



Online Exam Management System Using Deep Learning

Richa Bhardwaj

B. Tech Student, Department of Computer Science, Raj Kumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh, INDIA

Abstract- Deep Learning is a subfield of machine learning that is based on artificial neural networks that is capable of supervised learning or unsupervised learning from the data that is unstructured or unlabeled. Deep learning is used for processing data and creating patterns that can be used making decisions. The proposed system uses Deep Learning for face recognition and face detection for identifying and verifying the candidate and also for providing analytics to the candidate and exam creator for their assessments.

Keywords- Deep Learning, Drag and Drop, Face Recognition, Face Detection, Automatic Assessment

1. INTRODUCTION

Online exam systems have integrated well into today's technologically rich world. However, due to lack of direct supervision and monitoring, online exams have become open book exams. Students can take help of their course material and online search engines while giving exams. Hence correct evaluation of the students' caliber cannot be done. Therefore, the exam management system proposed in this paper uses Deep Learning to prevent malpractices by the students and provide automatic assessment of exams.

Exams are the inescapable part of the education system so a technologically advanced and secure system is a necessity to keep up with time. So, the idea is to use webcam or mobile camera to monitor the students while giving exams. This system provides the feature of creating and giving exams online without any need of technical expertise. Creation of exams is very easy due to drag and drop facility. The exams created are shared by automatically generated links. The checking of responses submitted and marks gained is instantaneous and automatic.

2. LITERATURE REVIEW

- A. An online exam system is less laborious and overhead intensive examination experience since it automated and digitized the examination administration experience.[1]
- B. The online examination system is useful all over the educational and corporate sector. Use of Random Number Generator Algorithm to shuffle questions.[2]

- C. The advancement in the field of Deep Learning can help in the better assessment and monitoring of the online exams.
- D. Many countries like India, USA, etc., are using online exam management systems for conducting exams.

3. INFERENCE FROM LITERATURE

The currently used online exam management systems have following shortcomings:

- A. *Malpractices and Suspicious Activities*
Due to the absence of supervision during the exams, identification of the rule violators is difficult. Students refer to their books, course materials and search engines while giving exams.
- B. *Identification and Verification*
While giving the exam the identification and verification of the correct student is not done right at that moment that is, either not done, or done after the exam and as a result any unauthorized person can give exam in place of the authorized candidate.
- C. *Infrastructural Barriers*
Continuous internet connection is required while giving the exam. If connectivity is lost then either student has to give the whole exam again or resumes from same point after logging in again. This causes distraction and disturbance as a result student loses focus. Also many exam systems only allow giving of exam on computers with webcam so the students without computer or laptop either have to go to the cyber café or other places with public computers or they cannot give exams.
- D. *Use of Human Evaluators and Proctors*
Many online exam systems are using human proctors for monitoring the activities of the students while giving exams through snapshots taken by their (students') webcam. Moreover, some hire humans to evaluate the theoretical responses of the students. This not only increases the cost of conducting exams but also somewhere affects the speed and accuracy of evaluation.

4. PROPOSED ARCHITECTURE OF THE SYSTEM

An online exam can be created using drag and drop feature that easily add fields to the question paper of selected subject. An automatic link is generated for each newly created exam that can be shared with targeted audience. The exam created can be given by any device with camera that is, either a computer, mobile or tablet. There is no need of any technical expertise to create and give exams. The feature of uploading a photo identity card and access of webcam or mobile camera while giving exam helps in monitoring and reducing use of unfair means by the students. The evaluation of the responses submitted by the students is done automatically and displayed instantaneously.

A. Exam Creation Module

An online exam can be created using drag and drop feature to easily add fields to the question paper. The fields that can be added are paper title, description, multiple choice questions, single choice questions, short answer questions and long answer questions. The user can edit each added field according to the requirement easily that is editing marks, number of options in multiple and single choice questions, grammar and plagiarism check for long and short answer questions, etc. User can choose any one from numerous templates and themes for exam. After that exam creator need to give responses for following fields:

- Start date of the exam
- End date of the exam
- Time duration of the exam
- Instructions to be followed by the students while giving exams. Few custom instructions are also provided to choose from.
- Number of rule violation warnings.
- Choice to make exam public or private. If exam is made public then any one can give exam but if it is made private then only candidates with pass key can give exam.
- Choice to add mandatory form with editable fields to collect basic information about the candidate. (Beneficial for corporate organizations conducting hiring process.)

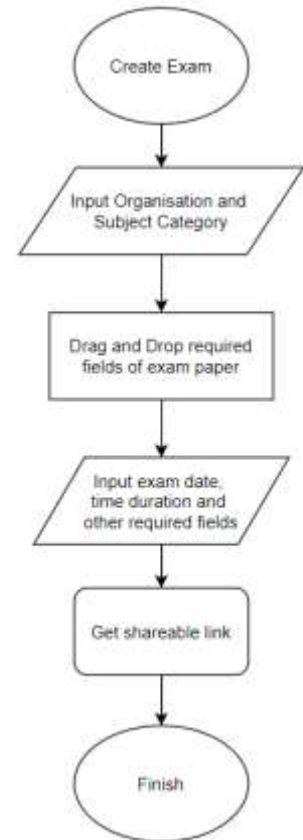


Fig1. Flow Chart of Exam Creation Module

By submitting the responses for above fields and clicking on create button the exam will be created and automatically a link will be generated for this exam which can be shared with the students.

