



Online Exam Portal Using CNN

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DOI : <https://doi.org/10.55248/gengpi.6.0425.1339>

ABSTRACT

Manual exam systems are time-consuming, requiring extensive resources for printing, distribution, and evaluation. They are prone to human errors, bias in grading, and security risks like cheating and impersonation. Additionally, they lack scalability, making it difficult to conduct large-scale assessments efficiently.

This paper aims to create an online exam portal that uses Artificial Intelligence (AI) to make online exams secure, efficient, and user-friendly. It allows students to take exams from anywhere and get their results instantly. Administrators can easily manage the creation, modification, and deletion of test papers and questions. The system supports a large number of students taking exams at the same time, making it ideal for nationwide use. Key features of the portal include automated test generation, which ensures diverse and fair question sets, and real-time proctoring using AI-driven facial recognition and behavior analysis to prevent cheating. By using CNN algorithm, it detects suspicious activities like looking away, multiple faces. Instant result evaluation and display provide immediate feedback, reducing the waiting time for results.

Overall, this AI-Powered Online Exam Portal addresses the growing demand for remote education and assessments, providing a secure, efficient, and scalable solution for conducting exams online. By leveraging AI technology, it enhances the exam-taking experience, maintains the integrity of the exams, and streamlines administrative tasks.

Keywords: Artificial Intelligence, Convolution Neural Networks, online exam,

1. Introduction

The existing system for online exams usually lacks advanced AI features, leading to several issues. Many platforms depend on simple question banks and manual supervision, making the process slow and less secure. Cheating can be a big problem because there isn't an effective way to monitor students remotely. Often, students have to wait for their results, causing delays in decision-making and progress. The current systems might also struggle to handle many students taking exams at the same time, limiting their use on a large scale. The current methods lack the advanced security, efficiency, and user-friendly features that the AI Powered Online

Exam Portal aims to provide.

An AI-powered exam portal is an advanced online assessment system that leverages Artificial Intelligence to enhance security, efficiency, and fairness in examinations. It integrates AI-driven proctoring using facial recognition and behavior analysis to prevent cheating, ensuring a secure exam environment. Additionally, the portal automates test creation, grading, and result generation, making the process faster and more reliable. Features like adaptive testing adjust question difficulty based on student performance, providing a personalized assessment experience. By streamlining administrative tasks, it reduces manual workload and improves the overall examination process.

The need for AI-powered exam portals has grown significantly due to the increasing shift towards remote learning and digital education. Traditional exam systems struggle with security concerns, scalability issues, and time-consuming evaluation processes. AI-driven solutions address these challenges by enabling large-scale exams with real-time monitoring, automated evaluations, and bias-free grading. They also reduce logistical costs by eliminating the need for physical exam centers and manual invigilation. As online education continues to expand, AI-powered exam portals offer a secure, scalable, and efficient solution, ensuring fairness and integrity in assessments.

2. Literature Review

Several research articles have explored the integration of Artificial Intelligence (AI) and Machine Learning (ML) into online examination systems to enhance security, efficiency, and fairness. Few notable articles in this domain are reviewed and given below.

In paper [1] addresses challenges in online education, particularly in proctoring and assessing student performance. It proposes a solution utilizing Machine Learning algorithms to detect anomalies in exam scores and predict student grades. The study compares various algorithms, including k-Nearest Neighbor, Naïve Bayes, Support Vector Machine, and Lion Optimization, concluding that Lion Optimization with anomaly detection achieves the highest accuracy of 95.2%.

The study [2] presents an AI-Based Intelligent Exam Proctoring System (AI-EPS) designed to monitor online assessments in real-time. The system employs facial recognition, eye-tracking, posture analysis, and voice recognition to detect suspicious behaviors indicative of cheating. Utilizing machine learning algorithms, AI-EPS offers real-time monitoring, automatic anomaly detection, and post-exam auditing. Evaluations across various online exam platforms demonstrate a 90% accuracy in detecting irregular behavior, enhancing the reliability of online examinations.

Paper [3] focuses on developing an online examination system that leverages deep learning models for proctoring. The system is designed to detect and counteract cheating attempts during exams using technologies such as Django and OpenCV for facial feature detection. The emphasis is on creating a user-friendly interface that ensures accessibility and reliability in online examinations.

