of expert-level questions on specific topics, by leveraging advanced large language models. The proposed technique ensures

grammatical as well as semantic accuracy by utilizing a large language model and employs a KNN classifier to extract relevant context from a large number of extensive text embeddings.

[4] N. M. Dhanya, R. K. Balaji, and S. Akash, This paper offers an in-depth review of the latest advancements in the automatic generation of medical case-based multiple-choice questions (MCQs). The automatic creation of educational materials, particularly MCQs, is pivotal in enhancing teaching effectiveness and student engagement in medical education. In this review, we explore various algorithms and techniques that have been developed for generating MCQs from medical case studies.

[5] This article offers an in-depth review of the research advancements and future directions in QG in education (QGE). We start by tracing the evolution of QG and QGE. Next, we explore the current state of QGE research through three dimensions: its three core objectives, commonly used datasets, and question quality evaluation methods.

[6] Y. Kurdi, H. Alfalahi, and M. A. Alazab, In this review, we provide an overview of the research progress in automatic question generation. We also present a comprehensive literature review covering the classification of Question Generation systems by categorizing them into three broad use-cases, namely standalone question generation, visual question generation, and conversational question generation.

[7] S. Susanti, H. Nishikawa, T. Tokunaga, and H. Obari, This paper describes details of the evaluation experiments for questions created by an automatic question generation system. Given a target word and one of its word senses, the system generates a multiple-choice English vocabulary question asking for the closest in meaning to the target word in the reading passage.

[8] A. S. Imran, F. Daudpota, Z. Kastrati, and R. Batra, The purpose of this study is to analyze reaction of citizens from different cultures to the novel Coronavirus and people's sentiment about subsequent actions taken by different countries. Deep long short-term memory (LSTM) models used for estimating the sentiment polarity and emotions from extracted tweets have been trained to achieve state-of-the-art accuracy on the sentiment140 dataset.

[9] M. N. Huda, M. F. Rahman, and S. M. M. Islam, Popular learning management systems such as Moodle, Blackboard, and Google Classroom provide online assessment features including quiz creation, grading, and performance tracking. However, these platforms generally require instructors to prepare questions manually and offer limited built-in support for intelligent question generation. Recent research has explored the use of artificial intelligence for automatic question generation using natural language processing techniques. AI models developed by organizations such as OpenAI have demonstrated the ability to generate multiple choice questions from textual input, reducing manual effort and increasing content diversity. Despite these advancements, many systems still lack full integration of AI-driven question creation with secure role-based access, analytics dashboards, and flexible question import mechanisms.

Therefore, there is a need for an integrated platform that combines AI-based dynamic question generation with complete online examination management, performance analysis, and secure user control, which the proposed system aims to achieve.

III. PROPOSED SYSTEM

The proposed system is an AI-enabled Online Examination Portal designed to automate and streamline the complete examination process. It integrates artificial intelligence to dynamically generate multiple-choice questions based on parameters such as topic, difficulty level, number of questions, and marks allocation. The system is developed using Angular for the frontend, .NET Core Web API for backend processing, and Microsoft SQL Server for secure data storage. AI-based question generation is powered through integration with the OpenAI API, which produces structured and diverse exam content automatically.

The platform supports role-based access for administrators, teachers, and students. Administrators and teachers can create exams either through AI-generated questions or by uploading structured Excel files, while students can securely attempt assigned exams online. Objective-type responses are evaluated automatically, and results are stored in the database for instant retrieval. The system ensures secure authentication, centralized data management, and scalable performance to support multiple users simultaneously.

Additionally, the portal includes a performance analytics module that presents results using interactive charts and dashboards. This enables educators to analyze student performance trends and identify areas of improvement, while students can monitor their progress over time. Overall, the proposed system enhances efficiency, reduces manual workload, ensures question diversity, and transforms traditional online examinations into an intelligent, data-driven assessment framework.