B. Exam Conduction Module

If the exam is public then candidate can simply open the exam by the link but if it is private then the candidate need pass key to open exam. Now before opening the question paper firstly instruction page will be displayed with an additional field of email id using which the candidate gives that particular exam. Without valid email id one cannot open the exam. After this the candidate need to provide the access for the webcam or mobile camera.

After getting the access the candidate need to upload photo identity card. Now, firstly the uploaded photo is matched with the live camera, if they match then the screen switches to full screen mode and question paper is displayed. If the photo does not match with the current snapshot then the candidate need to upload the picture again.

During the exam following things are monitored using Deep Learning:

- No more than one face should be suspected.
- The candidate does not turn off the webcam or mobile camera while giving exam.
- The candidate does not leave the screen before submitting the exam. Even movement of head to more than a set limit will be counted as no face.
- After a fixed time of interval the snapshot of the candidate is taken and matched with the uploaded image. So as to make sure that no other person other than the verified candidate is giving exam.

If any of the above mentioned activities are encountered then the snapshot of that particular violation of the candidate will be saved and a warning will be generated. If the number of warnings exceeds the set limit then the exam will be terminated automatically.

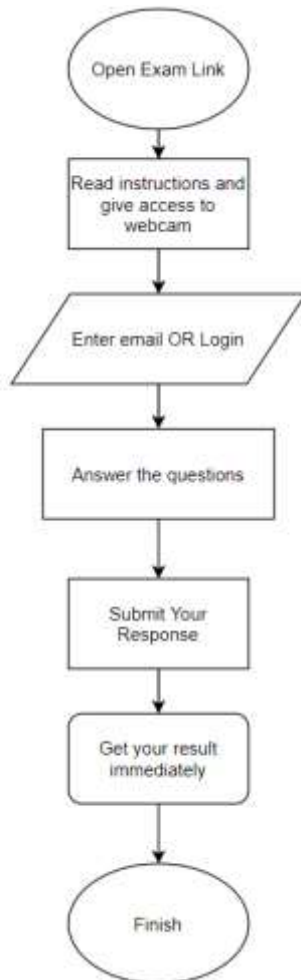


Fig2. Flow Chart of Exam Conduction Module

After submitting the exam the candidate is instantaneously displayed the result. Also the mark sheet is mailed to the candidate. The evaluation of the submitted responses is fully automatic and accurate. The single and multiple choice questions are evaluated on the basis of correct option/options selected. Whereas, the long and short answer questions are evaluated on the basis of keywords, grammar, spelling and plagiarism check.

C. Analytics Module

This module shows the analyses and evaluation of the logged user in the form of charts and graphs using Deep Learning. Both exam creator and candidate can get evaluation.

Like exam creator can see:

- Number of candidates who gave exam.
- Number of candidates passed the exam.
- Number of candidates who failed.
- Common mistakes of the candidates.
- Increase or decrease in the latest 10 results.

Candidates can see:

- Number of exams attempted.
- Number of exams passed.

- Number of exams failed.
- Strong or weak domains.
- Growth rate on the basis of latest exams.

The data display can be exported to Word or downloaded as a PDF.

5. ADVANTAGES OF ONLINE EXAM MANAGEMENT SYSTEM USING DEEP LEARNING

The advantages that Online Exam Management system using Deep Learning holds over other online exam systems are:

- This system allows reduction in the time invested in creating and administering exams and evaluating students' responses.
- The overhead cost of conducting an exam is reduced. Like that of securing an examination hall, printing multiple copies of question papers and hiring human proctors and evaluators.
- Because of the use of Deep Learning this system is technologically forward and helps in reducing malpractices by students.
- Identification and verification of the candidate can be done accurately with the features of face recognition and face detection.
- Any device with camera like computer, mobile or tablet can be used to give exam from anywhere.
- One does not need to create an account for giving an exam only a valid email id is enough.

6. ENHANCEMENT POSSIBLE IN FUTURE

A few more features that can be added to the proposed Online Exam Management System are as follows:

- The display of number of questions at a time on the basis of length of question paper. So that if question paper is short then one or two question at a time else four to five questions at a time.
- If the exam creator allows candidates can download the PDF of their responses for future reference.

7. CONSLUSION

The architecture for developing an online exam management system using deep learning is provided in this paper. It is very efficient in monitoring and supervising the exam and thus helps in drastically reducing the malpractices by the candidates. The evaluation of the candidates' responses is automatic and displays result instantly which saves time and is accurate. The feature of analytics helps candidates and exam creators to keep the track of their growth. The proposed online exam system can easily be adopted by schools, colleges; universities, training institutes and cooperate world to conduct exams more securely and flexibly.

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