

Cloud Based Secure Examination System Specially for Visually Impaired

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Abstract— Technology has become integral part of taking examinations. The current system of taking examination online has its own advantages but the disadvantages overrule the advantages in matter of authentication and providing examination privilege for visually impaired. This paper improvises authentication by using face recognition. The concept of voice input and output is incorporated to ease the process of taking the examination for the visually challenged. Through the application, all the related data storage on cloud is made possible. Along with the data storage, the computations of the results are also made possible via clouds and hence reducing the burden on the end systems. This paper adds features of Secure and Random Distribution of Exam Questions, Proctor Approval based strategy. It also deals with the network related issues such as Network Overload, Occasional Network Failures. Network Overload occurs when there is more number of students taking up the exam and the proposed application is able to resolve this issue by assigning the client to another access point without any negative impact on the end user.

Key words: Facial Recognition, Voice Input & Output, Cloud Based

I. INTRODUCTION

The process of examination is getting digitalized; the students who can take up the exams without any difficulty are excelling in every field. The current system of taking examination online includes entering register number, name and password of the applicant. There is a problem in digitalization of the exam process, any student without a proper authentication can take up the exam with someone else's name, For instance, just by using username and password of the candidate anyone can take up the exam. This process can be made more efficient if a Bio-metric verification process is added with addition to giving username and password at the time of taking up the exam, this has become a big concern.

The students who are visually impaired are not able to take privilege of the digitalized examination process of multiple choice based exam as they will not be able to use the keyboard, mouse or even see the question which is displayed on the screen. The visually impaired candidates can also take up examination the only difference between them and a normal candidate taking up examination is a visually impaired will be using voice output in order to listen to the questions and voice input to provide answer to the questions.

II. LITERATURE SURVEY

The examination process is not connected to any particular person such as an admin who co-ordinates the activities which happen during the registration and while taking up the examination.

In the current examination process for visually impaired, instead of using bulky Braille textbooks, students are taking up the test with devices that convert computer text into Braille characters, along with mouse-free keyboard navigation and Zoom Text magnification and color contrast software. Their screen readers can also describe images that show up on the test.

There a big wait for the results ones a student gives the examination he/she has to wait for weeks or sometimes even months before they get their results.

III. DESIGN AND IMPLEMENTATION

The design of the application includes facial recognition algorithms which are used as a Bio-metric for authentication of the candidates appearing for the exam. The facial recognition is done by combining three racial recognition Fisher face [1], Eigen faces [2], Multi face [3] All of these algorithms together provide an accurate face recognition platform.

The fisher face and Eigen faces algorithm identifies the facial features of a person and compares it with the already existing images in the database, if a match is found then return a success message. The multi face algorithm is useful when there are a lot of people around then the nearest person to the camera is been tested for recognition for the facial features.

The voice output is through an automated voice, the automated voice reads out the questions which are already present in the cloud. The visually impaired candidate speaks out the option on the microphone that is provided to them. The choice of the option is again stored back to the cloud.

The implementation begins with admin login. The admin has many responsibilities such as creating a new exam, adding subjects, adding questions to a specific subject for a specific exam, ones the admin adds the questions, they can be also be viewed in the respective subject the admin also has the authority to delete any question from the list.

The second main responsibility of admin is to add student. The student registration can only done by the admin. The reason behind this is that if a visually impaired candidate needs to register, the candidate will need a constant support and to make it through the authentication process in a secure way, the admin is being given the access for student registration.

A. Student Registration

Ones the admin log in to the system he has all the authorities. The most important of all is student registration where be it a common candidate or a visually impaired, he or she must fill the details as shown in the figure 1. The first is the name of the candidate then the candidate should enter a password, he/she should then provide his/her email to which the information about the exam will be notified along with the

password which the candidate has to enter while taking up the examination. The phone number field checks for a proper number format, the card number is should be his/her identification card which is provided by the institute. As the admin registers for the student he will provide a series according to which the students are placed in the examination time. Now the admin will select if the candidate is visually impaired or not for which the voice input and output feature will be available during the examination time. After filling up the details the candidate submits the form after which the candidate are asked to sit up straight as their image is being captured by the web cam. Ones the image is captured a prompt message notifies a successful registration.

Fig 1: Student Registration

B. Examination Module

After the registration for the candidates, proceeding towards the examination is being done. Before the commencement of the examination, the proctor approves all the candidates' presence in the examination center and the admin verifies that the candidates have logged in to their respective portals after providing the necessary details and being verified with facial recognition.