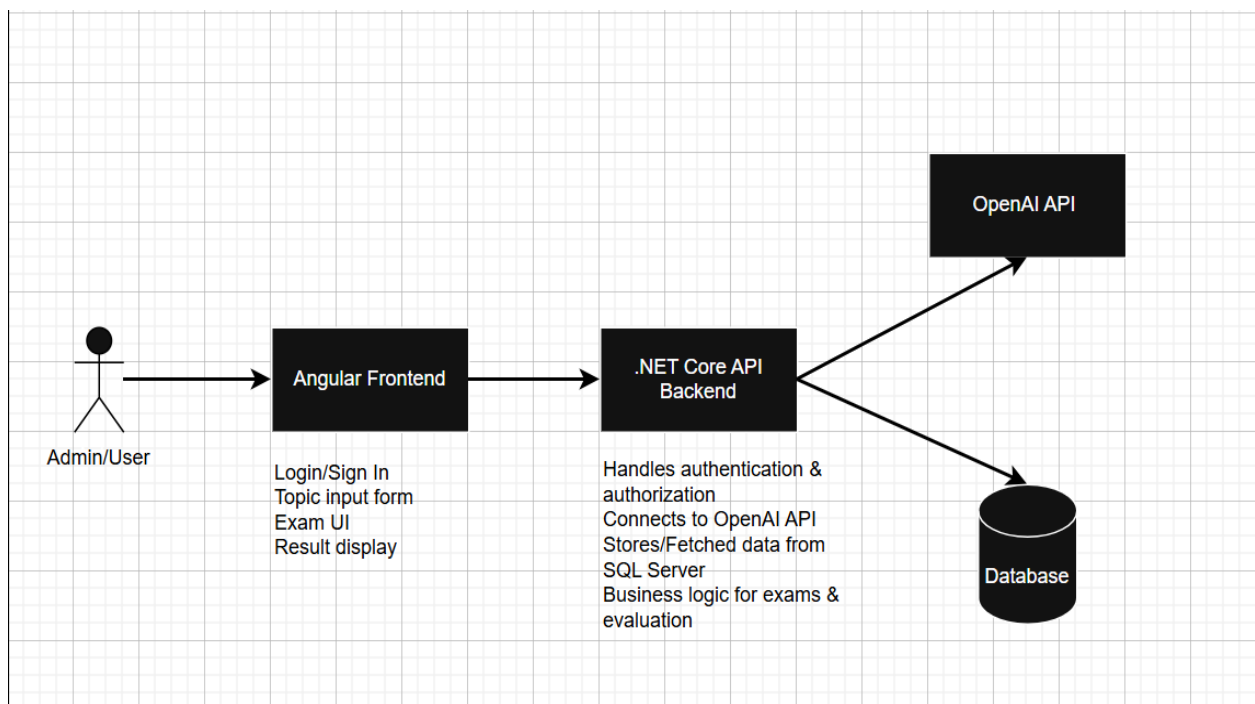


Figure 1. System Architecture

System Architecture Modules Overview

- i. Admin Module
 1. Login and authentication.
 2. Create exams via AI (OpenAI API) or Excel upload.
 3. View, modify, or delete existing exams.
 4. Manage users (teachers, students).
 5. View dashboards and charts for completed exams and performance trends.
 6. Assign exams to specific students or groups.
 7. Manage profiles, change passwords, and recover forgotten passwords.
- ii. Teacher Module
 1. Create or upload questions and exams.
 2. Generate AI-based questions based on parameters.
 3. View student submissions and performance.
 4. Update personal profile and manage credentials.
- iii. Student Module

1. Login/signup, update profile, and recover password.
 2. View list of assigned active exams.
 3. Attempt exams and submit answers.
 4. View results, scores, and feedback for completed exams.
 5. Analyze performance using visual charts.
- iv. AI Question Generator Module
1. Accepts parameters like topic, question type, marks, and count.
 2. Sends prompt to OpenAI API.
 3. Receives MCQs in structured format (JSON).
 4. Stores generated questions in SQL Server.
- v. Excel Upload Module
1. Allows bulk upload of questions in .xlsx or .csv format.
 2. Validates file format and data structure.
 3. Imports questions to the database under a selected exam category.
- vi. Result & Analytics Module
1. Auto-evaluates objective questions.
 2. Stores scores in SQL Server.
 3. Displays analytics in chart form (bar, pie, or line charts) using Angular chart libraries.

The proposed system introduces an AI-assisted examination portal capable of:

1. Generating structured questions automatically using large language models.
2. Allowing manual question uploads via spreadsheet files.
3. Supporting multiple user roles (Administrator, Teacher, Student).
4. Conducting automatic evaluation for objective-type questions.
5. Providing interactive dashboards for performance analysis.

