

O.E.S: An Online Examination System

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Abstract

As advancements in information and communication technology increase rapidly in our day-to-day life, the e-learning system has gained more attention within educational institutions. Many educational institutions attempt to progress from pen-paper examination to online examination for several reasons, including a personalized environment, secured system, and accurate evaluation. This project implements an internet-based online examination system named O.E.S which may be a perfect destination for conducting online exams. The system will have 3 main factors named admin, faculty, and students. Students and the school can register within the system with unique credentials and may manage their profiles. Faculties create the questions and schedule exams that students can attend by logging in with their unique credentials. Admin gives the access to the registered users as faculties or students. The system will have an online video proctoring throughout the exam which can be sent alerts to faculties if there is any cheating detected. The cheat detection will include tab-switching and on-line video proctoring. The possibilities and necessity of such a system are incredibly much known nowadays. Online examinations are the current trend within the education system from low-level classes to high-level classes. In this scenario, O.E.S will function as a significant product in the market.

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1. INTRODUCTION

Online assessments are a major technique for assessing the achievement capability of scholars. Over the years, the academic system has evolved to great levels and therefore the credit majorly goes to the technological advancements. With the introduction of Learning Management Systems and smart classrooms, teachers are given the ability to form their teaching ecosystem more interactive and straightforward to trace the general progress. Similarly, the arrival of the web examination system has also brought some huge advancements to the traditional assessment system. It's made the assessment method entirely automated, comprehensive, accurate, and instant. Such technological evolution has not just brought ease to the teachers/educators but has also introduced plenty of advantages for the scholars and test-takers. Traditional methods have several disadvantages, including time consumption, difficulty in manually analysing tests, the need for more observers to take exams for a large number of students, results that are not accurate because calculations are done manually, the risk of losing an exam's result is higher in current systems, checking of results is time consuming because it is done manually, and a limit on the number of students who can take an exam at one time. We can overcome the existing error in the manual system with the advancement of information technology. The information about the tests is saved in a database, making it easier to provide exams. Teachers can add their own exam rules, and students can give exams in a completely automated system. Exams play a significant role in social life since they are a valuable tool for assessing people's abilities. Faculty have spent a lot of time and attention on traditional paper examinations. This method, particularly in remote network teaching, is increasingly failing to meet the demand for education informationization and modernisation. In the future, remote education will play an important role in the field of education, promoting the development of online examination system technology with promising future prospects. Many launcher-based examination systems on the market will have superior fraud detection accuracy, but their maintenance costs will be significantly higher than our web-based online testing system.

2. EXISTING SYSTEM

In today's market, there are a range of applications for conducting online exams. High-end examination systems, which are largely rocket based, are used by India's big-shot companies. Such systems will have advanced functionality, and launchers will require a minimum system requirement to function properly. Such

prerequisites are frequently not completed by students, making it impossible for them to attend tests. These systems will also need to be maintained at a very high level and on a frequent basis. Another sort of examination system is web-based systems, which are easier to use because their requirements are less stringent. But the features in such systems may be less advanced than the launcher based system. TCS employs a high-end launcher known as TCS iON Remote Assessments, which, once installed, will run the exam and demonstrate all of its features. SEB (SAFE EXAM BROWSER) is another application used by many other companies which is a browser application in which the students can attend their exam after installing this application in their system. There are many more applications available in the market for conducting online exam. Each one of them may differ from one another by many factors like the type of its working (Launcher based or Web based), the console they are developed, the features they possess, the capacity of the system etc...

3. LITERATURE SURVEY

Here we look at some of the related works in the field of online examination systems:

A multimedia analytics system that provides automatic on-line exam proctoring is described in the paper Automated Online Exam Proctoring. One camera, one rear cam, and a microphone are included in the system hardware to monitor the visual and audio environment of the testing area. User verification, text detection, voice detection, active window detection, gaze estimation, and phone detection are the six essential components that continually assess the important behaviour cues. We create higher-level features to classify whether the test taker is cheating at any point throughout the exam by merging the continuous estimation components and applying a temporal sliding window. We collect multimodal (audio and visual) [1] data from 24 participants who engaged in various sorts of cheating while taking online exams to evaluate our suggested solution.

