

Online Proctored Test and Long Answer Evaluation

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Abstract - The web application provides an interface to conduct online proctored test to help cope up with the current situation and to programmatically evaluate the long answers from the examinee and hence reduce the need for physical attendance of lecturers and students in the examination hall itself. And there are existing systems that conduct online monitored exams and evaluate multiple choice questions but there are no existing systems that evaluate long answers.

There are systems to evaluate multiple choice questions or one phrase answers through programming, but when it comes to long answer evaluation it becomes a challenge, as we cannot just compare two answers like we do for one phrase answers. So, the system aims to provide an approach to evaluate long answers using Natural Language Processing (NLP). Where, key points from both the candidate and lecturer are identified and based on those key points the answer evaluation is done. Similar way marks will be allotted to each question.

Key words: Natural language processing, long answer evaluation

1. INTRODUCTION

COVID 19 pandemic hit the world, many covid cases were reported, and social distancing, wearing mask became compulsory. In 2020, things got worse in India. Staying at home became necessary, and not going out until absolutely necessary became a rule. With this everything became virtual. From grocery shopping, online classes to work from home. This also marks the need for many things, exams where one does not need to be present in the examination hall itself that marks for another need where efficiently monitoring students while writing online exams, which is not possible with only human intervention, it needs for technical solution which is online proctored tests to detect any malpractices. And to reduce the burden on lecturers to having to correct answers of hundreds of students. So, it calls for a software solution that monitors examination process and also evaluate answers. There are existing systems to conduct online proctored test but there are none that evaluates long answers, which makes our system stand out of the ordinary.

The project includes two major domains we need to work and focus on. First, long answer evaluation, as said before many researches have been done in this field. Here we are evaluating long answers using Natural Language Processing.

Second area of focus would be online proctored test. Which calls for requirement of monitoring tab switching.

2. LITERATURE SURVEY

Online proctoring test is the process to authenticate, authorize and control online examination process. In traditional exam process an invigilator needs to be present in an examination hall with 30-40 candidates to invigilate. But given the current situation, it is risky to do exams in traditional way. So, many institutes are conducting online exams where face recognition module is used to authenticate the process. This can be done using OpenCV for image processing.

Authors Riya Goswami et al. have done a knowledge-based approach for long answer evaluation. The work aims to introduce a system which programmatically evaluates the long answer using lexical and semantic similarity measure.

Authors Kr. Chakraborty et al. have proposed a system to approach automatic evaluation for free text answers using linked grammar using semantic similarity. System extracts the keywords from the answer and through the process of identifying and extracting the relational expressions for a keyword the model automatically evaluates a learners' free text response to a given question with respect to the model answer.

Authors Shervin Emami et al. have proposed to create an application that would allow user access to a particular machine based on an in-depth analysis of a person's facial features. The thesis objective is to provide a set of detection algorithms that can be later packaged in an easily-portable framework amongst the different processor architecture.

Authors J.Manikandan et al. have done Face detection and Recognition using OpenCV based on fisher face algorithm. The paper is a utilization of face identification and following in recordings and camera utilizing OpenCV. It utilizes calculations like Adaboost, Haar course.

Authors Yousef Atoum et al. have proposed multimedia analytics system that perform automatic online proctoring based on audio visual streams captured by webcam.

Authors Swathi Prathish et al. have proposed an intelligent system for online exam monitoring. Sytem detects

Examinee's face and uses it to extract feature points thereby estimating a head pose. System detects misconduct based on yaw angle variations, active window capture and audio presence.

3. PROPOSED SYSTEM

The proposed model of online proctored test with long answer evaluation is being developed for universities to be able to conduct online exams and also automate the process of evaluation. The model monitors the student's system as to whether he/she is switching between tabs.

The online proctored test module must be able to monitor the student throughout the test. Automatically monitor the student's system and end the test if the active window in the computer changes for more than once.

The long answer evaluation module used Natural Language Processing to evaluate the answers, the model takes the key answers into consideration by lecturers as base and based on the key answers the student's answers are evaluated. First the model removes any stop words from the lecturer's key answers, creates a corpus for each answer which contains the key words from the answer. Then for each word a word net is created that has all the synonyms of the words in the corpus.

