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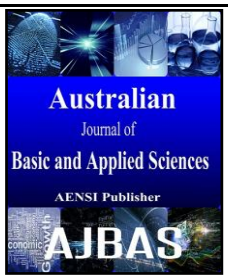

E-Test Management System Using Lsa Based Evaluation

[1]Wahida Begum. S and [2]Dr. C. Dhaya, Ph.D

[1]PG Scholar, Dept of CSE, Adhiparasakthi Engineering College, Melmaruvathur-603319. Tamil Nadu.
[2]Professor of CSE Dept, Adhiparasakthi Engineering College, Melmaruvathur-603319. Tamil Nadu.

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ABSTRACT

The E-test management system allows to learn, extract the knowledge of the course, and helps identify amount of knowledge is in taken by the students. In earlier days, many methods have been used for evaluating the descriptive sentences. The current paper aims at analyzing and discussing some of the best effective assessment, by proposing Latent Semantic Analysis (LSA) for evaluation of descriptive sentences. The online test management system helps the faculty to evaluate the answer script and gets to know the student knowledge about the course. This helps in evaluating the multiple sentences by using synonymy in LSA. It effectively finds the multiple sentences coherence. The E-test system helps in evaluation of answer scripts in fraction of seconds, faculty analysis the E-test results and report results are generated for individual student which prevents loss of time and waste of money unlike then conventional paper evaluation. This gives a clear hint about student knowledge in course and helps the faculty to improve learning method for students to gain a better knowledge about the course and lady luck doesn't have to play a major role in this evaluation system.

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INTRODUCTION

The researchers have been widely interested to do research on E-test management system. Conventional paper evaluation consists of checking of answer sheets and attending theory exam. Candidates don't get appropriate opportunity to express their knowledge because here lady luck plays a major role during the evaluation. And also a great deal of money and time is exhausted. The significance of E-test system is to provide clear picture about the evaluation of the answer scripts. Many matching algorithms are available but semantic analysis is still an open trouble.

In this system, Latent Semantic Analysis is proposed. Latent Semantic Analysis (LSA) is a concept and method for extracting and describing the contextual-usage meaning of words by statistical computations applied to a large amount of text. The structural idea is that the average of all the word contexts in which a given word does and does not appear provides a set of mutual constraints that largely determines the similarity of meaning of words and sets of words to each other. The appropriateness of LSA's indication of human knowledge has been established in a variety of ways. Its scores overlie those of humans on standard vocabulary and subject matter tests; it mimics human word sorting and category judgments; it simulates word–word and passage– word lexical priming data and it accurately estimates multiple sentences coherence, learn ability of multiple sentences by each and every student, the quantity and quality of the knowledge contained in multiple sentences.

2. Structure of The Proposed Approach:

All E-test management systems have three mutual parts: analysis of questions, retrieval of information, and extraction of information. In the question analysis part, system analyses the question, and extracts some features, for example keywords and question type, that will be used in the next parts.

The main task is categorized in three groups of document retrieval, sentence extraction, and word extraction, which will be described in the next three parts.

- **Document retrieval** part retrieves related documents and extracts their texts.

Corresponding Author: Wahida Begum. S, PG Scholar, Dept of CSE, Adhiparasakthi Engineering College, Melmaruvathur-603319. Tamil Nadu.
E-mail: Wahidabegums90@gmail.com

- **Sentence extraction** part first enforces a preprocess phase on the retrieved texts that contains splitting their sentences and eliminating a set of stop-words and punctuations from them. Then it finds the best sentence by Singular Value Decomposition.
- **Word extraction** part of grabbing one or more words from the best sentence by means of our hand-made patterns and represents the word(s) as the final answer.

The main benefit of the proposed system is that it can provide database access to any person regardless of his technical knowledge. This makes it valuable in the information sector, the system builds an interface and it's portable. It can thus be implemented on different operating systems. The flexibility of MySQL makes it more useful in real world applications.

In our proposed approach, named Latent Semantic Analysis (LSA).The core concept of Latent Semantic Analysis is a simple linear algebraic operation called Singular Value Decomposition and it is used to prepare the ranking of each extracted paragraphs by relating it to the answer script. This is represented as the weighted matrix.