Once the exam commences, the application then goes to full screen, where the candidates will not be able to minimize or close the application until the exam timer has expired. As the candidate logs in, the exam timer is set and the exam begins. The questions that are already being stored in the cloud prior to the examination are now being generated and displayed and are read for the visually impaired, in a random manner for each candidate with the help of the Random Generation Algorithm. This way chance of malpractice is being greatly reduced.

The normal candidates can begin answering the questions in the conventional way by simply selecting the appropriate option for the corresponding question as shown in the figure 2.

For the visually challenged candidates, the questions are also generated in the same way, and the questions are being read out by a voice through the headphones provided by the center. Since the spacebar in the keyboard is universal in its size and position in all versions of keyboard, the challenged candidates can identify the spacebar and can press it any number of times to which the voice reads out the question along with the options accordingly if it has to be repeated.

Fig. 2: Sample of a question

After the question and the options are being read, the candidate can respond by saying out the options either as a, b, c or d according to which the appropriate option will be selected. After selecting the option, the candidate must say 'click' to proceed to the next question.

IV. TEST CASES

The below mentions are examples of some of test cases which are tested on the application.

A. Login Form

The login has 4 different cases which occur as mentioned in the table 1 and table 2. In the table 1 there are two test cases which demonstrate the validation of username and password. In test case 1 the student enters a valid username and password so the test case and then the control goes to the facial recognition algorithm. In test case 2 the student enters an invalid username and password this should display a message stating that the given details are invalid and ask student to re-enter the details.

SL.No	Test Case	Excepted Result	Test Result
1	Enter valid name and password & click on login button	Software should display main student window	Successful
2	Enter invalid	Software should not display main student window	Successful

Table 1: Login Test Case for username and password

In test case 3 the application takes an image of the student which is compared to previously stored images and compared using Fisher Face Algorithm. If the face is of the authorized student then there will be a successful login dialog and redirected to the student page.

SL.N	Test Case	Excepted Result	Test Result
3	Facial Detection by authorized person	Software should display main student window	Successful
4	Facial Detection by unauthorized person	Software should not display main student window	Successful

Table 2: Login test case for face recognition

In test case 4 the applicant is not an authorized student so the face will not be recognized and an error message will show up which tells that the student is not an authorized and his/her face could not be recognized.

B. Student Registration Form

The student is asked to enter his details each one of the parameter has its own set of constraints and rules to be followed as shown in table 3.

In case 1 the student enters his data, if all the fields are filled correctly and there is no mistake in any field such as text or email id then the control goes to the web cam where an image of the student is taken for further reference in facial recognition when he is taking up the exam.

In case 2 if the student does not enter the right data and submits, that is if he enters an invalid email or a phone number which he enter has less no of characters then there will be a message pop up and user will be asked to enter the right data and then submit.

SL.No	Test Case	Excepted Result	Test Result
1	On the click of SUBMIT button	At first user have to fill all fields with proper data if everything is fine Add Records To the Database	Successful
2.	On the Click of SUBMIT Button	If any Error like entering text data instead of number or entering number instead of text is found then it gives proper message otherwise and asks to re-enter the data.	Successful

Table 3: Student Registration test case

V. ADVANTAGES AND DISADVANTAGES

A. Advantages

- Makes the examination process easily usable by visually impaired candidates also.
- Examination process is made more authenticated using the fisher face algorithm for facial recognition.
- Cloud based storage.
- Cloud computations which helps in calculation of result immediately.
- Centralized system where admin controls everything. So less chances of errors or mistakes

B. Disadvantages

- This cannot be used if the student is deaf, dumb, and blind at the same time.
- Face recognition algorithm is not 100% accurate
- Major disadvantage is that they have to give a voice input in a clear manner, there may be noise suppression and also for different language other than English they are not feeling comfortable.

VI. CONCLUSION

This Application would be a very useful for blind people to admire their talent easily through online exams like other humans are currently doing. This application will be providing interactive interface and a Bio-metric authentication by facial recognition for both a normal

candidate and a visually impaired candidate to ease the examination process and make it more secure. Thus visually impaired people can easily give exam like a common man without much difficulty. Through this they will be able to attend many exams in the future and also we will try to do more and more improvement in future as per the given feedback.

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