The system follows a modular and service-oriented architecture to ensure extensibility and maintainability.

IV. DESIGN

i. Data flow diagram

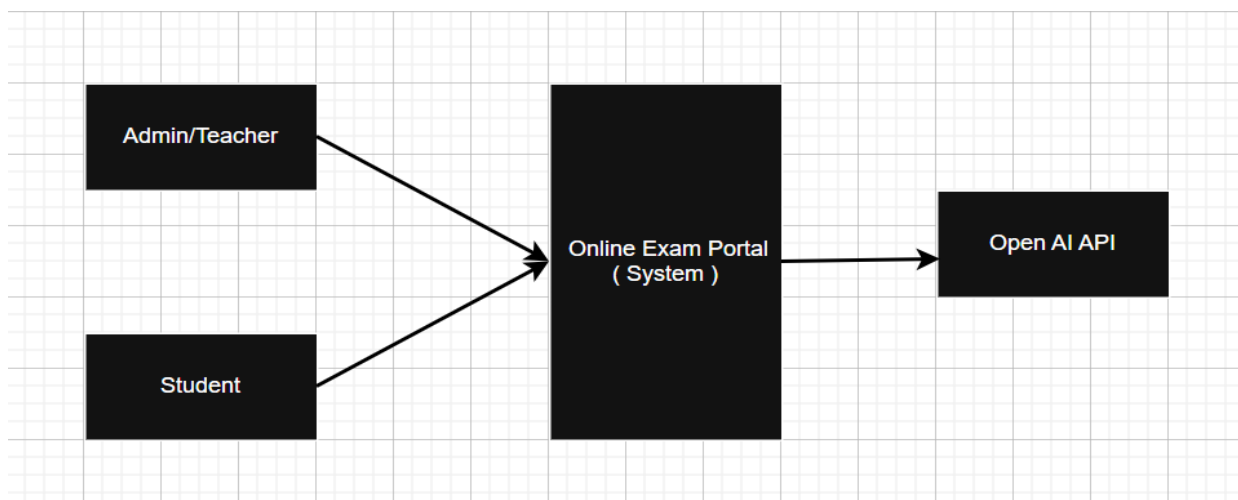


Figure 2. Level 0 DFD

V. SAMPLE OPENAI PROMPT

```
You are an expert exam question generator.  
Generate {number_of_questions} multiple-choice questions on the topic "{topic_name}".  
Each question should carry {marks_per_question} marks and match the given difficulty level:  
{difficulty_level}.  
For each question, include:  
1. Question text  
2. Four options labeled A, B, C, D  
3. Correct answer (A/B/C/D)  
4. A short explanation  
Return the result in JSON format as:  
[  
  {  
    "question": "",  
    "options": {"A": "", "B": "", "C": "", "D": ""},  
    "correct_answer": "",  
    "marks": {marks_per_question},  
    "explanation": ""  
  }  
]
```

VI. FUTURE SCOPE

The Online Exam Portal Integrated with AI is designed as a scalable and flexible platform. While the current system provides AI-based question generation, role-based management, and analytics, there are several opportunities to enhance its capabilities in the future:

- i. AI-Based Proctoring - Future versions can integrate AI-driven proctoring using webcam and microphone monitoring to detect cheating.
- ii. Adaptive Examinations - Implementing adaptive exams where the difficulty of questions adjusts according to the student's performance.
- iii. Support for Additional Question Types - Currently, the system focuses mainly on MCQs, but future versions can include Descriptive questions, Programming or code-based questions with auto-evaluation and Diagram-based or interactive questions
- iv. Multi-Language Support - AI integration can allow automatic generation of questions in multiple languages, making the platform suitable for global users.
- v. Voice and Image-Based Question Generation - Future AI models can support Voice-based question input for accessibility and Image or diagram-based question generation and evaluation

VII. CONCLUSION

This research proposes an AI-powered online examination system designed to modernize digital assessments. By integrating intelligent question generation, secure role-based access, automated evaluation, and analytical dashboards, the system enhances efficiency, scalability, and reliability in examination management.

The integration of advanced language models demonstrates the practical application of artificial intelligence in educational technology. The proposed solution not only reduces administrative effort but also establishes a foundation for adaptive and intelligent assessment systems.

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