IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

Online Examination System

Mr. Devidas. S. Thosar[1], Mr. Rohit Narahare[2], Mr. Amay Kapse[3], Mr. Mayuresh Sananse[4], Mr.Hamza Khan[5]

Assistant Professor, Computer Engineering, SVIT, Chicholi, Nashik[1]

Student, Computer Engineering, SVIT, Chicholi, Nashik[2,3,4,5]

Abstract: *Online examination system is a web-based examination system where examinations are given online, either through the internet or intranet using computer system. either through the internet or intranet using computer system. Research and comparison for different web examination system in the current individual field, proposed a set of design mode about general examination platform which apply in colleges and universities, research and analysis the key technology, and proposed improved scheme, made system being perfect. The purpose of this paper is to create an online examination system application that utilizes network laboratories available in any college. The application greatly reduces the time required to administer the examination and handout the results.The main goal of this online examination system is to effectively evaluate the student thoroughly through a totally automated system that not only reduce the required time but also obtain fast and accurate results.*

Keyword: Online Examination System, Dlib, Aforge, Firebase, Database, etc.

I. INTRODUCTION

Today, Online Examination System is considered a fast-developing examination methodbecause of its accuracy and speed. It is also needed less manpower to handle the examination. Almost all organizations today, are managing their exams by online examination system, since it reduces student's time in examinations. Organizations can also easily monitor the progress of the student that they give through an examination. As a result of this, the result is calculated in less time.It also helps diminishing the need for paper. Online examination project in PHP is very useful to learn it, according to today's requirement Online examination system is significantly important to the educational institution to prepare the exams, saving the time and effort that is required to check the exam papers and to prepare the results reports. Online examination system helps the educational institutions to monitor their students and keep eyes on their progress. The best use of this system in Scholastic Institute and training centers because it helps in managing the exams and get the resultsin easy and an efficient manner. Until today the preparing for exams and preparing the results was performed manually, this required more time to complete.

Examination System was helpful to separate teaching and testing. It promoted teacher to make the lesson planning and teach in theclass carefully. It was also an important means of evaluating the teaching effect. Otherwise, itstimulated students to conscientiously study and attend a lecture, to do their homework independently. Therefore, the Examination System could improve the teaching level by providing better technical support. Within the Examination System we developed, the teacher could set the score and number of different types of question according to their need. And then, the Examination System generated an exam paper randomly in accordance with the requirements. Finally, the paper in standard format and its answer could be outputted. Taking into account the development of course content, the Examination System could easily update and add questions, to make the teaching content developing with the technology synchronously. The Examination System also provided online testing capability for students. Students could log in the system at any time in the campus network, test themselves, understand their learning level, and adjust their learning progress.Universities are developing extensive online offerings to grow their international loads and facilitate the massification of higher learning.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

These protocols, informed by growing policy targets to educatea larger quantity of graduates, have challenged traditional university models of fully on-campus student attendance. The development of online examination software has offered a systematic and technological alternative to the end-of-course summative examination designed for final authentication and testing of student knowledge retention, application, and extension. As a result of the COVID-19 pandemic, the initial response in higher education across many countries was to postpone examinations. However, as the pandemic continued, the need to move to either an online examination format or alternative assessment became more urgent.

II. LITERATURE REVIEW

Zhenming et al. [1] (2003): They developed an online examination system based on web browser/server framework. Which supports some premium basic features, carriers out the examination and provide the auto grading system for objective questions and operating questions like programming, edit MS word, Power Point, MS-Windows, Excel etc.

Guzman et al. [2] (2005): They developed an online examination system called as SIETTE; (System of intelligent Evaluation using Tests for Tele education). Many different researches have focused on the subject of an online examination system this work can be represented. SIETTE is a web-based environment to generate and construct adaptive tests. It can be used for instructional objectives, via combining adaptive student self-assessment test questions with hints and feedback. SIETTE supports secure login and portability features. On the other hand, the other features: resumption capability, multi-instructor, random question selection, random questions distribution and random choices distribution are missing.

Devidas Thosar el al. [3] Review on Advanced Graphical Authentication to resist shoulder surfing attack. In today's world of newly coming technologies, an authentication play's an efficient role to provide authenticity to every user's vital information from variety of system attacks. So, we need to provide strong authenticity to avoid from such an unsecured problem.

