Information Retrieval Project Proposal

Project Title and Details of the Group:

"Automatic Answer Evaluation System"

Project group No. - 25

Team members: -

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Motivation and precise problem statement:

Traditional answer evaluation, i.e., manual checking of answers, takes a lot of time and energy. However, objective-type questions can be evaluated using computers very efficiently, but there is no platform for checking the answers very precisely and efficiently when it comes to theoretical evaluation of answers. So invariably, there is a need for a checker to check the answers manually, which takes a lot of effort and time, and sometimes he/she has to provide the feedback, which would again take a lot of effort and analysis.

Hence, we propose a system that evaluates the assessment copies automatically according to the rubric set by the checker for every type of question(subjective and objective) and also for multiple types of copies like pdf, scanned pdf. Our system would also give feedback over every question in a sheet generated for each student.

How is our proposed system better?

Our proposed system is more efficient than the existing systems because our system has less error rate than other systems.

- Checking of copies by teachers could lead to human error, but our system shows uniformity over all copies, which reduces human errors.
- Our system could reduce lots of human time, power, and money, which could be utilized in a better place.
- Our system would also accept the handwritten scanned type file which students could submit.
- Our system is also supposed to provide the partial marking or binary marking option, which could be opted by the checker.

Literature review: -

We studied multiple existing Literature in order to understand the problem more deeply. Few of the Literature is mentioned down.

Answer Evaluation Using Machine Learning:-

We have to scan the answer to a question using this application, and then the system will automatically generate the keyword using the OCR technique. Based on keywords written in the answer and the keywords in the dataset, the application provides marks.[1]

Limitation-

This model can not evaluate the handwritten text from the answers. It can only check the printed text from the image of answers. It does not include a feedback feature as well.

ONLINE SUBJECTIVE ANSWER CHECKER:-

The answer selected by the student (String1) is compared with the answer stored in the database(String2) provided by the checker. If String1= String2 then score=+1 or else score=0. After processing the results of the test into the database, the results are displayed to the student.[2]

Limitation-

This system is inefficient, but it is less time-consuming. It still lacks the feature of extracting the handwritten text from the image, i.e., this model checks only digital or printed text.

It does not include a feedback feature as well.

NATURAL LANGUAGE PROCESSING AND ARTIFICIAL NEURAL NETWORKS--

Once the student has submitted the answer, this system will automatically calculate the result using two algorithms of NLP (Natural Language Processing) and ANN (Artificial Neural Network). Here this model uses an Artificial Neural Networks algorithm for the standard answer comparison and evaluates the same answer using Natural language processing [NLP] algorithm for grammar mistakes and stores the marks in the student database. Some fundamental linguistic analysis is performed in a natural language parser and used to perform POS tagging of the student's answer text. After linguistic analysis, the student's answer text is processed by the artificial neural networks algorithm; it will compare the student's answer text with the answer provided by the checker and keywords. The result of each process is calculated using a "marks calculator" to compute the total marks obtained by the student for his/her answer and finally compares both marks and provides a final result.[3]

Limitation-

This model is still in the development phase for recognizing handwritten text using deep learning methods, i.e., it is still not implemented.

Automated Answering for Subjective Examination [4]

This is an excellent platform for answer checking. It has a feature that allows more than one possible answer to the question and provides marks for any possible answer.

Limitation: Although it was a good platform, it does not provide feedback on each answer and does not work over handwritten text.

AI Answer Verifier[5]

It is a good platform here; instructors only need to upload the answer sheets and rubric. Also, he can make a rubric there as well.

Limitation: It was friendly for the instructor, but if an answer sheet has many types of questions and some have partial marking, and some have a binary marking, this model will not work perfectly.

Plan of Work:

We have divided the whole project into the following five subtasks, which are mentioned below. For each subtask, we have assigned one member as the head (responsible for completing the particular subtask), and one or two members would assist.

1. **User Interface:-**
   Head- Udbhav Gupta

   Assistance by- Ram Kumar

   Here We will make the visual interface of the entire system look representable and usable.

   - Upload rubric,
   - Set number of questions checker wants to evaluate,
   - Uploading the directory which contains a database of student responses, here the domain of files are handwritten scanned files or typed text simple files (.docx, .text)
   - After completing the evaluation, pop up the downloading option of the .csv file, which contains all the marks and feedback of each student.

2. **Text Retrieval:-**
   Head- Ram Kumar

   Assistance by- Sudhir Kumar

   - In this section, we will get the rubric and the database of the students by applying different types of indexing and searching methods to make the system work fast.

- And then, it will retrieve the particular answer efficiently that is required for the evaluation process.

3. **Reading of image or Scanned files**
   Head-Ankit Kumar,

   Assistance by Prashant.

   - Here we have an option to run our algorithm based on the type of file. If we get the scanned or image, we will try to fetch the information using Optical character Recognition and other algorithms.
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4. **Evaluation**
   Head - Prashant,

   Assistance - Udbhav Gupta, Ankit Kumar

   - Whether the question is Subjective or Objective, we will run the different algorithms
   - For a Subjective answer, we will use the concepts of NLP and cosine similarity, word2 Vec, etc.
   - Then we will produce the .csv file for the output and finally will get the evaluated database.

5. **Feedback**
   Head- Prashant

   Assistance by- Sudhir Kumar,

   - Here we would provide feedback for each question to the student so that they can understand the mistake, and it will also make it easy for the student and the professor to understand the student's weak area.
   - We are also thinking of providing overall or collective feedback from all students' answer feedback, which will help the professor know how many students made a similar mistake.
   - Also, student's feedback will be stored in a .csv output file.

Reference:

[1] S. Bharadia, P. Sinha, and A. Kaul, *Answer Evaluation Using Machine Learning*. 2018.
[2] M. Mathew, A. Chavan, S. Baikar, ONLINE SUBJECTIVE ANSWER CHECKER, *International Journal of Scientific & Engineering Research, Volume 8, Issue 2, February-2017, ISSN 2229-5518*
[3] S. M. Patil and S. Patil, "Evaluating Student Descriptive Answers Using Natural Language Processing," Int. J. Eng. Res., vol. 3, no. 3, p. 3, 2014.
[4] Asmita Dhokrat, Gite Hanumant, C. Namrata Mahender "Automated Answering for Subjective Examination" in International Journal of Computer Applications · October 2012.

[5] Sakshi Berad, Pratiksha Jaybhaye, Sakshi Jawale "AI Answer Verifier" .e-ISSN: 2395-0056 Volume: 06 Issue: 01 | Jan 2019 p-ISSN: 2395-0072