This research [4] introduces a computer-aided intelligent examination system aimed at improving e-learning through an intelligent question bank and examination system. The system incorporates questions of varying complexity levels and serves as a tool for assessing students' understanding of teaching materials. The proposed methodology includes designing the question bank and implementing an AI-based examination system to enhance e-learning efficiency.

These studies collectively highlight the advancements in AI and ML applications in online examination systems, focusing on enhancing security, proctoring efficiency, and assessment accuracy.

3. Methodology

The proposed online exam portal focuses on creating an AI powered exam software to make exams secure, efficient, and user-friendly. This software is done using python and MySQL. With the growing demand for remote education and assessments, this system allows students to take exams from anywhere and receive their results instantly. The portal is capable of handling many students taking exams simultaneously.

The system automates the creation of exams, ensuring a diverse set of questions for each test. This simplifies the process for administrators, who can easily create, modify, and delete test papers and questions. Real-time proctoring is a key feature, using AI-driven facial recognition and behavior analysis to monitor students during exams and prevent cheating. This ensures the integrity of the exam process even when students are not physically supervised. Additionally, the system employs adaptive algorithms to detect and flag suspicious activities, maintaining high security standards and fairness.

Instant result evaluation and display provide immediate feedback to students, reducing the waiting time for results and enabling quicker decision-making. This feature benefits both students and administrators by streamlining the entire exam process. The portal's scalability, security features, and user-friendly design make it an ideal solution for conducting online examinations on a large scale

The proposed system consists of several key modules to manage users, exams, security, and evaluation efficiently. Below is a structured list of the main modules:

- User management module
- Exam management module
- Proctoring module
- Result module
- Alert module

3.1 User Management Module

The User Management Module is an essential part of the online exam portal. It is responsible for handling all aspects of user interactions, including registration, login, and profile management. For students, it manages their sign-up process, stores personal information, and keeps track of their exam history and results. For administrators, the module allows them to create and manage user accounts, assign roles and permissions, and oversee user activities. This module ensures that only authorized users have access to the system, maintains user data securely, and provides a seamless experience for both students and administrators.

3.2 Exam Management Module

The Exam Management Module is a critical component of the online exam portal. It handles the entire lifecycle of exam creation, administration, and management. Administrators use this module to create, modify, and delete test papers and questions. It provides tools for organizing questions into different categories and difficulty levels, ensuring a diverse and comprehensive set of exam questions. Additionally, it facilitates the secure distribution

of exams to students and ensures that the exams are delivered in a controlled environment. Overall, the Exam Management Module streamlines the process of creating and administering exams, making it efficient and user-friendly for administrators while maintaining the integrity and security of the exams.

3.3 Proctoring Module

The Proctoring Module is a crucial part of the online exam portal, ensuring the integrity and security of the exam process. It uses Artificial Intelligence (AI) to monitor students in realtime during their exams. By employing facial recognition technology and behavior analysis, the module can detect any suspicious activities or attempts to cheat. For instance, it can identify if a student is looking away from the screen frequently or if there are unexpected faces in the background. This module alerts administrators if any irregularities are detected, allowing them to take appropriate action. And it will automatically logout from the screen make the student mark as zero.

3.4 Result Module

The Result Module is a vital part of the online exam portal, responsible for evaluating and displaying student exam results. Once a student completes an exam, the module automatically grades the answers based on predefined criteria. It then calculates the final score and provides instant feedback to the student, showing detailed results. The module also stores the results securely for future reference and generates reports for administrators to review overall exam performance. By streamlining the result processing, this module ensures a quick, accurate, and transparent assessment of students' exams.

3.5 Alert Module

The online exam portal features a real-time malpractice alert system that ensures teachers are immediately notified of any suspicious activities during an exam. When a violation is detected, such as multiple face detection, eye tracking anomalies, the system automatically generates an alert. This alert is sent to teacher's mail.