The system is built based on J2EE architecture [2] and it basically includes three modules: user management, test management, and score management, according to the paper The Design and Implementation of Online Examination System Based on J2EE. Administrators, teachers, and students' information are managed by user management. Administrators or teachers can use test management to generate exam papers by selecting random questions from the database. Score management is in charge of automatically scoring test papers and providing students with the appropriate feedback. The system's installation effectively provides an interactive platform for professors and students while also improving administration.

The online examination system is designed as a three-layer C/S architecture based on XML Web Service in the paper. The three layers of architecture are: Data Layer (database server layer) for data integration; Business Layer (web application server layer) for data delivery and business processing; Presentation Layer (client layer) for data display and client process control. The three-layer C/S architecture is based on web service: the business layer obtains examination data from the data layer and delivers the examination results to the client, which are arranged into XML documents; the presentation layer does not need to connect to the web application server any longer. Only when necessary, the presentation layer interfaces loosely to the business layer and the data layer via suitable web services. As a result, employing XML in the three-layer C/S paradigm allows programmers to create cross-platform client programmes and reuse logic from the business layer [3].

The paper Automated Proctoring System Using Computer Vision Techniques demonstrates how to build a multi-model system that uses computer vision to eliminate the presence of humans during the examination. They propose a system that combines eye gaze tracking, mouth open or close detection, object identification, and head posture estimation utilising facial landmarks and face detection, among other aspects that students can use during the test. This system can also convert the student's voice to text, which could be handy for keeping track of what the student says [4]. This could help the examiner figure out if the student is conversing with a close friend.

A system that tracks the test-taker's and reports whether he is looking to the left, right, or up, which he might do to glance at a notebook or signal to someone, is described in the paper Face Recognition Classification in Proctored Exam. Dlib's face key point detector and OpenCV [5] for image processing can be used to do this. To recognise individuals and mobile phones in the webcam feed, we used the pre-learned weights of YOLOv3 trained on the COCO dataset.

They developed an AI-based symmetric response evaluation system for descriptive responding in their paper AI BASED SYMMETRIC ANSWER EVALUATION SYSTEM

FOR DESCRIPTIVE ANSWERING. It is a computerised system that examines the descriptive nature of responses. Keywords are given as input. Hyperspace analogue to language and self-organizing map approaches are used in the actual evaluation. Unlike other objective online exams, the online exam in this system will be descriptive. The exam system administrator will be in charge of the system. Exams will be administered by the teaching staff, and students will be involved in their completion. Both the teacher's model answer and the

students' answers will be included in the evaluation process. Every student's response will be unique. The database will hold the model answer[6]. The text will then be tokenized and stemmed, with stop words deleted. The text will be subjected to Latent Semantic Analysis and then Self-Organizing Map Clustering. Marks will be assigned based on the cosine similarity.

Automatic Evaluation of Descriptive Answers Using NLP and Machine Learning entails extracting text from answer scripts, calculating various similarities between summarised extracted text and hold on correct answers, and then assigning a weight value to each calculated parameter to arrive at the solution script. We used keyword-based summarisation algorithms to create an outline from the retrieved material. Four similarity measures are utilised here (Cosine, Jaccard, Bi-gram, and Synonym). parameters that will be used to create the final mark. The automatic analysis of answer scripts has been found to be quite ineffective. Our investigations have shown that the assigned marks are frequently the same as those manually scored marks[7].

The paper TEXT SIMILARITY ANALYSIS FOR EVAL-

UATION OF DESCRIPTIVE ANSWERS provides a text analysis-based automated approach for automatic evaluation of descriptive answers in an examination, keeping in mind the need for an intelligent system in the educational sector. The study focuses on the application of intelligent Natural Language Processing and Data Mining principles to a computer-aided examination evaluation system. The paper lays up a framework for evaluating the response sheet fairly. The examiner prepares a sample response sheet for each set of questions in this architecture. The final score for each answer is derived utilising the concepts of text summarising, text semantics, and keyword summarization. Siamese Manhattan LSTM is used to create the text similarity model (MaLSTM)[8]. The findings of this study were compared to hand graded assignments and another system already in use.

This method has been found to be quite effective when used in a school or university[15].

Subjective Answers Evaluation is a paper written by a scholar Using Machine Learning and Natural Language Processing proposes a novel approach for automatically evaluating descriptive answers that incorporates a variety of machine learning and natural language processing techniques and tools such as Wordnet, Word2vec, word mover's distance (WMD), cosine similarity, multinomial naive Bayes (MNB), and term frequency-inverse document frequency (TF-IDF)[13]. Answers are graded using solution statements and keywords, and a machine learning model is developed to predict grades. Overall, the results demonstrate that WMD outperforms cosine similarity. The machine learning model could also be utilized on its own with appropriate training. Without the MNB model, experimentation yields an accuracy of 88 percent. Using MNB, the error rate is lowered by another 1.3 percent[9].