Next, the student's answers are considered and the stop words are removed. Then compare the words with the lecturer's word dictionary. This is done for each sentence in the answer. And the marks are allotted based on the comparisons done.

3.1 MODULES

Administrator Modules Description

- **Lecturer/Student details upload:** This module allows admin to enter details of lecturers and students to allow only the students and lecturers within the university to be able to access the platform.
- **Lecturer/Student information management:** This module allows the admin to manage data about lecturers and students, so there by admin can add/delete a lecturer/student in case of any unforeseen situations.

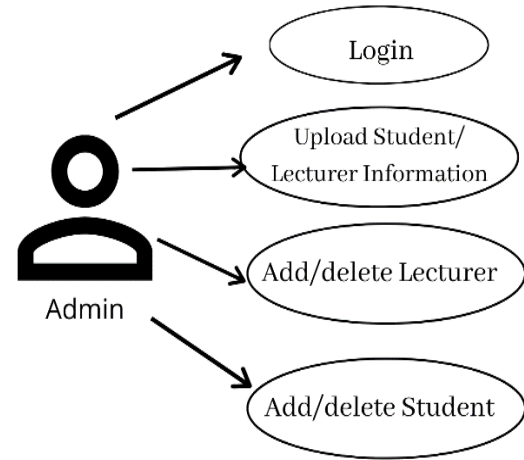


Fig - 1: Use case diagram for Admin

Lecturer Module Description

- **Registration:** This module supports the lecturer to register with the application, only those lecturers will be registered whose Email-ID is provided by the admin.
- **Test schedules management:** This module supports the lecturer to create and schedule tests to specific semesters and sections.
- **Test schedule details:** This module provides the history of scheduled tests and also upcoming tests and also provides support to suspend an ongoing or upcoming tests.
- **Re-evaluation:** This module supports a feature for lecturer to re-evaluate the model evaluated answers and re-assign marks if needed.

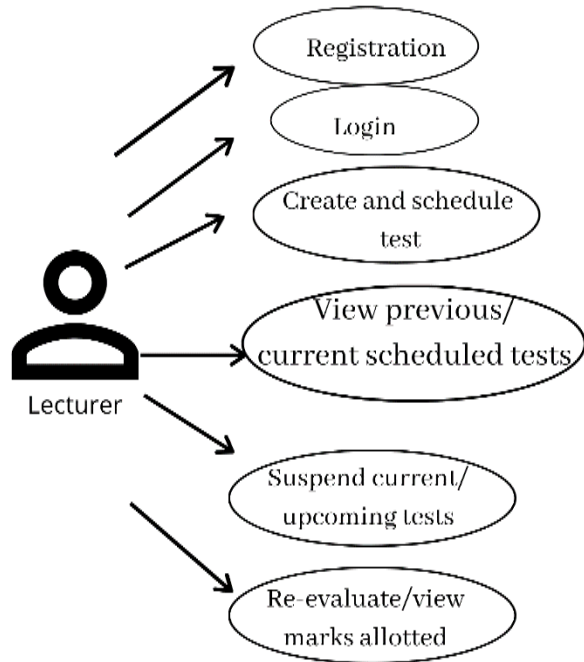


Fig – 2: Use case diagram for Lecturer

Student Module Description

- **Registration:** This module supports the student to register with the application, only those students will be registered whose USN is provided by the admin.
- **Test details:** This module provides the details of upcoming and previous tests.
- **Take tests:** This module provides interface for students to take tests.