Ayo et al. [4] (2007): They proposed a model of e-examination. Jim and sean et al. (2006): They justified the e assessment can be taken in different ways. The reason behind the developed such as software is to conduct the entrance examination for all Nigeria universities called JAMB (Joint Admission Matriculation Board). This software was designed and tested in Covenant university they were the private university in Nigeria. They found the software really helpful for conducting neat and clean with accuracy entrance examination. It is eliminating the problems that are associated with the traditional methods of entrance examination.

EMS: Rashad et. al. [5] (2010) proposed a web-based online examination system called Exam Management System (EMS). EMS manages the examination and auto-grading for student's exams and supports conducting exams collects the answers, auto mark the submissions, and produce the reports for the test.

Arvind Singh et al. [6] 2011: The project evaluates the examiners by using the online examination system concept. The exams will be totally customizable. This system will check results automatically basing on student's answers. Evaluates the examiners and the exams are highly customizable. Responses by the candidates were checked automatically and instantly.

CBTS: Fagbola et. al. [7] (2013) developed a Computer Based Test System (CBTS). CBTS is a web-based online examination system developed to address issues such as lack of timing flexibility for automation candidates log-off upon expiration of allowed time, result integrity, guaranty, stand- alone deployment, need for flexibility, robustness, designed to support the examination processes and overcome challenges framing the conduct of examination, auto-marking, auto- submission, andgeneration report of examination result.

Devidas Thosar, el al. [8] Review on click points graphical passport, Knowledge-based authentication and textbased authentication system have some drawbacks which are renowned. Users mostly choose easy to remember passwords which are easy for hackers to guess, and password generated by system are difficult for users to remmber.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

III. Problem Statement

Since the Covid Pandemic situation and the traditional have many drawbacks such as time consuming, Difficulty of analysing the test manually, more observers are required to take exam ofmany students, Results are not accurate since calculations is done manually, the chance of losing exam's result is higher in current systems, checking of result is time consuming since it done manually, Limitation of no of student can give examination at a time. with the development of information technology and use it in an orderly and properly helps to overcome the existing error in the manual system. Online examination system saves the exams information in a database, and this make it an easier way to give exam teachers can add their exams rules, and student can give exam in a totally automated system.

IV. Architecture Design

The Online examination portal consists of two sections, Admin login and Student login. Admin login has three functionalities which are student enrolment, see result and create exam. For enrolling student, admin requires the general information of student which are enrolment ID, name,contact no., branch name, year and password along with photo. This photo can be extracted from local file or using camera. Creating exam is very simple Admin just has to fill the information of branch, year, semester, subject, time and after this add the MCQ and save exam. All this information will be saved in our database. Student login allows registered students to login with their login information. After successful login of student camera activates and face recognition starts along withexam. Exam will use conducting and simultaneously AI proctoring. After finishing exam student can submit exam from submit button. After submitting the exam result will be evaluated.

A. System Architecture

Our system mainly works with face recognition and database connectivity. For keeping trackof unfair means used by student and hold the exam properly we depend on these two things. Face recognition is done by Dlib and Aforge of C#. Dlib is used for face recognition by image, the image which is clicked at the starting is continuously compared to the current images while giving exams. The Aforge is used for video vision so that there should be less chances of students using their unfair means for giving exam. Given a new image of a person, we can verify if it is the same person by checking the distance between the enrolled faces and the new face in the 128-dimensional space.

Read name-labels mapping and descriptors from disk. Then read the query image that is an image ofclassroom with multiple students and convert it from BGR to RGB format. Because Dlib uses RGB as default format. Then convert OpenCV RGB image to Dlib's cv_image, and then Dlib's cv_imageto

Dlib's matrix format. Dlib's cv_image format is not recognized by neural network module. Detect faces in query image. For each face detect facial landmarks. Get a warped and patch of 150x150 for each face. Now compute face descriptor for each face. Now we calculate Euclidean distance between face descriptors in query images versus face descriptors of enrolled images. Find the enrolled face for which distance is minimum. Dlib specifies that in general, if two face descriptor vectors have a Euclidean distance between them less than 0.6 then they are from the same person, otherwise they are from different people. This threshold will vary depending upon number of imagesenrolled and various variations (illumination, camera quality) between enrolled images and query image.

