

Automatic Evaluation of Descriptive Answer Using Pattern Matching Algorithm

Pranali Nikam, Mayuri Shinde, Rajashree Mahajan and Shashikala Kadam

Dept. Computer Department, Savitribai Phule Pune University, India

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Abstract— Automation of descriptive answer evaluation process would be helpful for various universities and academic institution to efficiently handle the assessment of exam answer sheets of students. Our objective is to design an algorithm for the automatic evaluation of multiple sentence descriptive answer. This paper represents an approach to check the degree of learning of the student, by evaluating their descriptive exam answer sheets. By representing the descriptive answer in the form of graph and comparing it with standard answer are the key steps in our approach. In this approach we use pattern matching algorithm for evaluation of answer. .assumption is no grammar checking.

Keywords—: Descriptive Answer, Graphical Representation, Word Net

1. INTRODUCTION

The purpose of providing education is to make student learn a specific topic or domain, so that the student is able to apply those knowledge and information in the practical field. This can be possible only if the student is able to grasp it properly. So, its important to evaluate *how much knowledge has been absorbed by the student* ? For this, one has to find out the *degree of learning* of a student by conducting some written test of specific pattern which may include descriptive/objective questions or through some practical examination and evaluating it to find the degree of learning. Evaluation of objective answer is comparatively easy and well supported in many systems but, in the case of descriptive answer, it is an open problem. Evaluation work is very cumbersome as far as descriptive answer is concerned. So, how to automate this task? Our objective is to design an algorithm for the automation of evaluation process of descriptive answer. Motivation behind automation of descriptive answer evaluation includes fast processing, less manpower, independent of change in psychology of human evaluator, ease in record keeping and extraction. It also ensures uniform evaluation irrespective of any mood swings or change in perspective of human assessor. In this paper, we have considered only text in descriptive answer with no spelling mistakes. Our approach is to represent student and teacher answer in the form of graph and then comparing it, by applying some of the similarity measures for the allocation of marks.

2. RELATED WORK

Many architectures and features have been proposed for descriptive answer evaluation. The approaches are mainly based on keyword match, sequence match and quantitative analysis, but semantic analysis of descriptive answer is still an open challenge. Considering the structure of text analysis in natural language processing, most of the work has been

done for morphological and syntactic analysis but semantic, pragmatic and discourse are still being explored. Online tools that support managing of online assessments such as Moodle and Zoho are based on string matching technique for short answers but long answer evaluation is still handled manually by most systems. The evaluation descriptive answer is still an open challenge. Existing system is used for conducting online objective test or single sentence, the test will be customized such system will have automated evaluation of answers based on the user interaction. This project helps the faculties to create their own test based on the subject. This also helps the instruction to perform online interview, test paper such that the academic performance of the students can be increased and can take the feedback from students.

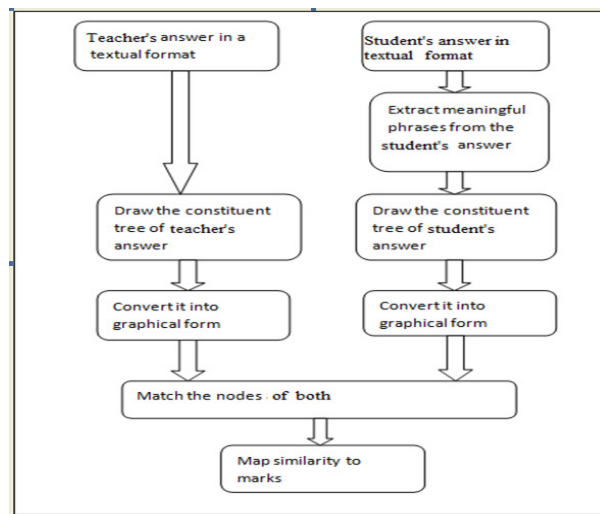


Fig: Basic Block Diagram

This approach is used for the development of the algorithm is to match student's descriptive answer with the teacher's descriptive answer by converting both answers

into a graphical form and then matching their nodes is an intelligent way.

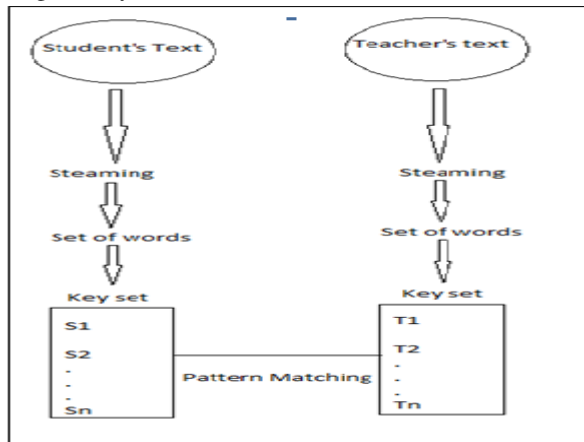


Fig II: Architecture of assessment of Answer

In the proposed approach, we have considered the graphical representation of descriptive answer to present complex information clearly and to represent knowledge in a machine interpretable form. From above figure stemming process is applied on both teacher & student's answer. In that process meaningful words are extracted and separate key set is made for teacher and student answer. Then pattern matching algorithm is applied to check similarity score between them. If any word in student's answer does not match with teacher answer then synonym of that unmatched word is checked in dictionary if synonym of that word match with teacher answer then replace it with teacher answer then appropriate assessment of marks will given to the student.

ii. Similarity Matching:

After converting the teacher's answer and student's answer into its graphical form, we will match the similarity between both the answers by applying some of the similarity measures. The similarity score will gives us the parameter to judge or evaluate the degree of correctness in the student answer. Some of the similarity measures are as follows:

1. String match:
 - a) Partial string match
 - b) Full string match
2. WordNET: It is one kind of an Application interface (API), which is used as online dictionary.

iii. Figures and Tables

The student answer is first extracted from the file and a sequence state transition is generated i.e. nothing but a state transition diagram using the given input for example. A sample answer of 5 students is given in table 1 for the question "When the process does goes into waiting state?" In

our sample set of questions descriptive and describe type of questions was considered.

Student No.	Student Answer	correctness of answer in %
1	When the execution time of process gets completed the process goes to waiting state	0%
2	When some events to occur after running state then process go in waiting state	70%
3	The processes go in waiting state. When for some event to occur such as an I/O completion of a signal	80%
4	When process's ready to execution and it has to wait for some event then it goes to waiting state	90%
5	-	Not attempted

Table 1: Paraphrased answer for given question.

From 5 students stated, one was wrong. Student 1 answer was incorrect due to semantically be different from the model answer and student 5 has not attempted the answer thus to be taken as wrong answer. For verifying the answer for its appropriateness a confidence factor was provided for each answer, as per the sequence of pattern match found between the student and teacher answer. If the density of matching is more than or equal to 50% then the answer was termed to be correct and it is known as positive confidence else a negative confidence is provide for the mismatched and the answer is termed to be wrong.

3. CONCLUSIONS

Automatic evaluation of descriptive answer would be beneficial for the universities, schools and colleges for academic purpose by providing ease to faculties and the examination evaluation cell. As well as it is used for conducting online interview. No grammar checking in this paper because manually paper is not grammatically checked. so accurate assessment of marks will be given to student.

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