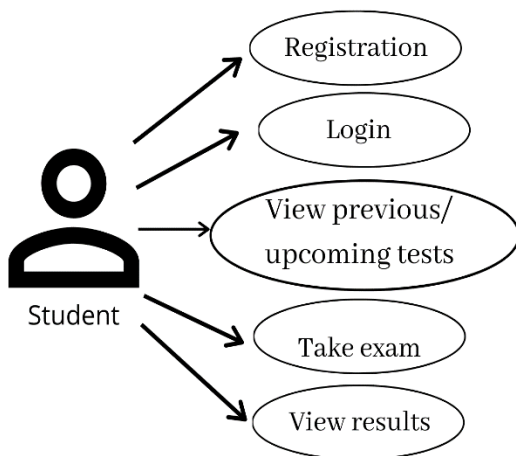


Fig-3: Use case diagram for Student

3.2 Registration and test monitoring

Admin will be given a unique user ID and password. When this platform is launched initially in any institution, the admin has the responsibility to upload .csv file that contains the information of lecturers - Name and official Email ID. And also upload .csv file that contains information of students - Name and USN. This will be stored in the database. And this information is used to provide access to the website to only those who are within the university. So, with this, the website will be accessible to only those lecturers and students who are part of the University. As the year passes by, every year new batch of students enter the university and the record changes, so the admin can re-upload the file.

And in cases where a lecturer leaves the college or a new lecturer is hired, or a student is detained or leaves the college, or a student has joined in the mid semester, then admin is provided with the interface to add a new lecturer/student. And an interface to delete new lecturer/student.

Once the admin uploads the information of Lectures/Students in the website, Lecturers will receive an E-mail to complete the registration process. So, the next step would be registration. Lecturer registration - Lecturer enters website for registration and enters all the details, the entered email-ID of lecturer will be checked as to see if it exists in the database (Only those Email-IDs exist in the database which has been uploaded by the admin). So, if the Email-ID does not exist in the database (i.e., that particular Email-ID was not provided by the admin) then an error message is generated. Or if the Email-ID exists in the database then and Email is sent to the same email-ID for verification so as to prevent impersonation i.e., someone else registering as lecturer using lecturer Email-ID. So, in the verification mail, a formal message with an account activation button is sent. So, only when the lecturer clicks on the button only then the registration process is completed. Else the registration will not be completed.

The same process is carried out for student registration. When the student enters the details in the registration form, algorithm checks to as whether the entered USN exists in the database (as per the information provided by the admin). If the USN is not found in the database then an error message is generated. Else a verification mail is sent to the Email-ID of the student as entered by them. This is to prevent impersonation. So, in the verification mail, a formal message with an account activation button is sent. So, only when the student clicks on the button only then the registration process is completed. Else the registration will not be completed.

For both lecturer and student, a separate table is present in the database, so once the registration is complete, the details entered by them are stored in the corresponding columns. And the passwords are stored as a hash key, thereby no one will be able to access any user's password, eliminating the security issues.

Once the registration process is completed, lecturer/students would have successfully set passwords for their account. Using the same credentials one can now login to the platform.

A lecturer can login to their account and will be able to schedule a test. Lecturer has to fill the form, where the scheduled date of the test needs to be selected, and the start time and then the duration of the test. A lecturer can choose the semester and section that is applicable. Then the lecturer just has to upload .csv file that contains question number, question and key answers to each question. And submit it. Once the test is submitted the test will be visible to the students at the scheduled time.

While the test is going on the online proctored test module must be able to monitor the student's system throughout the test. Automatically end the test if the candidate navigates from the test window to another more than once.

3.3 Long answer evaluation using Natural Language Processing

After the student gives test, this is where the long answer evaluation module comes into picture. The long answer evaluation module uses Natural Language Processing to evaluate the answers, the model takes the key answers into consideration by lecturers as base and based on the key answers the student's answers are evaluated. First the model removes any stop words from the lecturer's key answers, creates a corpus for each answer which contains the key words from the answer. Then for each word a word net is created that has all the synonyms of the words in the corpus.

Next, the student's answers are considered and the stop words are removed. Then compare the words with the lecturer's word dictionary. This is done for each sentence in the answer. And the marks is allotted based on the comparisons done.