We are using a threshold of 0.5. If minimum distance is less than threshold, find the name of person from index, else the person in query image is unknown. AForge.NET is an open-source C# framework designed for developers and researchers in the fields of Computer Vision and Artificial Intelligence - image processing, neural networks, genetic algorithms, fuzzy logic, machine learning, robotics, etc. The framework is comprised by the set of libraries and sample applications, which demonstrate their features: The framework is provided not only with different libraries and their sources, but with many sample applications, which demonstrate the use of this framework, and withdocumentation help files, which are provided in HTML Help format. The documentation is also available on-line A Forge Imaging, which

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

is the biggest library of the framework so far, contains different image processing routines, which are aimed to help as in image enhancement/processing, as in some computer vision tasks:

- Linear color correction filters (RGB/HSL/YCbCr correction, brightness/contrast/saturationcorrection).
- Nonlinear color correction filters (contrast stretch, histogram equalization, color remapping,gamma correction).
- Image re-coloring filters (grayscale, sepia, hue modifier, rotate channels, invert).
- Pixel filtering by color (RGB, HSL, YCbCr color spaces).

B. Algorithm

Dlib is an open-source suite of applications and libraries written in C++. Dlib offers a wide range of functionality across a number of machines learning sectors, including classification and regression, numerical algorithms such as quadratic program solvers, an array of image processing tools, and diverse network functionality, among many other facets.

Dlib also features robust tools forobject pose estimation, object tracking, face detection and face recognition. The process starts with saving the input image. Then Dlib.Get Frontal Face Detector method loads a face detector that's optimized for frontal faces, people looking straight at the camera. Next, we will load image and perform face detection. The Dlib.LoadImage<RgbPixel> method loads the image in memory with interleaved color channels. The Operator method then performs face detection on the image. The faces variable now holds an array of Rectangle structs. Each rectangle describes where the face detector found a face in the image. To highlight the detection results I'm calling Dlib.DrawRectangle to draw a rectangle on the image at the location of each face. The final step is to save the modified image. Add this to the end of the Main method.

A Forge framework provides genetic algorithms library, which contains set of classes providing functionality allowing to solve many different problems with the help of evolutionary computations based on Genetic Algorithms (GA), Genetic Programming (GP) and Gene Expression Programming (GEP). The main class of the library is Population class, which organizes the work of genetic algorithm (GA/GP/GEP) creating initial population of random members, creating new members with the help of crossover and mutations operators, calculating fitness values of new members and performing selection of members to keep basing on members' usefulness (fitness). Creating population object, it is required to specify which chromosomes, fitness function and selection algorithm to use. The Population class also supports migration of members from one population to another, which allows to exchange by good solutions between populations. Also, this feature allows to run several populations simultaneously in different threads (distributing computations on multiple cores/CPUs if they are available) and exchange by good solutions from time to time bringing "fresh blood" to populations. Using the A forge. video library which contains different classes, which provide access to video data.

C. Mathematical Model

A mathematical model is a description of a system using mathematical concepts and language. A model may help to explain a system and to study effects of different components of a system to predict the behavior of system.

The mathematical modeling for our system is as followsS= {∑, F, δ, C}

S = Face Recognition.

∑ = set of input symbols = {Video File, image, character information}

F = set of output symbol = {Match Found then notification to user, Not Found}δ =

1. Start
2. Read training set of N*N image
3. Resize image dimensions to N2 * 2
4. Select training set of N2 * M

   Dimensions, M: number of sample images

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

5. Find average face, subtract from the faces in the training set, create matrix AΨ = 1/M ∑ Γi
Where, Ψ= average image,
M= number of images, andΓi= image vector.
Φi = Γi – Ψ Where,i = 1, 2, 3, …, M.
A = [Φ1, Φ2, Φ3…ΦM]

6. Calculate covariance matrix: AA'C = CA * A
7. Calculate eigenvectors of the c covariance matrix.
8. Calculate eigenfaces = No. of training images –no. of classes (total number of people) ofeigenvectors.
9. Create reduced eigenface space.
10. The selected set of eigenvectors are multiplied by the Amatrix to create a reduced eigenface.
11. Calculate eigenface of image in question.
12. Calculate Euclidian distances between the image and the eigenfaces.
13. Find the minimum Euclidian distance
14. Output: image with the minimum Euclidian distance or image unrecognizable C = {The system will not process the audio data, Eigenfaces will generate the grayscale images, The algorithm will run only on key frames.}

V. METHODOLOGY USED

Methods used for the system is extremely easy, one can use it very easily without any difficulty. The methods are made in such a way that the unfair means of student in exam can be detected at a higher accuracy. The libraries and technology we have used is OpenCV using .Net and cloud.

