

# AI Based Online Education by using Smart Infrastructure

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**Abstract:** *The main objective of the online examination system is to provide equal opportunity to every student who is not going to the exam due to the lack of geographical areas. If you are regularly watching TV in India, you show one advertisement about online education to remove geographical barriers. In the Ad, one girl is leaving in the mountain region and can't go to the learning institute due to the lack of infrastructure (buses or transport). So, with the help of mobile phones and the internet, the girl educates herself and prepares for her future.*

*However, Online examinations use the same for the assessment of students' yearly learning. As a result, candidates from remote locations can participate in examinations without physically being present, enhancing inclusion and facilitating access to education.*

*In this project, we are going to implement unique question-answer types like, Fill in the blanks, String Matching, Ordering/Sequence, etc. in online examinations with Restrict Users to Single Sessions to prevent malpractice..*

**Keywords:** Parallel programming; String matching, JavaScript, Java, MySQL, Sequence matching, Artificial intelligence

## 1.1 Objective Scope of Proposed System

1. **To enhance the accessibility of the exams:** Online examinations use the same for the assessment of students' yearly learning. As a result, candidates from remote locations can participate in examinations without physically being present, enhancing inclusion and facilitating access to education.
2. **Time and Cost Efficiency:** In this blog, I am not elaborating on this section because we already see one separate blog for the time and cost benefits of the online exam software. If you haven't read that please read that. Conducting exams online eliminates the need for costly logistics and paperwork, leading to significant cost and time savings. It simplifies the examination process by automating tasks such as question paper generation, grading, and result processing, reducing administrative burdens on educational institutions.
3. **To Secure the Examination and to maintain Integrity:** Another main aspect of online examinations is to maintain the integrity of examinations. Keeping integrity means completing a secure examination in academic institutions. With the help of online proctoring software, the system provides robust security measures that prevent cheating and ensure the fairness of the examination. Nowadays online proctoring software is working with advanced tech like AI (Artificial Intelligence) and Machine Learning. It provides features like facial recognition, audio and video monitoring, preventing users from using another browser (Called screen monitoring), and feature that prevent students to see outside of the monitor screen. Whenever a candidate shows an outside screen it shows one warning sign. After that, it might lead to a copy case. Features like randomized question order, time limits, and anti-plagiarism algorithms help maintain the authenticity and reliability of assessments. Also, the Implementation of a per-question-timer reduces the cheating premises.
4. **Real-time Analytics and Performance Tracking:** Examination systems provide valuable insight into students' performance. Administrators or Educators can access detailed analytics and reports of students' exam reportcards. Where teachers can use these report cards and help students to increase their performance in weak

subjects. Personalized Learning is the main trend for online exam software trends in 2023. So, after identifying the mistakes or weak subjects, teachers can help students to create a personalized model for individuals. It improves overall problem-solving skills

5. **To Create Exam a Flexible and Adaptable:** The software offers flexibility in terms of scheduling exams and accommodating various time zones and individual preferences. It allows students to take assessments at their convenience. It creates a more relaxed and focused test-taking environment. This software offers companies or organizations to hire employees with online assessments. It increases the trust and integrity of the companies.

### 1.2 Features of Project

1. Real-time student management and reporting
2. Unique login credentials (Single Session)
3. System IP address detection
4. Date and time access implementation
5. Study Material and Videos
6. Support different types of questions (Audio, video, subjective, objective, descriptive)
7. Import/Export Data
8. Generate Reports

### 1.3 Literature Review

[1] String matching refers to the search of each and every occurrence of a string in another string. Nowadays, this issue presents itself in various segments in a great deal, starting from standard programs for text editing and processing, through databases and all the way to their various applications in other sciences. There are numerous different efficient algorithms to solve this problem. One of the efficient algorithms is Rabin-Karp algorithm which has complexity of  $O(m(n-m+1))$  whereas the complexity of proposed advanced Rabin-Karp algorithm is  $O(n-m)$ . However, the main focus of this research is to apply the concepts of parallelism to improve the performance of the algorithm. There are lots of parallel processing Application Programming Interfaces (APIs) available, like OpenMP, MPI, CUDA MapReduce, etc. out of these we have chosen OpenMP and CUDA to achieve parallelism. Comparison of the results of both serial and parallel implementations will give us insights into how performance and efficiency is achieved through various techniques of parallelism. DOI:10.1109/ICCUBEA.2017.8463971, 2017

[2] Zhenming et al (2003): They developed an online examination system based on web browser/server framework. Which supports some premium basic features, carries out the examination and provide the auto grading system for objective questions and operating questions like programming, edit MSword, Power point, MS windows, Excel etc. DOI: 10.2139/ssrn.3611554, 01 April 2020. SSRN