3.4 Architecture

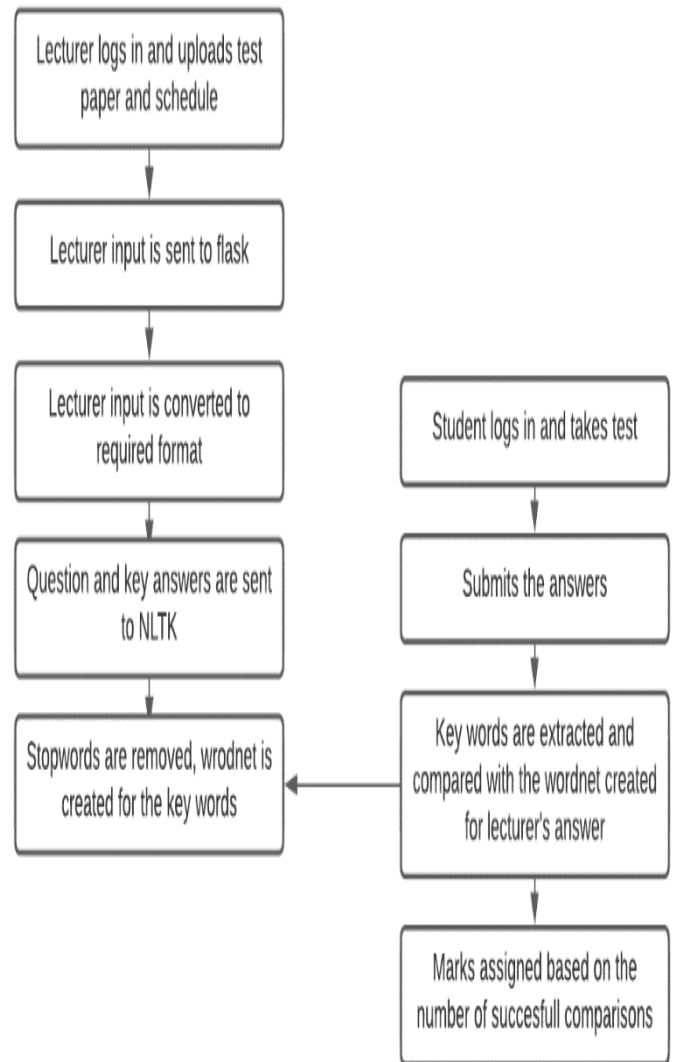


Fig - 4: Architecture Diagram of Long answer evaluation.