OpenCV method is used to perform face detection and recognition. The Dlib and Aforge made our work easy for face detection and recognition. It extracts the feature images into a large sample set by extracting the face Haar features in the image and then uses the AdaBoost algorithm as the face detector. In face detection, the algorithm can effectively adapt to complex environments such as insufficient illumination and background blur, which greatly improves the accuracy of detection. For a set of training sets, different training sets are obtained for subsequent work by changing the distribution probabilities of each of the samples, and each training set is trained to obtain a weak classifier, and then these several classifiers are weighted. For example, each sample is distributed with a training class, and a new training set is obtained by changing the distribution probability according to the correctness of the training set classification. The higher the classification accuracy rate, the lower the distribution probability. The new training set is trained to get the classifier, and it is repeated, and several classifiers are obtained, so that the weight of each classifier is increasedby the classification accuracy. It shows the structure of the face detection model.

The extraction of Haar's rectangular features and the strong classifier based on AdaBoost are an important part of face detection. The HAAR feature is composed of several identical rectangles, which are distinguished by the black and white difference of colors, and thefeature values of the Haar features are defined by the pixel values of the rectangle. OpenCV provides the trainer as well as the detector. We can train the classifier for any object like cars, planes, and buildings by using the OpenCV. There are two primary states of the cascade imageclassifier first one is training and the other is detection. OpenCV provides two applications to train cascade classifier OpenCV haartraining and OpenCV traincascade. These two applications store the classifier in the different file format. For training, we need a set of samples. Thereare two types of samples: Negative sample: It is related to non-object images. Positive samples: It is a related image with detect objects. OpenCV already contains various pre- trained classifiers for face, eyes, smile, etc.

Firebase Cloud gives developers many options for creating highly functional and versatile web applications. While there are several contenders in the development space, Firebase is always conversing with the best currently available platforms. The Firebase Realtime Database is a cloud-hosted database. Data is stored as JSON and synchronized in realtime to every connected client. When you build cross platform apps with JavaScript SDKs, all of the clients share one Realtime Database instance and automatically receive updateswith the newest data. The Realtime Database provides a flexible, expression-based rules language, called Firebase Realtime Database Security Rules, to define

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

how your data shouldbe structured and when data can be read from or written to. When integrated with Firebase Authentication, developers can define who has access to what data, and how they can access it. The Realtime Database is a NoSQL database and as such has different optimizations and functionality compared to a relational database. The Realtime Database API is designed to only allow operations that can be executed quickly. This enables you to build a great realtime experience that can serve millions of users without compromising on responsiveness. Becauseof this, it is important to think about how users need to access your data and then structure it accordingly.The Firebase has the enrollment number, That is, a specific id of the user and it is accessed in real time and with the use of OpenCv the face is Recognised. If the face is not as same as the Enrolled face and the output from OpenCv is not as Expected then there is some mechanism to avoid unfair means in the project.

VI. ADVANTAGES, DISADVANTAGES AND PLICATIONS

Online Examination System has many advantages and application and somedisadvantages mentioned as follows:

Advantages

More Secure and Less Cheating:

Security has always been a main concern for every online examination, especially with high profile exams like bar exams. With online examinationthere are much less chances of paper leaks as there is no physical papers.

Less Efforts:

The more people who took exam, the bigger the challenge to facilitate it. Online examinations make it easy to scale. Setting up paper for 1,000 peopletakes same amount of time and efforts as it takes for 10 people. Another advantage of the tech-centric nature of online exams is that the more onlineexams people take, the more they get used to the concept and the more comfortable they get with it.

Convenient:

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 ittakes to travel to-and from examination locations, then waiting for the papersto be handed out and collected. Since most online examinations use auto-grading, teachers don’t have to spend excessive amounts of time markingexam papers, and students get their results almost instantly.

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 ofpaper 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.

Money Saving:

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.