### 1.4 Representation of the Methodology

it will be based on an open book test idea, open lecture notes, open internet resources. The proposed method is based on some constraints, in order to minimize or cancel cheating, and therefore consider the online exam as valid as the onsite one. The results show that both online exam grades and onsite exam grades have relatively strong correlation coefficients, both have similar distribution, fairly symmetrical skewness, and platykurtic distribution, and both have similar central tendency and dispersion

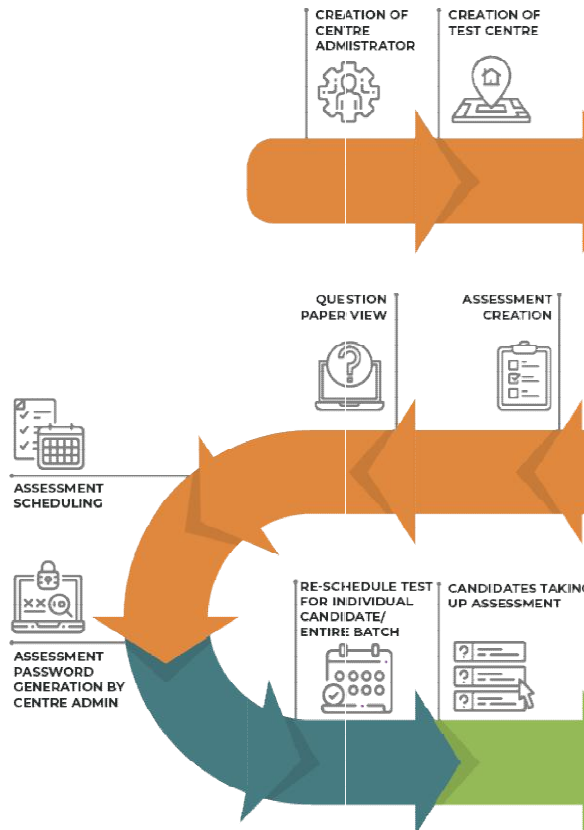


Figure 1.1: Representation of the Methodology

### 1.5 Programming Architecture

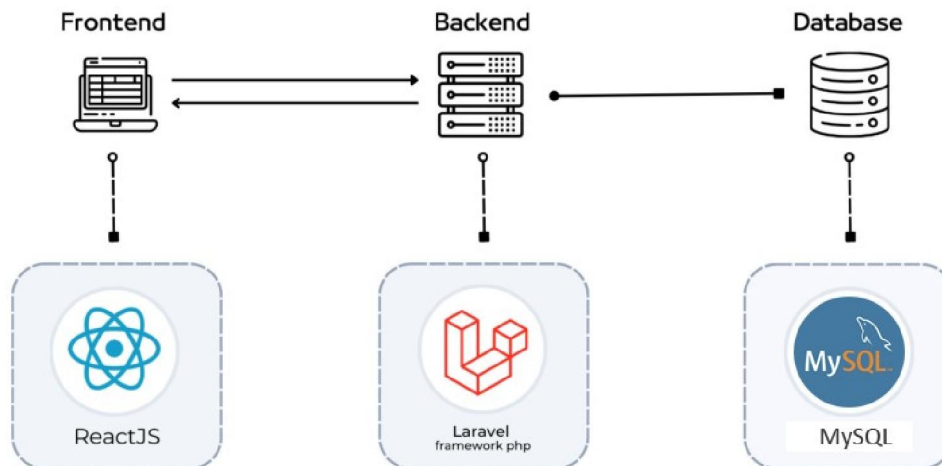


Figure 1.2: Programming Architecture

### 1.6 Advantages

#### Environmentally friendly:

One of the biggest, yet indirect advantages of online examinations is the impact it has on the environment. Pen-and-paper examinations require a lot of paper to print question and answer sheets. There is also a lot of waste due to printing errors or over-estimation of learner numbers, not to mention the carbon footprint of the logistics around getting the

papers to and from examination locations. It's simple, online examinations are the most environmentally friendly assessment option.

**Saves you money:**

Online examinations also save you money in so many ways. Since everything is online, there are no printing costs and no logistics costs. You also save money on examination facilities and having to pay facilitators and invigilators to oversee the exams. Online examinations still require some expenses like admin, email distribution systems, online proctoring, and IT support, but it's dramatically less than that of pen-and-paper exams.

**Saves time, big time:**

Online exams are a big time saver. Not only is there less time between the setting of the 'paper', but it also saves students time by eliminating the time it takes to travel to-and from examination locations, then waiting for the papers to be handed out and collected. Since most online examinations use auto-grading, teachers don't have to spend excessive amounts of time marking exam papers, and students get their results almost instantly. What's more, issues can also be flagged immediately with examiners who have immediate access to all the papers at once.