4. RESULT ANALYSIS

Login

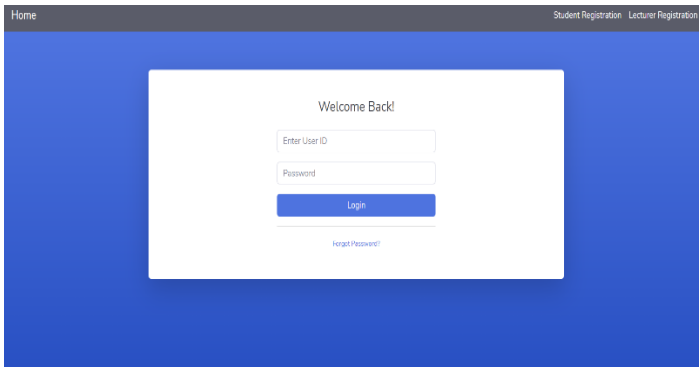


Fig - 5: Login page

Admin

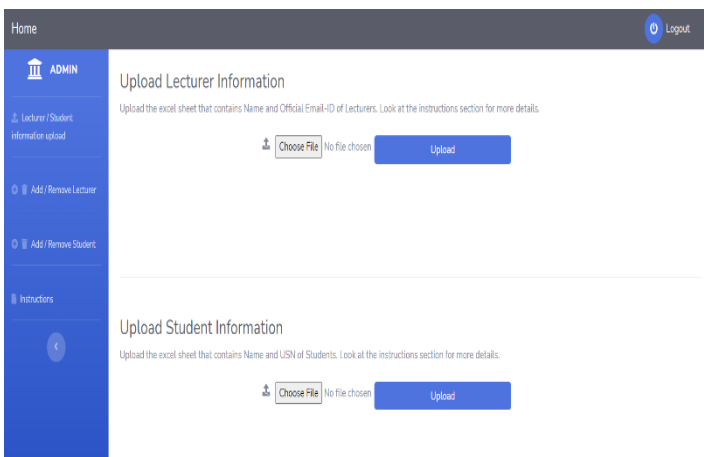


Fig - 6: Admin - Upload lecturer/student details

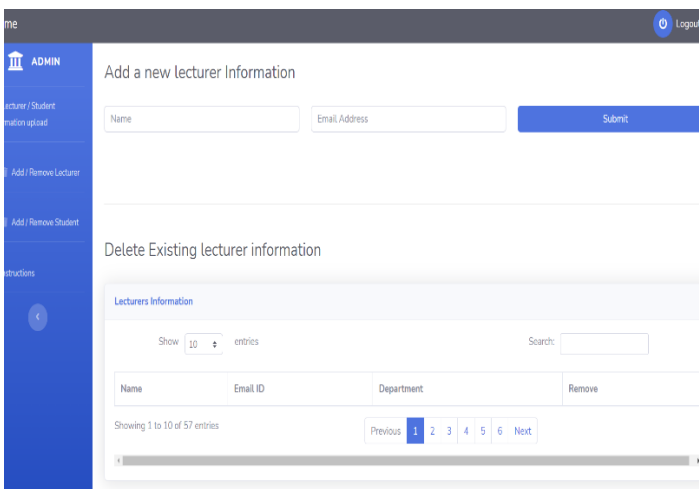


Fig - 7: Admin - Add/delete lecturer details

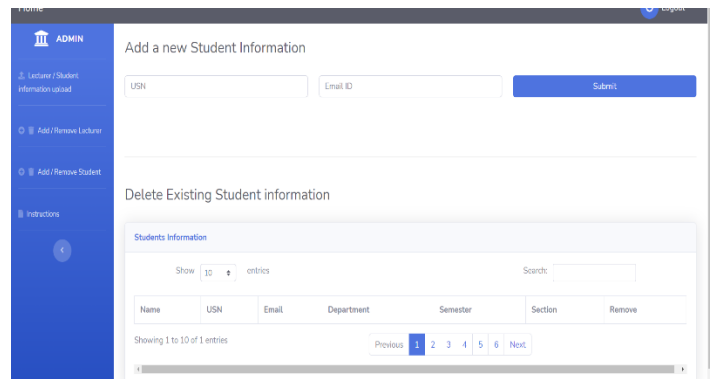


Fig - 8: Admin - Add/delete student details

Registration

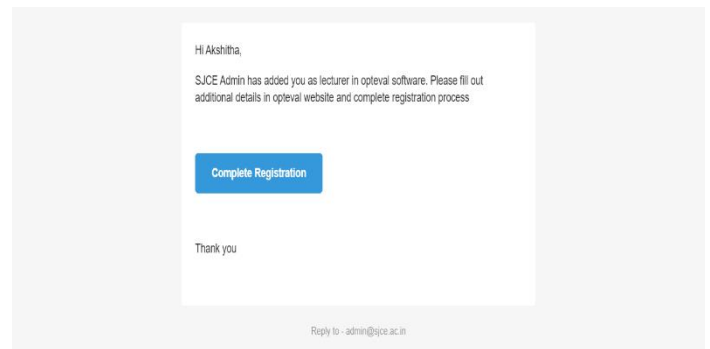


Fig - 9: Lecturer/Student received mail to complete registration

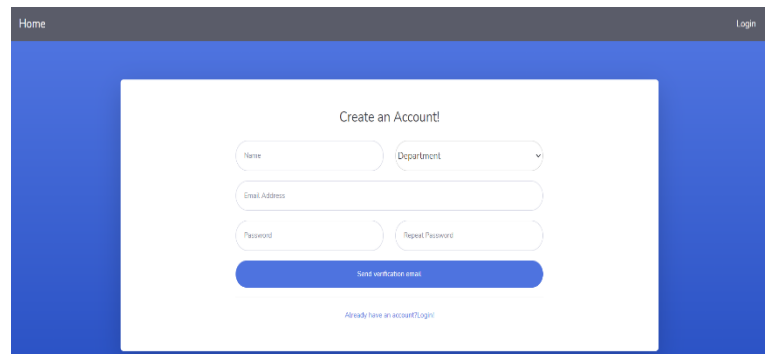
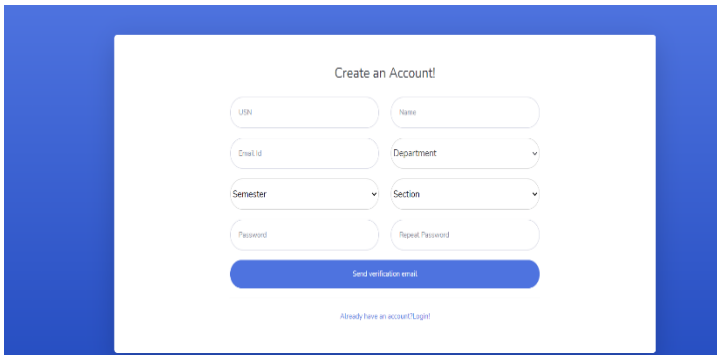


Fig - 10: Lecturer registration



Create an Account!

USN Name

Chair ID Department

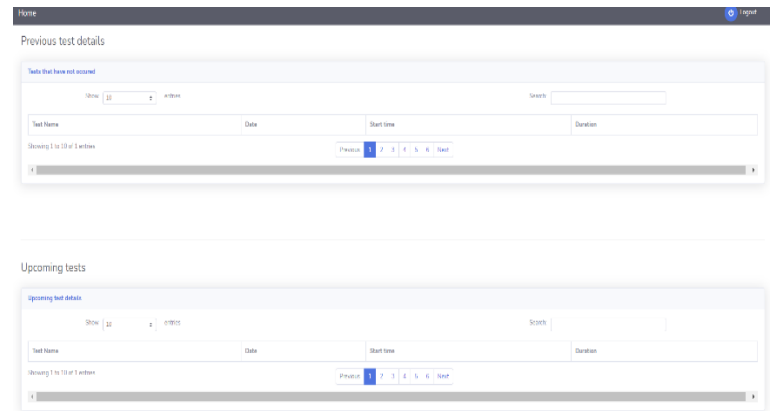
Semester Section