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 maybe 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.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

Internet Dependency:

Internet dependency is a vulnerability of conducting online exams. Internet connectivity is a basic requirement for online students in the first place. A challenge here is the net stability given the fact that it is dependent on the weather and signal. In order for exam takers to access the electronic assessment, they should have a stable connection to the web. To intervene with this, educational institutions can choose to have updates from the internet connectivity of the students especially before the day of the online exam. Alternatively, the schools with virtual exams may automate re-scheduling the assessment for the online student who happens to miss them.

Availability of Facilities:

Either it's the online or offline examination, in both cases, there are certain facilities required. Where we talk about offline exams to have stationary, space, etc. in the same way for online examination, we need to give systems required. For remote areas, there is a possibility that these things are not provided with sturdiness. So, if an institute is conducting an examination, then the students can be from anywhere with no guarantee of equal distribution ofresources of the campus.

Applications

Company recruitments.
Government exams
Assessment of Company
Educational institute/ schools

VII. ANNOTATION PROCESS

Annotation process is done using a C# file named as "Missingperson.cs".

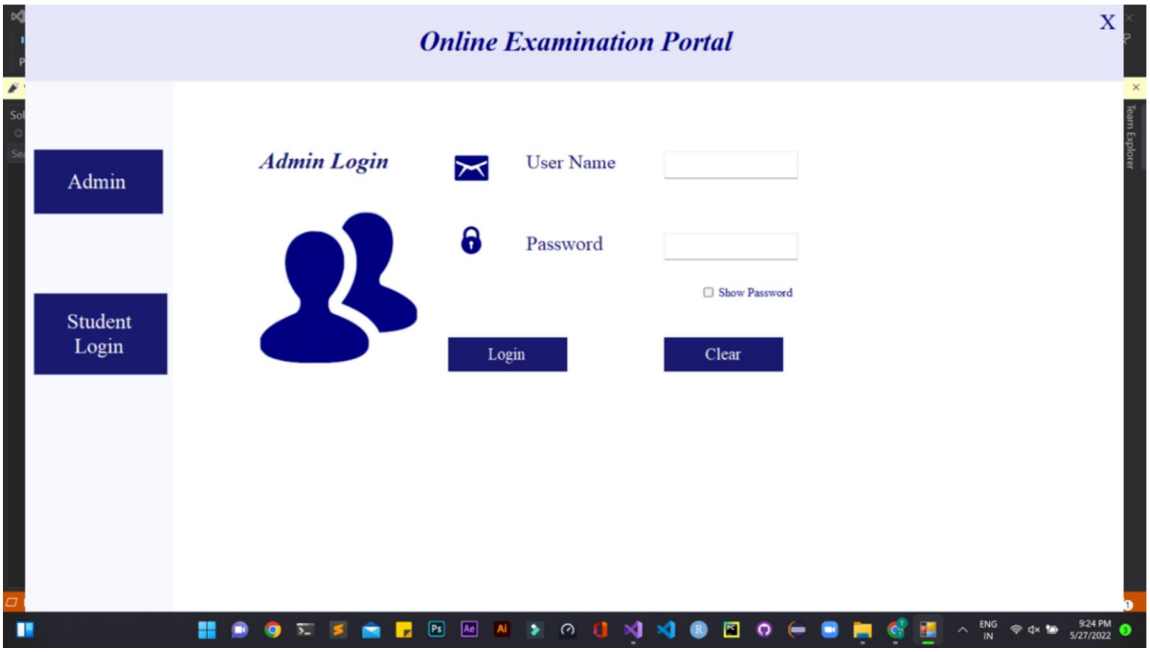

Figure 1. Login Page for Admin

We have created two options for login, one is admin login which is done by the staff and other is Student login. From admin login we can enrol a student and add questions for the exam.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

