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Online Evaluation System for Descriptive Answer

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Abstract : Online subjective tests are very rarely proposed. All the online subjective exams set for the students are pen and paper based evaluated by the teachers manually. This paper presents a survey on effective way of online subjective tests. In this system, the answers are unstructured data which have to be evaluated. The evaluation is based on the semantic similarity between the faculty's answers and students' answers. Different techniques are compared and a new approach is proposed to evaluate subjective test assessment of text.

***Key Words*:** Computer, Assesment, Descriptive, Evaluation, Database

1.INTRODUCTION:

In today's education system the entire entrance exam in different fields are objective tests. Objective tests are not sufficient in order to test the knowledge of students. Students are judged by the answers that they have marked. In this case, there can be two situations either the answer marked is surely known by the student or it can be an assumed answer. So in this situation we cannot completely judge whether the student is really intelligent or whether it is his/her luck. The student may have knowledge about the topic but not complete, in such cases in order to actually test the knowledge of student, descriptive answers play an important role. But the evaluations of descriptive answers are mostly manual and that becomes hectic for faculty. To solve the problem of manual checking of subjective answers we have proposed an online evaluation system of descriptive type answers. Descriptive answers vary from student to student, so in our proposed paper to extract the meaning from the various answers the concept of semantic similarity is used. Faculty needs to give the answer along with some compulsory keywords in it. The answer will be pruned, stemmed which will reduce the size of the answer and then converted into vectors and matrix form. Depending upon the keywords used in the answer marking will be done. For this the required text will be extracted from the database by using various methods such as Term Frequency/ Inverse Document Frequency (TF/IDF). To extract the meaning from the text, techniques like LSA, SOM are used. The TF/IDF method with LSA semantic work is suitable for information retrieval, text classification , etc. The marks will be assigned using the Cosine Similarity depending upon the value of theta. In this proposed system the length of the answers will also be taken into consideration while allotting the marks. The result analysis will then be mailed to the students.

2. Literature Review:

There are various works proposed for short answers evaluation and objective answers. Even though, there are various work proposed for short-answer evaluation, the works related to the descriptive type answer evaluations are very limited. Some work related to descriptive answers evaluation is mentioned below.

Menaka Sand Radha N, have classified the text using keyword extraction. The keywords are extracted using TF-IDF and WordNet[1]. TF-IDF algorithm is used to select the words and WordNet is the lexical database of English used to find the similarity among the words. In this proposed work, the word which have the highest similarity are selected as keywords. Sungjick Lee and Han-joonKim proposed conventional TFIDF model for keyword extraction. It involves cross domain filtering and table term frequency(TTF) for

extraction[2]. Ari Aulia Hakim, Alva Erwin, Kho I Eng, MaulahikmahGalinium, andWahyuMuliady works on the TF-IDF algorithm which create a classifier that can classify the online articles[3]. Stephen Robertson, explains the understanding concepts of IDF[4]. Professor Teuvo Kohonen, along with a group of researchers at the Neural Networks Research Center in Helsinki University of Technology, developed a few optimization techniques for SOM training.[5]. KristaLagus received theM.Sc. degreein Computer Science from Helsinki University of Technology, Espoo, Finland, in 1996. She has been a Research Associate at the Neural Networks Research Centre, Helsinki University of Technology, since 1995. Her main research interests are related to neural networks, especially self-organizing maps, and their application to natural language processing and data mining. Jarkko Salojärvi received the M.Sc. degree in technical physics from Helsinki University of Technology, Espoo, Finland, in 1998. His main research interests are related to neural networks, the emphasis being on self-organizing maps and their application to data mining[6] Stop words Vangie BealWords that are filtered out by Web search engines and other enterprise searching and indexing platforms. Stop words are natural language words which have very little meaning, such as "and", "the", "a", "an", and similar words.[8]. In the University of Adelaide, study has been performed for compare LSA vector with word and n-gram feature vectors. When compared with word and n-gram, LSA gives better performance because according to an entropy measure LSA vectors are weighted[7]. P.Y.Hui, and H.Y.Meng, used LSA for semantic explanation of a multimodal language with speech and gestures[9]. V.Balakrishnan and E.Lioyd-Yemoh, compared the information retrieval performance using stemming and lemmatization techniques[7]. Stemming and lemmatization improves the language model[1].The process is used in removing derivational suffixes as well as inflections(i.e. suffixes that change the form of words and their grammatical functions)[7]. There are many stemming algorithms available. Stemming techniques are many, including the Paice/Husk stemmer , Porter's stemmer and Lovin's stemmer [6].In the Paice/Husk stemmer, a file is created which holds a set of rules, and these rules are read by an array which implements it until a final stem is achieve[7].The Lovins stemmer is a single pass, context-sensitive algorithm which only removes one suffix from a word by utilizing a list of 250 suffixes and removing the longest suffix that it finds attached to the given word[1].

The Porter's stemmer is one of the widely used stemmers in information retrieval[6].Firstly it will remove all the stop words,this are the words that frequently occur in ouranswers like 'and','the',etc. The next step will be to remove endings that make the keyword plural (e.g. -s, -es), past tense (-ed), and continuous tenses (-ing)[7].The stemmer then moves on to check and convert double suffices to single suffice. Other suffices such are -ic, -full, -ness,-ant, -ence[1]. Lemmatization also helps to match synonyms by the use of a thesaurus so that when one searches for "hot" the word "warm" is matched as well[2].In the feature extraction phase, several methods were discussed to find the semantic similarity[4]. For this proposed fast SOM clustering technology for text information[3]. Y.C.Liu, C.Wu, and M.Liu proposed a rapid SelfOrganizingMap(SOM) clustering technique for passage information[2]. SOM used to projects the documents. K.Appiah, A.Hunter, A.Lotfi, C.Waltham, and P.Dickinson [2] used SOM for mechanically categorize the hidden location of a moving object in the covered surroundings[4]. T.Kohonen used SOM for data investigation in linguistics, finance andindustryand clustering problems[4].Cosine similarity is used to measure the similarity between two vectors. It will generate a value that tells how two answers are related by looking at the angle. This survey discussed the methods which is suitable for assessment of descriptive type answers. In this paper, detailed form of answers are assessed with Latent Semantic Analysis and Self-Organizing Map[2].

3. Objectives:

- To develop an online exam system for descriptive type questions.
- To implement techniques and algorithms that uses semantic similarity for evaluation of detailed type answers.

4. Motivation:

- There are many online exam systems, but existing system can evaluate only objective type questions.

- There is no online system to evaluate descriptive type questions. Manual evaluation is time consuming and very lengthy process.
- Result will be declared in very short span of time because calculation and evaluations are done by the machine itself.

5. Proposed Work:

The proposed system is an educational based system. In this system the online exam will be descriptive unlike other objective online exams. The system will be administered by the exam system admin. The teaching staff will conduct exams and students will be involved in solving the tests.

6. Conclusion:

The existing online exam systems are mostly objective exams because online evaluation for multiple choice questions is a very simple task. The proposed system aims on evaluation of descriptive answers. From the proposed system it is clear that descriptive answers too can be evaluated automatically. This will reduce the work of manual evaluation of number of answer sheets. Various algorithms and techniques like tf-idf, tokenization, stop words removal, stemming, LSA, SOM, cosine similarity has effectively contributed in evaluating the students' answers though each students' answer is different. These algorithms will assign appropriate marks to the answer. The proposed system will surely help the educational system in getting the accuracy for marks allocation. The result will be mailed to the students in very short time.

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