3.6 Database Design

Instructor table

Column	Type	Constraints
Id	Int	Primary Key, Auto_Increment
Name	Varchar(100)	Not Null
Password	Varchar(100)	Not Null
Phone No	Int(10)	Not Null
Address	Varchar(255)	Not Null

Student table

Column	Type	Constraints
Id	Int	PrimaryKey, Auto_Increment
Name	Varchar(100)	Not Null
Password	Varchar(100)	Not Null
Phone No	Int(10)	Not Null
Address	Varchar(255)	Not Null

Exam table

Column	Type	Constraints
Id	Int	PrimaryKey, Auto_Increment
Name	Varchar(100)	Not Null

Question table

Column	Type	Constraints
Id	Int	PrimaryKey, Auto_Increment
Exam_Id	Int	ForeignKey References Exam(Id)
Type	Enum('Mcq')	Not Null
Content	Text	Not Null
Options	Text	Null (Only For Mcqs)
Answer	Text	Null

Result table

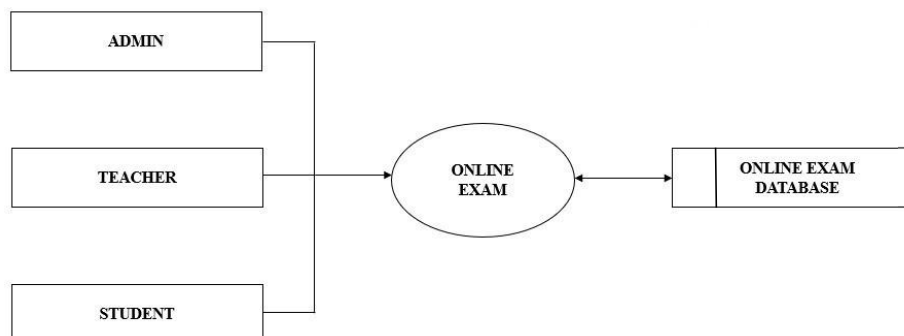
Column	Type	Constraints
Id	Int	PrimaryKey, Auto_Increment
Student_Id	Int	ForeignKey References Student(Id)
Exam_Id	Int	ForeignKey References Exam(Id)
Score	Decimal(5,2)	Not Null
Status	Enum('Passed', 'Failed')	Not Null

Feedback table

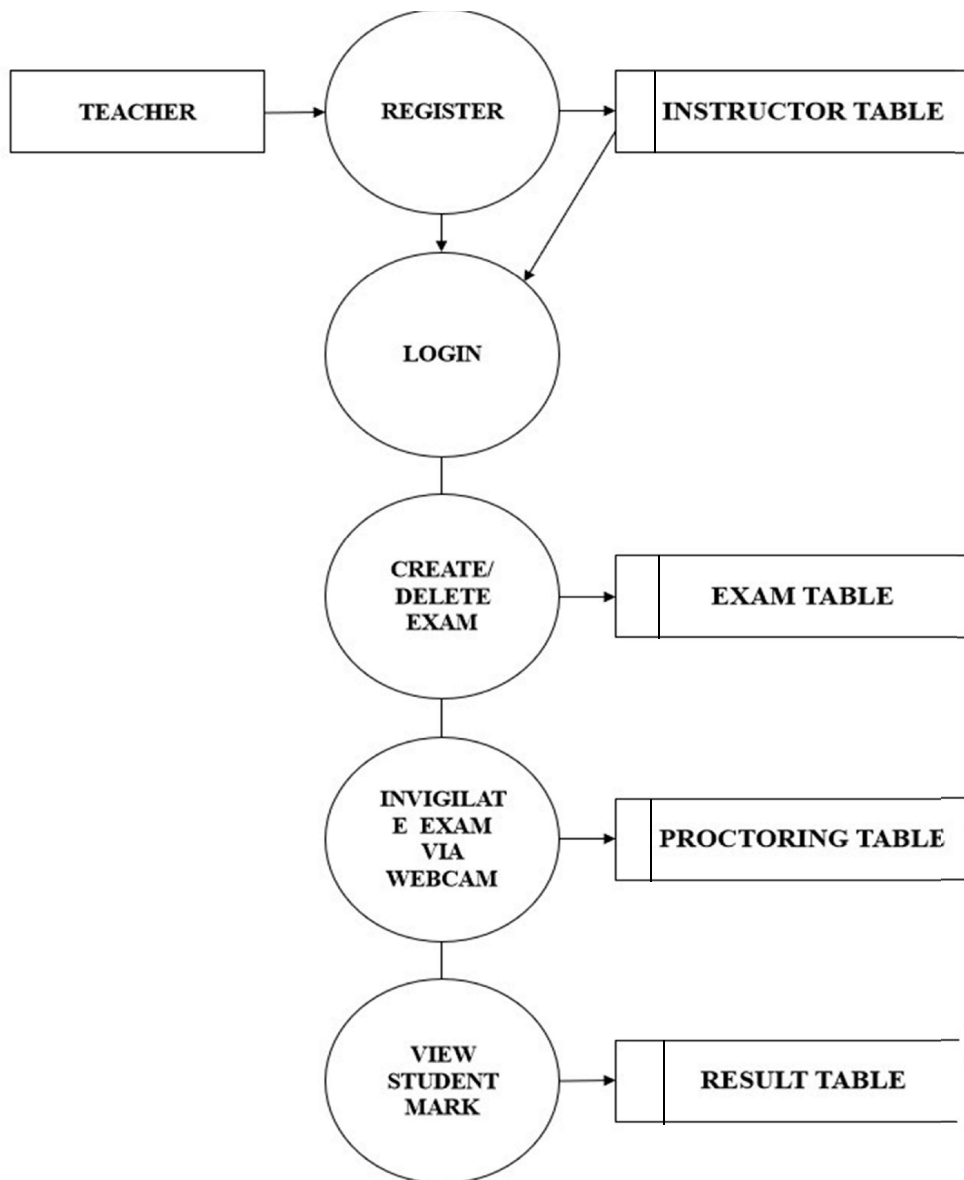
Column	Type	Constraints
Id	Int	PrimaryKey, Auto_Increment
Student_Id	Int	ForeignKey References Student(Id)
Exam_Id	Int	ForeignKey References Exam(Id)
Content	Text	Not Null