The designed system allows the proctor to manually lock or unlock the exam to all examiners in the paper Online Examination System with Cheating Prevention Using Question Bank Randomization and Tab Locking. The technology is based on the Tab Locking mechanism, which automatically locks the examinee's terminal moment they open a new tab or reduce the screen, and notifies the proctors that the examiner has forfeited the exam due to attempted academic malpractice. If this is acceptable, the examinee can send a query to the proctor to gain access to the manual capability[10][14].

4. PROPOSED SYSTEM:

Our system, entitled "O.E.S: Online Examination System," is a web-based application software that aims at providing services to the faculties and students. It has three modules: admin, faculty, and students. The Admin will monitor all activity in the system. The user part of the system contains faculty and students. With this system, faculties can register, create questions, and schedule exams. The students can log in to appear in the exam and view their results. So the student module consists of Student and Online Proctoring, Tab locking, Auto submission, and Descriptive evaluation. The purpose of the system is to provide a system that saves the efforts and time of both the faculties and the students.

It is a web application that establishes a network between the faculties and the students. Faculties enter the questions they want on the exam into the system. These questions are displayed to the students as a test. The answers entered by the students are then evaluated, and their scores are calculated and saved. This score can then be accessed by the faculties to evaluate the performance of the students. Students can view their results in their profile as well.

Algorithm:

Step 1: Admin can register a faculty in the software with all necessary information.

Step 2: Once the admin has created a faculty, the faculty can log in to the faculty module using the username and password.

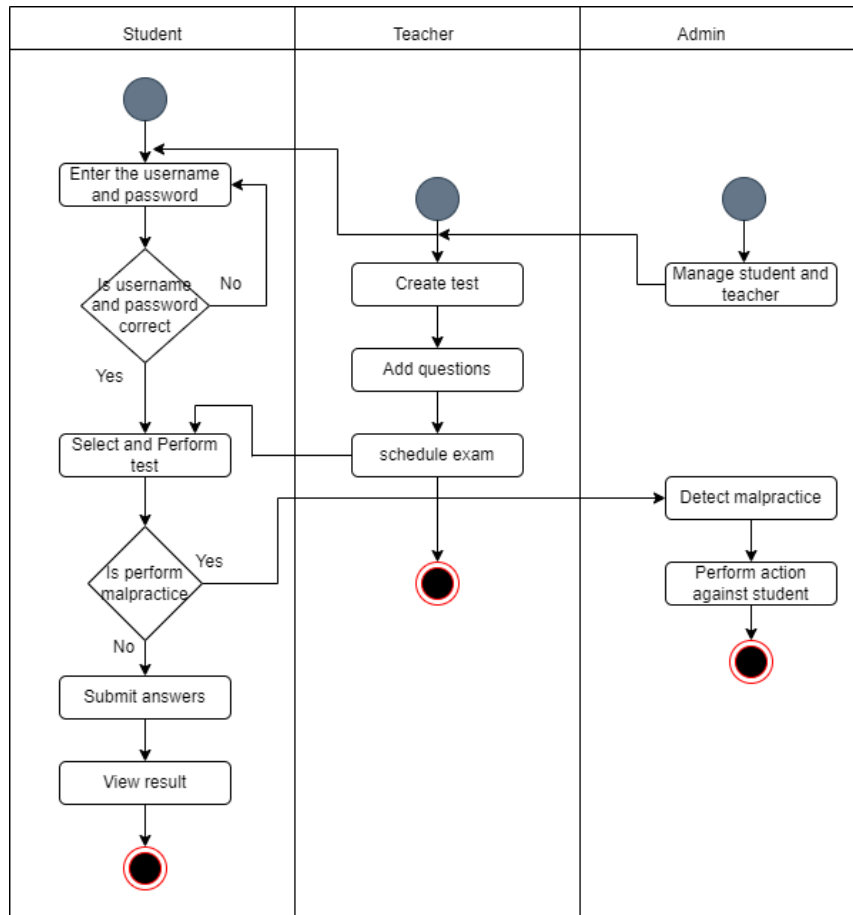


Fig. 1. Activity Diagram

Step 3: The admin can register the students in the student module of the software.

