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Automated Answer-Checker

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ABSTRACT

We have seen that a number of students apply for various examinations which may be institutional, non-institutional or even competitive. The competitive exams mostly have objective or multiple choice questions (mcqs). The automation of scoring of subjective or descriptive answers is a need considered nowadays. This paper focuses on designing an efficient algorithm that will automatically evaluate the answers given by students and assign a score based on the AI technologies which are as good as scores given by a human being. Herein the concept of automatic text similarity has been used to establish an application that would check the answers of provided questions automatically and decide the correctness of the answers.

KEYWORDS:*E-assessment, Online Subjective Answer Checker, Automatic text Similarity, Grammar, Descriptive.*

I. INTRODUCTION

Examination is a test of a person's knowledge in a particular area which is either subjective or objective or both. Usually, competitive examinations consist of multiple-choice questions or mcqs. Automatic evaluation of the objective exams is beneficial as it saves time, provides efficiency and reduces usage of resources. However, this automated evaluation technique is only for the objective exams and not for the subjective ones. Subjective answer sheet checking is one of the huge administrative tasks for any education institute. In this examination process, candidates need to write answers, an examiner collects those answer sheets and submits them to authority for further checking process. This process involves 3 levels of paper checking: -

- First Level Paper Checker
- First Level Moderation
- Second Level Moderation

So, the amount of pressure education systems and teachers hold is understandable as the number of answer sheets to evaluate is too large. So, there is a necessity for an approach which will reduce the usage of resources which will automatically evaluate the answers given by students and provide results. And this paper is exactly for this purpose. We have developed a system which takes answers from student for the question paper set by the teacher and compares them with the reference answers present in the system and awards marks by checking them automatically.

It takes certain parameters into consideration while evaluating, such as keywords, grammar, similarity between sentences

II. RELATED WORK

Checking subjective Answers automatically has been a major field of research in recent years**.** InMarch 2020, Saloni Kadam, Priyanka Tarachandani, Prajakta Vetal and Charusheela Nehete[1] focuses on designing an efficient algorithm that will automatically evaluate the answers given by students and assign a score based on the AI technologies which are as good as scores given by a human being.In [2] Bjorn Andrist, Martin Hassel describe TEXTSIM, a system for

determining the similarity between texts. Further, we show the results of a comparison between two various configurations of TEXTSIM; one with and one without any deeper linguistic analysis. To evaluate and compare the two models of TEXTSIM we used two sets of examples: a set of automatically generated examples and a set of examples acquired from two assessors. Depending on the type of documents, we found the model using linguistic analysis to perform equally well or better than the model not using linguistic analysis.

In [3] Mayeesha Mariam proposed Automatic Text Summarization is a demanding subject for Natural Language Processing(NLP).Wherein the concept of automatic text summarization has been used to establish an application that would check the answers of provided questions automatically and decide the correctness of the answers. In 2017, [4] Merien Mathew, Ankit Chavan, Siddharth Baikar proposed "ONLINE SUBJECTIVE ANSWER CHECKER". The system here requires you to store the original answer for the system. This facility is provided to the admin. The admin may insert questions and respective subjective answers in the system. These answers are stored as notepad files. When a user takes the test he is provided with questions and area to type his answers. Once the user enters his/her answers the system then compares this answer to the original answer written in database and allocates marks accordingly. Both the answers need not be exactly the same, word to word. The system consists of inbuilt artificial intelligence sensors that verify answers and allocate marks accordingly as good as a human being.

III. Methodology

We have developed the process of Subjective Answer Evaluation which includes short answers. It goes through pre-processing-case normalization, stopwords removal, tokenization. Each answer coming from a student is evaluated using same pre-processing against the reference answer provided by teacher.

3.1. Question Paper

When a teacher logs-in into its id, the following three questions are asked:

a. Select from the 2 sets of paper
b. Select the no. of questions
c. Choose level of complexity

Based on the choices made and the reference QnA loaded in the system a random Question paper is generated which is then stored into a dynamically generated text file along with corresponding reference answers which is used for evaluation.

3.2. Answer Sheet

When a student logs-in into its account, The same Question paper as set by the teacher and stored in the text file is presented in front of the student for which the student takes the exam and submit its answers.

3.3. Evaluation

Both the answer sheet(provided by student) and answer Key(Provided by teacher) is then pre-processed using same following libraries: **pandas, numpy, math, nltk.**

The processed data is then converted into vectors using Embedding and is then passed through cosine formula which provides the similarity between the two.

On the Basis of the value of similarity achieved (between 0 and 1), marks are rewarded for each provided answer and final result is calculated by adding them all.

$$similarity(A,B) = \frac{A \cdot B}{\|A\| \times \|B\|} = \frac{\sum_{i=1}^{n} A_i \times B_i}{\sqrt{\sum_{i=1}^{n} A_i^2} \times \sqrt{\sum_{i=1}^{n} B_i^2}}$$

Figure 1: cosine formula

3.4. Result

Pass/Fail status is printed along with marks obtained on the basis of similarity in answers.