Password Repeat Password

[Already have an account? Login!](#)

Fig - 11: Student registration

Student



Home

Previous test details

Tests that have not occurred

Show 10 | 20 | 50 entries

Test Name	Date	Start time	Duration
Showing 1 to 10 of 1 entries			

Previous 1 2 3 4 5 6 Next

Upcoming tests

Upcoming test details

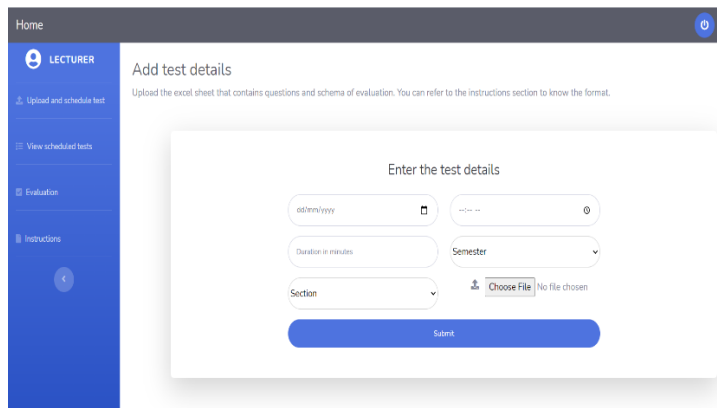
Show 10 | 20 | 50 entries

Test Name	Date	Start time	Duration
Showing 1 to 10 of 1 entries			

Previous 1 2 3 4 5 6 Next

Fig - 14: Student - View upcoming test details

Lecturer



Home

LECTURER

Add test details

Upload the excel sheet that contains questions and schema of evaluation. You can refer to the instructions section to know the format.