2.1. Singular Value Decomposition:

In 1965 G. Golub and W. Kahan introduced Singular Value Decomposition (SVD) as a decomposition technique for calculating the singular values, pseudo-inverse and rank of a matrix. The conventional way of doing this was to convert a matrix to a row-echolon form. The rank of a matrix is then given by the number of nonzero rows or columns of the echolon form, which ever of these two numbers is smaller. SVD is an entirely different approach. The technique decomposes a matrix A into three new matrices

```
    single_value_decomposition (matrix)
    Begin:
    word_vector : word vector of the matrix;
        sigma : sigma vector of the matrix;
        document_vector : document vector of
the
            matrix;
             k : sqrt(no.of columns);
        reduced each vectors;
        weights : reducedWordVector*

reducedSigma*reducedDocumentVector;
        for all elements in each column
        sum : sum of all elements in that
column
        for all elements in each row weight:
            elements/sum;
              return weights;
    End
```

The pseudo code of SVD in the proposed approach

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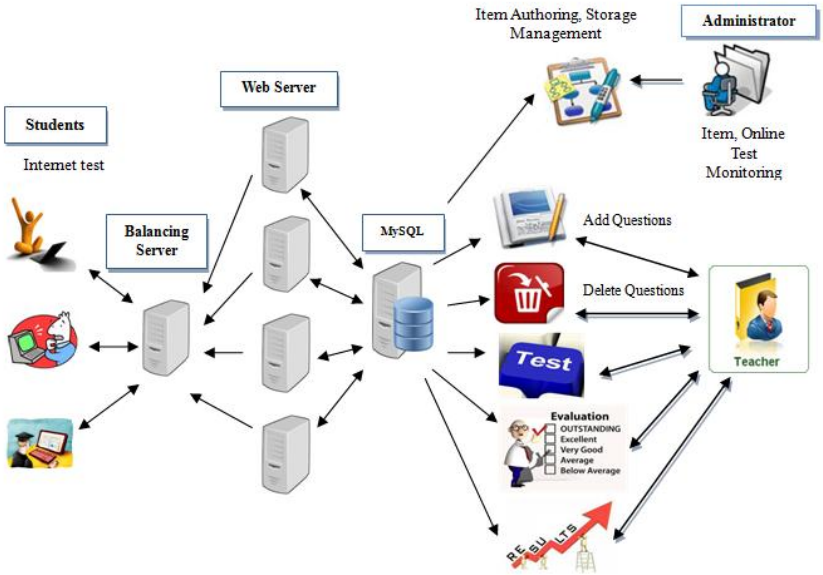

Fig. 1: Architecture Diagram

2.2. System Design:

The system architecture is shown in Figure 1. A question paper is first processed to answer from the set of questions. The answer sheet, answers are retrieved from the documents that have semantic matched words. Then that answer sheet contents are used to generate the content words that are stop word filtered terms. These are the semantic analyzed to produce the expression frequency matrix.

This is used by the Latent Semantic Analysis process to hit upon relationship between both the contents of answer sheet and document. Based on that resulting value, they are clustered to dig out the required student knowledge.

2.3. Working Model:

The following describes the module of the E-test management test are branched into five modules and they are explained below.

- Load Management
- Server Process
- Database
- Admin Login
- Faculty Login

2.3.1. Load Management:

Balancing Server is in charge for distributing the arriving traffic among servers hosting the same application content because that all users get served faster and more at the same amount of time.

2.3.2. Server Process:

It helps in maintain the database and manipulating several systems. And it helps in displaying the web pages which may contain images and scripts, and also used for uploading of files from the faculty and managed by the admin.

2.3.3. Admin Login:

A system administrator is responsible for the periodical configuration; the operations are tracked up to dated and especially multi-user computers like servers. Admin must have update of uptime, performance rate is measured, resources management and security of the computers must be maintained and checked by admin and giving the separate authorization for the students and faculty.

2.3.4. Database:

Database is very useful for getting the backup data, inspect status of the users and data records are maintained. Here all the details required my admin, faculty and student are stored, obtained whenever it is required.

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2.3.5. Faculty Login:

The faculty authorized to set a question paper according to the course by adding the question or deleting the question. The system is evaluated by the LSA and they are divided into five parts and the results are stored in MySQL for future references.

- QA Processor and Document Filter
- Paragraph Extractor
- Evaluation and Result
- Latent Semantic Analyzer
- Content Word Extractor
- Evaluation and Result
- Evaluation and Result

2.3.5.1. QA Processor and Document Filter:

This module prompts the user to enter the QA, the answer is based on that the knowledge of student is extracted. This answer script is semantically processed to generate keywords by using the DISCO (extracting dIStributionally related words using CO-occurrences). These keywords are used to match the document title, to generate the list of filtered documents.