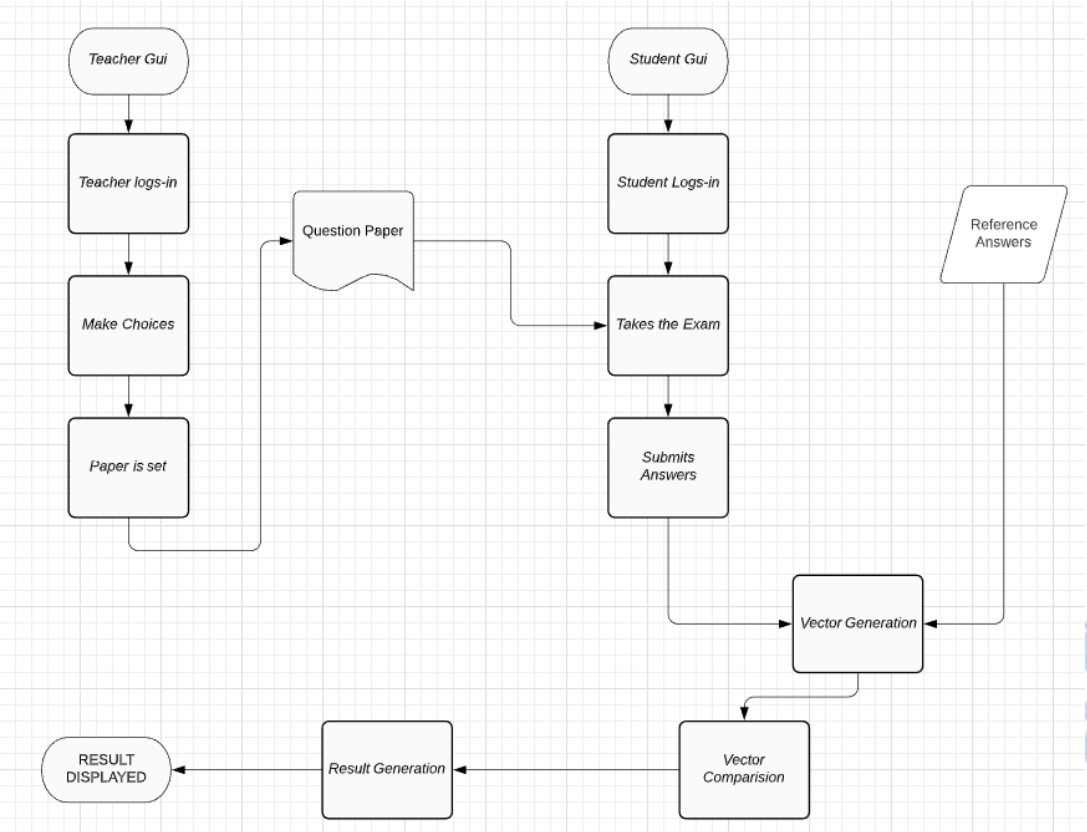

Figure 2: Flowchart for the system

IV. RESULTS

4.1. The Teacher GUI is as shown below, where the teacher makes the choices and question paper and reference answers for the student with unique question paper code are set.

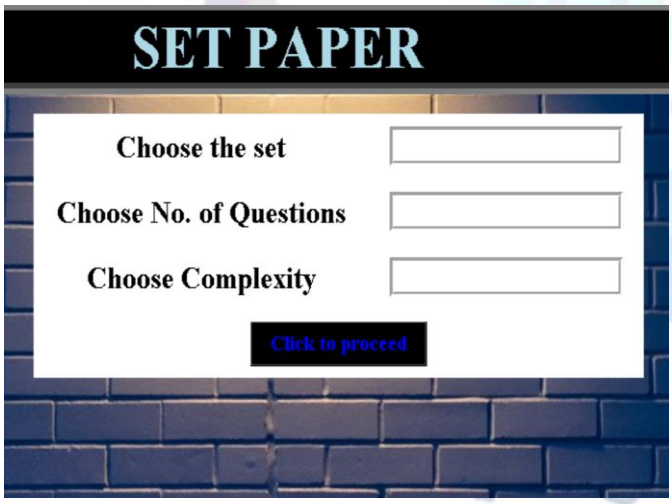

Figure-3: Teacher's G.U.I

4.2. Students GUI, where the student gets Question paper and takes the test.

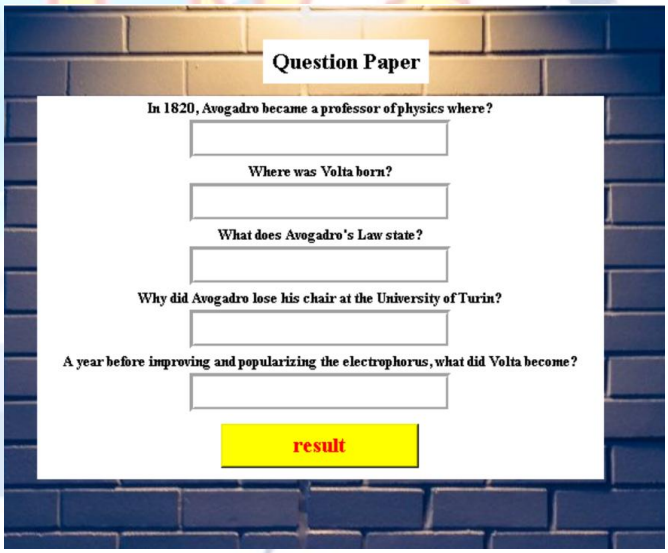

Fig-4: Student's G.U.I

Then the student clicks on result and gets the marks based on submitted answers.

V. CONCLUSIONAND FUTURE SCOPE

This System would be beneficial for the universities, schools and colleges for academic purpose by providing ease to faculties and the examination evaluation cell. Many educational institutes conduct their examinations online, but these exams only contain multiple choice

questions which test the student's aptitude, and fail to test the conceptual knowledge a student or learner must possess. Therefore, descriptive answers must be included in online examinations. Our proposed system evaluates the answer based on the keywords. By judging against the reference answer, marks are allocated to the student. Highest marks are gained if the student writes grammatically correct answers with all the keywords mentioned in the reference answer. Hence the proposed system could be of great utility to the educators whenever they need to take a quick test for revision purposes, as it saves time and the trouble of evaluating the bundle of papers

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