Step 4: The faculty can set the questions and time.

Step 5: The admin can trigger time-based proctored exams for the candidates.

Step 6: The admin can send notifications to the student using the software.

Step 7: Candidates will be able to take an exam once the exam has been triggered for them by logging into the student module with their username and password.

Step 8: The student can give real-time exams without having to be present physically in the examination centers.

Step 9: The student will be monitored continuously during the exam, hence any misbehavior will be considered as an act of malpractice.

Step 10: The student will receive time to time notifications and exam results will be published in the student module in less time.

System Advantages:

- 1) Students can take the exam without having to be physically present in the exam room.
- 2) The instructor will be able to keep an eye on things without needing to be physically present.
- 3) Any misconduct committed by a candidate is easily detectable.

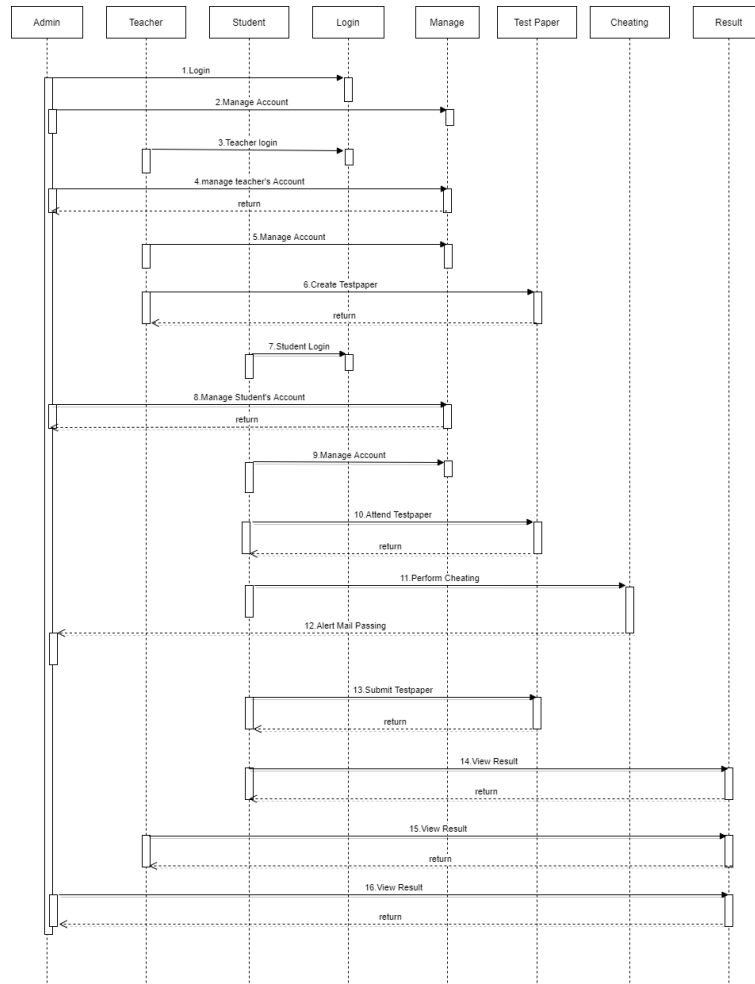


Fig. 2. Sequence Diagram

- 4) Descriptive responses can also be automatically as-sessed. This will lessen the amount of time it takes to manually evaluate a large number of response sheets.
- 5) To ensure a fair examination, real-time proctoring and tab-locking will be used.
- 6) It is possible to provide results and messages to students in less time.

5. CONCLUSION

The development of modern education technology has promoted the changes in teaching patterns and examination pattern, the appearance of online examination system (OES) is the best embodiment of these reforms and the monitoring system are designed to ensure the fairness and impartiality of the OES. Online exams are one among the vital parts of present education system. Even though there are many existing examination systems available in market, each of them differs in their functionality, features, efficiency and cost. OES is a web based online examination system that provides features for smooth functioning of exams and detecting fraud activities. This system finds a wide application in many small institutions and companies where they can save their money without compromising in efficiency. This system also have a door to wide possibilities in improving the features of it in the future. The necessity of such a system is higher in the modern world of education system. More advanced versions of this system with enhanced features and efficiency is expected to be developed in the future.

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