2.3.5.2. Paragraph Extractor:

This module is given with the filtered documents to extract all the available paragraphs. This uses the Apache POI – API to extract the paragraphs from the word documents

2.3.5.3. Content Word Extractor:

This module uses the set of key matched document contents to separate the word that has factual meaning know as content words from it based on the architecture. The content words are the word does not have the stop words. This content word extraction process is based on the stop word list initialized in it.

2.3.5.4. Latent Semantic Analyzer:

This module uses the list of content word as keys to generate term count matrix based on the appearance of the content word in the paragraph of the filtered documents. It then used to generate the Singular Value Decomposition (SVD) matrix based on the formula $X = USV^T$ and implemented.

This SVD matrix represents the relation between the filtered documents

2.3.5.5. Evaluation and Result:

This module uses the values of the SVD matrix based on user specified keywords, then cluster those values to rank the list of paragraphs given by latent semantic analyzer module that are relevant to user query .

Then the Architectural Knowledge from the ranked paragraphs is used to get the document path. That uses the answer repository to identify the answer script based on the retrieved knowledge. This ranking aids the evaluator to gather knowledge of the student about the subject in an efficient way.

3. Experimental Result:

After the E-test, the evaluation process is carried out by Latent Semantic Analysis (LSA). It is not based on Simple Text matched keyword indexing algorithm. It is based on inter-relationships between the Answers and its Keywords. This is done by the core process called Singular Value Decomposition (SVD).

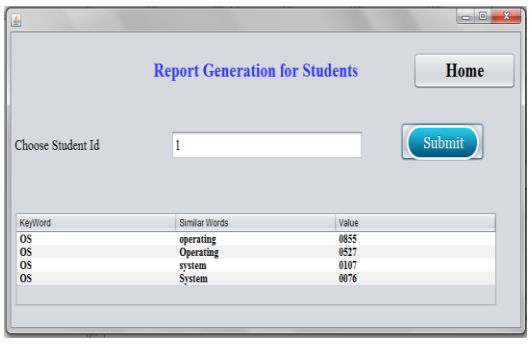

Fig. 2: LSA based Evaluation

The similar words are matched to the keywords of the answer scripts and values are displayed according to the similar words present in the DISCO tool. The student report are generated according to the answers which are matched with the keywords. The marks are allocated for each and every student.

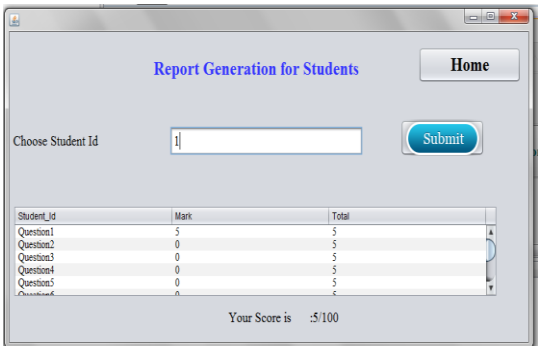

Fig. 3: Reports Generated

Conclusion:

The E-test management system allows to learn, extract the knowledge of the course, and helps identify amount of knowledge is in taken by the students. Since software reuse will be effective. Given that there is no single source that contains or provides all relevant architectural knowledge and so over work is going to extract the answer keywords that resides in the set of software documents with the help of the Latent Semantic Analysis technique.

This Latent Semantic Analysis is used in analyzing documents to find the underlying meaning or concepts of those documents to extract the architectural knowledge. It helps the answer scripts to get the semantic related search of the documents and single value decomposition makes the document to relate to each other to acquire the knowledge. The result analysis also shows that it evaluates the multiple sentences and manages all the operation performed in it.

REFERENCES

Li, X., D. Roth, 2006. Learning question classifiers: The role of semantic information.Nat. Lang. Eng., 12 (3): 229-249.

Kwok, C., O. Etzioni, D. Weld, 2001. Scaling question answering to the web. Proceedings of the Tenth World Wide Web Conference, pp: 150-161.

Zhang, P., M. Li, J. Wu, et al, 2005. The community structure of science of scientific collaboration network. Complex Syst. Complexity Sci., 2: 30-34.