**Plugged into technology:**

In the past, the more people who took an exam, the bigger the challenge to facilitate it. Online examinations make it super easy to scale. Setting up an exam for 1,000 people takes almost the same amount of effort as it is to set up an exam for 10 people. Another advantage of the tech-centric nature of online exams is that the more online exams people take, the more they get used to the concept and the more comfortable they get with it.

**More secure, less cheating:**

Security has always been a challenge with exams, especially with high profile exams like bar exams, SATs, or college, and university final exams. With online exams, there are fewer chances of leaks since there are no physical papers that can go missing during the printing and logistics process. An added security benefit is that examiners can make use of question banks that select questions at random. This means that almost no two exams are the same, further minimizing the chances of cheating.

**1.7 Disadvantages**

**Challenges of tech:**

While the tech side of online examinations is a big advantage, it can also pose some challenges. The transition from traditional pen-and-paper to online may be difficult for some, especially older learners who are not computer literate. The transition may also initially take time as examiners need to get used to the system and find ways to use it most efficiently. Some learners and examiners may simply be resistant to change.

**Infrastructure problems:**

One of the biggest hurdles of online examinations is learner access to technology, including computers/tablets and/or a stable internet connection. This aspect of online examinations can be especially challenging for learners in rural areas. Infrastructure challenges can negate many of the advantages of online examinations like cost and convenience since examination locations need to be set up, times set and facilitators hired.

**Not all grading is the same:**

Instant or near-instant grading is a big advantage of online examinations, however, not all types of exams lend themselves to auto-assessment. Questions that involve some sort of interpretation and questions with longer answers most often require someone to read and grade the answers. However, advances in artificial intelligence and machine learning will make auto-grading of even these types of questions possible.

### Susceptible to cheating:

No matter what platform an exam is taken on, whether it be online or traditional pen-and-paper, there will always be cheating. However, online examinations can be especially vulnerable to cheating like screen sharing with other exam-takers, doing online searches during the exam, or plugging in an external drive with answers. Different exam times also mean that there's a chance that students who had already taken the exam might share answers with those yet to take the exam. Two ways of curbing cheating on online exams are through online proctoring and using a question bank to randomise questions so that no two exams are the same.

### 1.8 Hardware Requirements

- CPU Quad Core (not counting hyper-threading) 2.4Ghz, Intel VT or AMD V (Intel i3 or better)
- Memory 4 GB
- The ability to install more memory is desirable. Disk 512 GB SSD or better
- Graphics Accelerated, Gaming Support Nvidia is preferred over AMD 1920 by 1080 resolution is recommended (at least on an external port) At least 1280 by 1024 resolution
- HDMI output recommended (perhaps with an adapter)
- Sound Mic in/Headphone out (either analog or two free USB ports)
- Mouse An external mouse (USB or Bluetooth) is desirable.
- USB 3.0 desirable for an external disk Other USB ports may be needed for: mouse, printer, mic-in, and headphones-out, depending on how these are connected.

### 1.9 Software Requirements

#### Installation:

Students must be able to install software on the computer they will use for the Conduct the Mock Exam courses.

#### Operating system:

Students should Google their chosen system for serious Linux support problems. A few manufacturers use non-standard hardware configurations, making running Linux a challenge.

#### Microsoft Office

Development Software: Laravel – Leading PHP Backend Framework, Vue.js – Fastest JavaScript Framework, Inertia.js – Laravel-Vue Bridge, Tailwind CSS – CSS Library, MySQL - Database

### 1.101 Test Data requirements

- **Unit Testing:** Unit testing concentrates verification on the smallest element of the program – the module. Using the detailed design description important control paths are tested to establish errors within the bounds of the module. In this system each sub module is tested individually as per the unit testing such as campaign, lead, contact etc are tested individually. Their input field validations are test
- **Integration Testing:** Once all the individual units have been tested there is a need to test how they were put together to ensure no data is lost across interface, one module does not have an adverse impact on another and a function is not performed correctly. After unit testing each and every sub module is tested with integrating each other

### 1.11 System testing for the current system

In this level of testing, we are testing the system as a whole after integrating all the main modules of the project. We are testing whether the system is giving the correct output or not. All the modules were integrated and the flow of information among different modules was checked. It was also checked whether the flow of data was as per the requirements or not. It was also checked whether any particular module is non-functioning or not i.e. once the integration is over each and every module is functioning in its entirety or not.

In this level of testing we tested the following:

- Whether all the options are swapped or not.

- Whether all the options are properly linked or not.
- Whether a Single session works or not

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