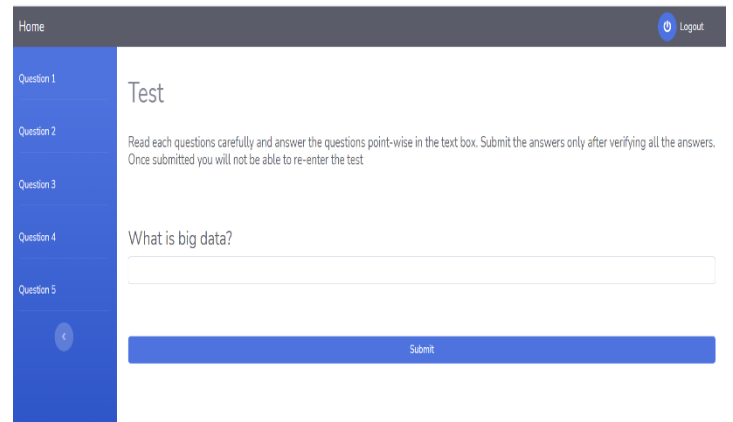
Enter the test details

os/mm/yyyy --:--:--

Duration in minutes Semester

Section No file chosen

Fig - 12: Lecturer - Upload test details



Home

Question 1

Test

Question 2

Read each questions carefully and answer the questions point-wise in the text box. Submit the answers only after verifying all the answers. Once submitted you will not be able to re-enter the test

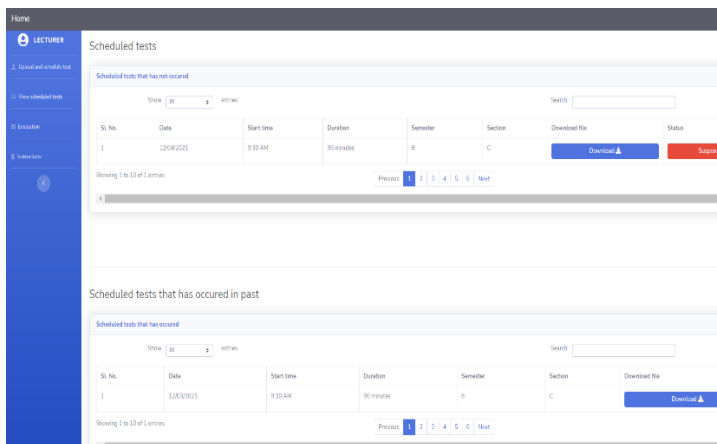
Question 3

Question 4

What is big data?

Question 5

Fig - 15: Student - Take tests



Home

LECTURER

Scheduled tests

Scheduled tests that has not occurred

Show 10 | 20 | 50 entries

Sl. No.	Date	Start time	Duration	Semester	Section	Download file	Status
1	12/04/2021	9:30 AM	30 minutes	B	C	<input type="button" value="Download"/>	<input type="button" value="Support"/>

Showing 1 to 10 of 1 entries

Previous 1 2 3 4 5 6 Next

Scheduled tests that has occurred in past

Scheduled tests that has occurred

Show 10 | 20 | 50 entries

Sl. No.	Date	Start time	Duration	Semester	Section	Download file
1	12/03/2021	9:30 AM	30 minutes	B	C	<input type="button" value="Download"/>

Showing 1 to 10 of 1 entries

Previous 1 2 3 4 5 6 Next

Fig - 13: Lecturer - View test details

5. CONCLUSION AND FUTURE WORK

Online Test Proctoring is a new trend in the education system that has opened doors to many possibilities in the online assessment sector. For the education industry, it is something that one needs to adapt the ease of the technology to keep the integrity and credibility of the online exam, which has now become a new standard concept since the lockdown.

Our platform is a software for online proctored test with long answer evaluation. It is a platform for universities to conduct online examination and also conduct evaluation online. An interface to conduct test is provided. And to do the evaluation of answers based on the key answers provided by lecturers.

Further, we can work on the proctoring module where we can use the face recognition system as the next level progress. Once this module is completed then the platform gives the overall package for a university to conduct online exams without much human intervention.

Going further once the module is launched in the university, and few tests are conducted using the platform, later a machine learning module can also be integrated to the model so that based on the many different answers written by students and also the re-evaluation marks provided for the students by the lecturers, model will learn many different ways of writing the answer and evaluation module will become more efficient.

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