Ferrnandez, Oscar, Izquierdo, Rube´n, Ferra´ ndez, Sergio, Vicedo, Jose´ Luis, 2009. Addressing ontology-based question answering with collections of user queries. Inf. Process. Manage., 45: 175-188.

Kaisser, M., 2007. Question answering based on semantic roles. In Proceedings of the deep linguistic processing workshop in 45th annual meeting of the association for computational linguistics (ACL2007).

Ofoghi, B., J. Yearwood and R.G hosh, 2006a. A hybrid question answering schema using encapsulated semantics in lexical resources. In Advances in artificial intelligence, 19th Australian joint conference on AI (pp. 1276-1280.

Ofoghi, B., J. Yearwood and R. Ghosh, 2006b. A semantic approach to boost passage retrieval effectiveness for question answering. In Computer science 2006, twenty-nineth Australian computer science conference pp: 95-101.

Shen, D., M. Wiegand, A. Merkel, S. Kazalski, S. Hunsicker, J. Leidner et al., 2007. The alyssa system at trec qa 2007: Do we need blog06? In Proceedings of the sixteenth text retrieval conference (TREC2007).

Lo, K., and W. Lam, 2006. Using semantic relations with world knowledge for question answering. In Proceedings of the fifteenth text retrieval conference (TREC2006).

Green, B., A. Wolf, C. Chomsky and K. Laugherty, 1963. BASEBALL: An automatic question answerer. In Computers and thought (pp. 207–216). McGraw Hill.

Woods, W., 1973. Progress in Natural Language Understanding: An Application to Lunar Geology. In Proceedings of the National Conference of the American Federation of Information Processing Societies, p: 441-450.

Voorhees, E., 2002. Overview of the TREC 2002 Question Answering Track. In Proceedings of the Text Retrieval Conference (TREC 2002)

Zhang, D. and W. Lee, 2003. Question Classification using Support Vector Machines. In Proceedings of the 26th Annual International ACM SIGIR Conference.

Woods, W.A., R.M. Kaplan and B.N. Webber, "The Lunar Sciences Natural Language Information System", (1972). Final Report. BBN Report 2378, Bolt Beranek and Newman Inc., Cambridge, Massachusetts

Anisha Radhakrishnan, Mathew Kurian." Effective Pattern Matching Approach for Knowledge Discovery Application". ISSN: 2278-909X

International Journal of Advanced Research in Electronics and Communication Engineering 2013. (IJARECE) 2: 2.

Radev, D.R., W. Fan, H. Qi, H. Wu and A. Grewal, 2002. "Probabilistic Question Answering from the Web",(2002), In Proceedings of the 11thWorld Wide Web Conference,Hawaii.

Amarjeet Kaur, M Sasikumar, Shikha Nema, Sanjay Pawar, 2013. "Algorithm for Automatic Evaluation of Single Sentence Descriptiv Answer" International Journal of Inventive Engineering and Sciences (IJIES) ISSN: 1(9): 2319-9598.

Page, E.B., 1994. "Computer grading of student prose, using modern concepts and software," The Journal of experimental education, 62(2): 127-142.

Burstein, J., K. Kukich, S. Wolff, J. Lu, and M. Chodorow, 2001. Enriching automated essay scoring using discourse marking.ERIC Clearinghouse.

Valenti, S., F. Neri, and A. Cucchiarelli, 2003. "An overview of current research on automated essay grading," Journal of Information Technology Education, 2: 319-330.

Rudner, L.M. and T. Liang, 2002."Automated essay scoring using bayes' theorem," The Journal of Technology, Learning and Assessment, 1: 2.

Foltz, P.W., D. Laham and T.K. Landauer, 1999. "The intelligent essay assessor: Applications to educational technology," Interactive Multimedia Electronic Journal of Computer-Enhanced Learning, 1(2).

Li, B. and J.-M. Yao, 2011. "Automated essay scoring using multi-classifier fusion," in Computing and Intelligent Systems. Springer, pp: 151-157.

Peng, H., 2005. "The minorities-oriented chinese level test," China Examinations, 10: 57-59.

Ke, D., X. Peng, Z. Zhao, Z. Chen and J. Wang, 2011."Wordlevel- based automated chinese essay scoring method," in Proceedings of National Conference on Man-Machine Speech Communication, Xi'an China, pp: 57-59.