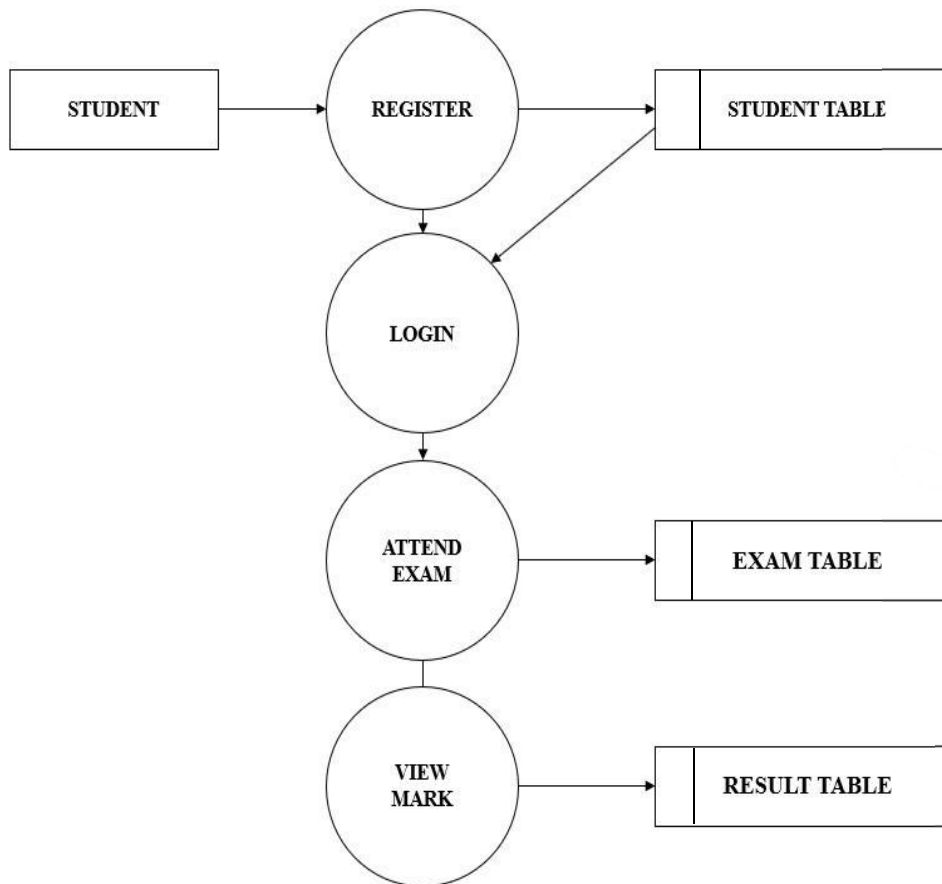
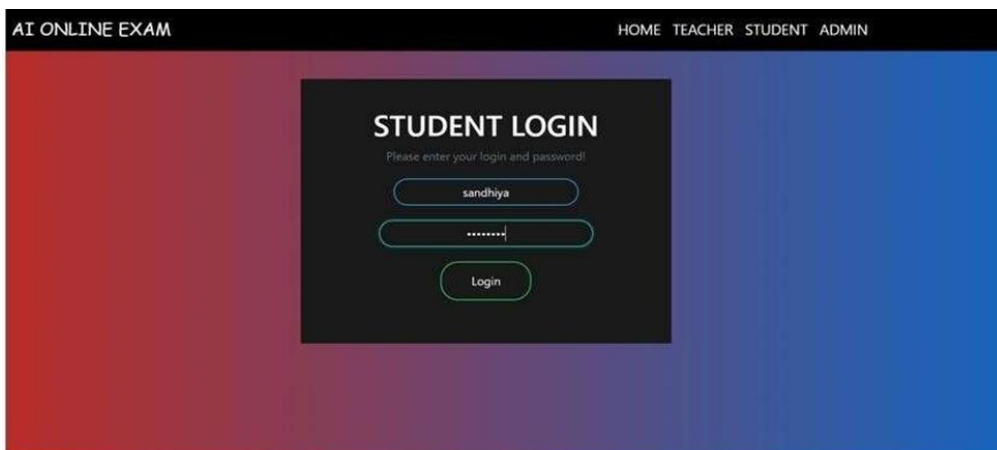
Proctoring table