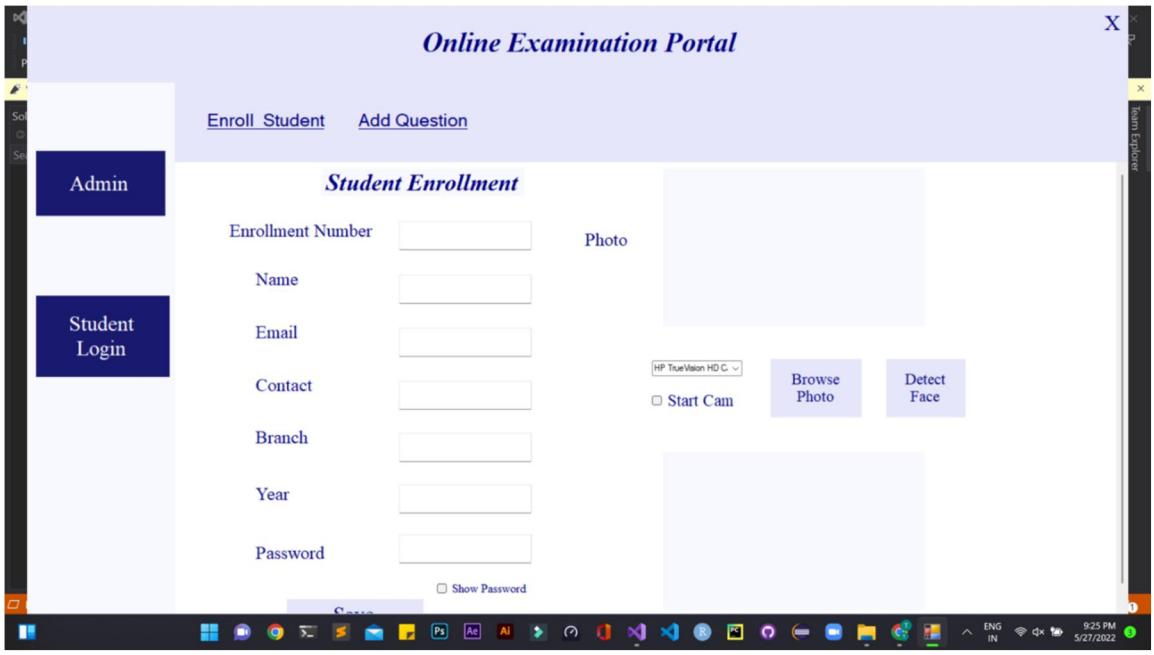

Figure 2. Student Enrollment

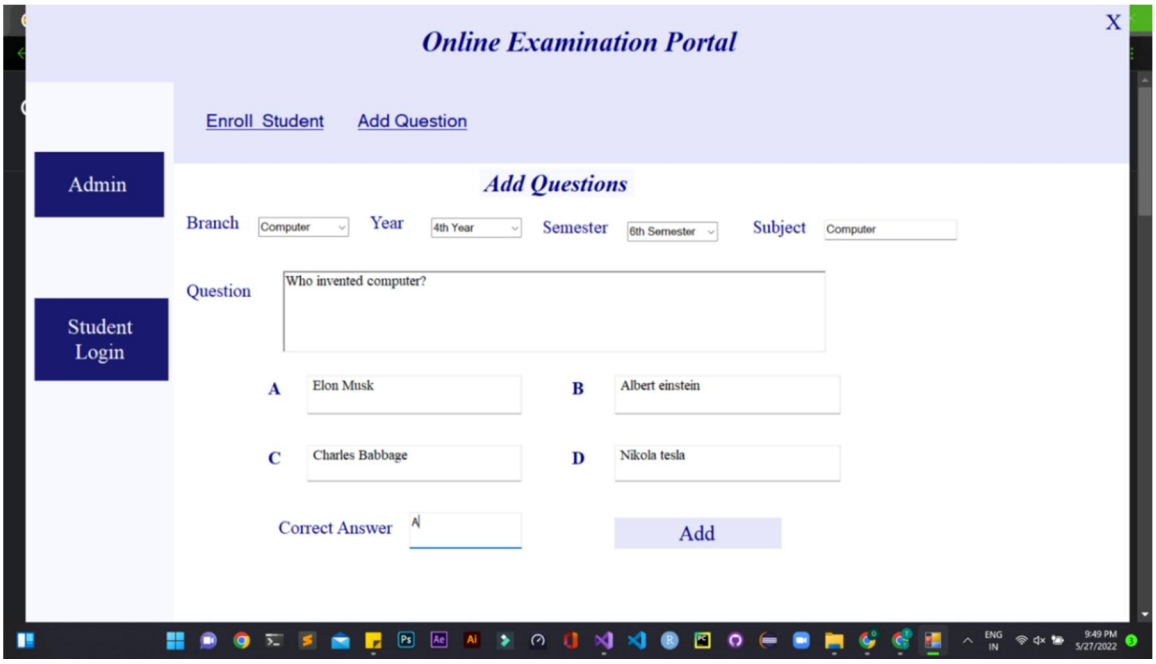

Figure 3. Add questions

Figure 2 and figure 3 shows us the enrollment student option and Add question option which are available with admin login. In Student enrollment we have to add required information about student and a photo of student from which we can detect he face. In add questions we have the add questions along with options and correct answer.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 7, May 2022
Impact Factor: 6.252