Column	Type	Constraints
Id	Int	PrimaryKey, Auto_Increment
Student_Id	Int	Foreign Key References Student(Id)
Exam_Id	Int	Foreign Key References Exam(Id)
Verification_Status	Boolean	Not Null

3.7 Data Flow Diagram**Level-0**

LEVEL-1 Teacher view

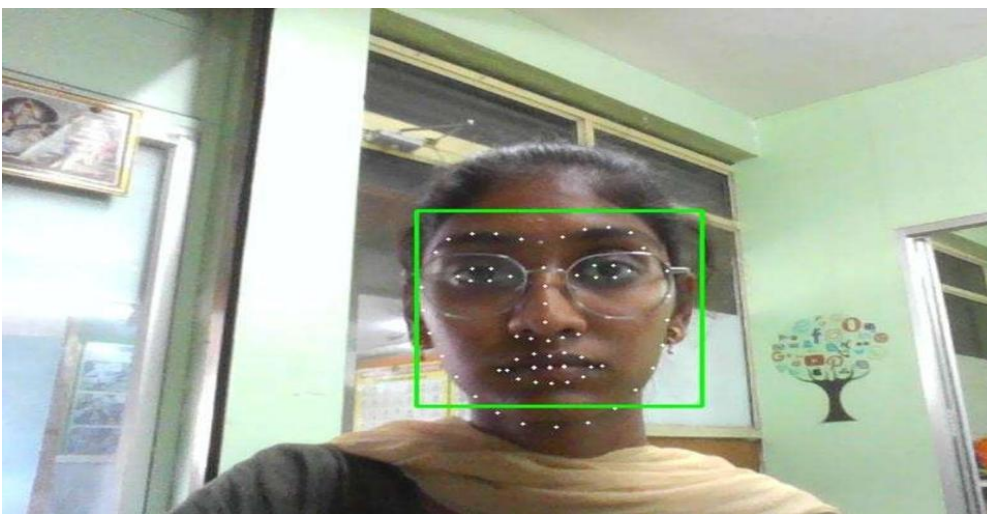


LEVEL-1 Student view**3.8 Screen Shots****Student Login**

Student Portal

The screenshot shows the 'ONLINE EXAM' student portal. At the top right is a 'Logout' button. On the left is a dark sidebar with a user profile for 'SANDHIYA (Student)' and navigation links for 'Dashboard', 'Switchon Cam', 'Exam', and 'Marks'. The main content area features two summary cards: a red card for 'Total Exams Available' with the value '3', and a dark brown card for 'Total Questions' with the value '65'.