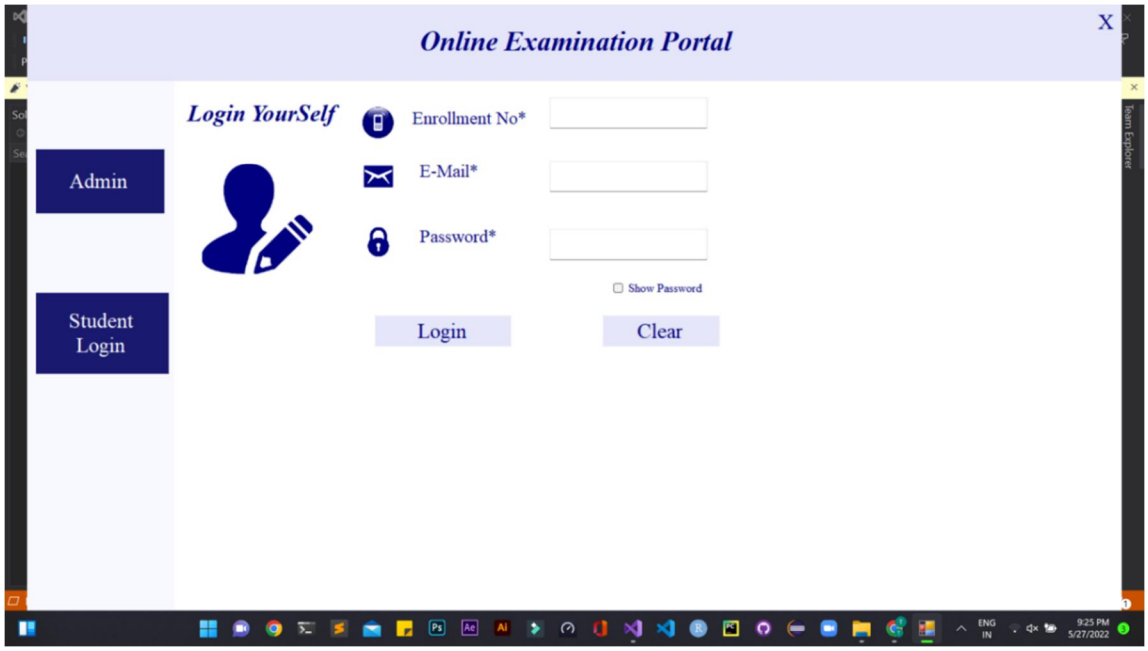

Figure 4. Student Login

Figure 4 shows student login, from where student will login to exam using their login information which is Enrollment no, email and password.

VIII. CONCLUSION

This paper gives an overall information about online examination system using globalapproach to conduct the exams online in a very easy and handy way, making efforts easy and secure examination. Having more advantage than the traditional examination.

REFERENCES

[1] Zhenming et al. (2003): They developed an online examination system based on web browser/server framework.
[2] Guzman et al. (2005): They developed a online examination system called as SIETTE; (System of intelligent Evaluation using Tests for Tele education).
[3] Devidas Thosar, Review on Advanced Graphical Authentication to resist shoulder surfing attack. DOI: 10.1109/ICACAT.2018.8933699, 19 December 2019, Published by IEEE.
[4] Ayo et al. (2007): They proposed a model of e-examination. Jim and Sean et al. (2006): They justified the e assessment can be taken in different ways.
[5] EMS: Rashad et. al. (2010) proposed a web-based online examination system called Exam Management System (EMS).
[6] Arvind Singh et al. 2011: The project evaluates the examiners by using the online examination system concept.
[7] CBTS: Fagbola et. al. (2013) developed a Computer Based Test System (CBTS).
[8] Devidas Thosar, Review on click points graphical passport, Volume 5 issue 2, August 2018, by International Journal of Research and Management (IJERN).