Student Exam Monitoring



The screenshot shows the 'ONLINE EXAM' interface for a 'Java' exam. The title 'Java' is centered at the top. Below it are two questions, each worth 1 mark. The first question asks 'Which of these is not a feature of Java?' with options: Object-oriented, Platform-independent, Compiled (selected), and Interpreted language. The second question asks 'Which component of Java is responsible for running the compiled Java bytecode?' with options: JDK (selected), JVM, and JRE. A sidebar on the left shows the user profile and navigation options.

Exam Results

ONLINE EXAM ☰
Logout



SANDHIYA
(Student)

- 🏠 Dashboard
- 📷 Switchon Cam
- 📄 Exam
- 📊 Marks

View Marks

Exam Name	Total Marks	Result	Attempt	Exam Date
Java	44 / 50	Pass	Attemp 1	March 2, 2025, 7:33 a.m.

Tutorial Sites to Improve Your Skill

Excellent Score

Advanced Topics

Teacher Login

AI ONLINE EXAM
HOME TEACHER STUDENT ADMIN


TEACHER LOGIN

Please enter your login and password!

Login

Adding Exam

ONLINE EXAM ☰
Logout



mahalakshmi
(Teacher)

- 🏠 Dashboard
- 📄 Exam
- ❓ Questions
- 👤 Student

Add Exam
+

View Exams
👁️

Adding Questions To Exam

ONLINE EXAM Logout

ADD QUESTION

Exam
Java

Question
Who invented Java Programming?

Marks
1

Option 1
Guido van Rossum

Option 2
James Goslin

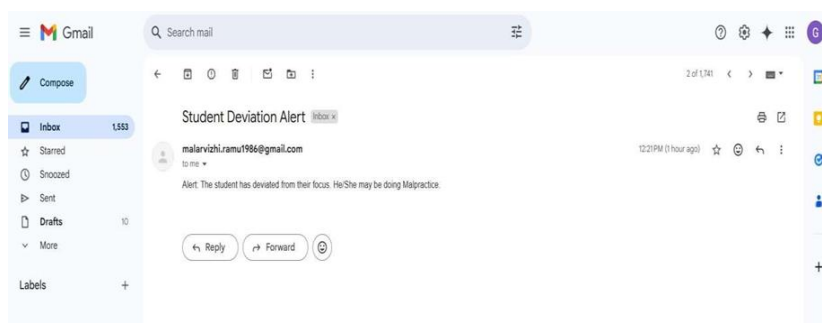
Option 3
Dennis Ritchie

Option 4
Bjame Stroustrup

Answer
Option2

ADD

Email Alert



Admin Login

AI ONLINE EXAM HOME TEACHER STUDENT ADMIN

ADMIN LOGIN

Please enter your login and password!

admin

.....

Login

ONLINE EXAM Logout

Admin

- Dashboard
- Teacher
- Student
- Exams
- Questions

Total Students	Total Teacher	Total Exams	Total Questions
7	3	3	65

3.9. System Implementation

The proposed system is implemented using HTML, CSS, JavaScript, React.js as front end and Python/Django as back end. It makes use of MySQL as database. It is run in VS Code.

4. Conclusion

The developed Online Exam Portal has successfully achieved its goal of providing an efficient and user-friendly platform for conducting online examinations. It offers a seamless interface for both students and administrators, allowing for smooth exam scheduling, automated grading, and real-time result generation. This paper is beneficial for educational institutions and organizations looking to digitize their examination process, making it more accessible and efficient. The paper was implemented the following software development best practices, ensuring security, reliability, and scalability. Extensive testing was conducted, including unit, integration, and system testing, to validate the system's functionality and performance.

The future work of this paper to evaluate the subjective answers, several advanced techniques can be implemented to make grading faster, more accurate, and fairer.

AI-Based Deep Learning Models. Use advanced NLP models (BERT, GPT) to analyze context, grammar, and relevance of answers, making AI grading more accurate.

Improved Plagiarism Detection. Integrate AI-powered plagiarism checkers to identify copied content from external sources.

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