Chapter 5
Answer Evaluation of Short Descriptive Questions

ABSTRACT

Reforms in the educational system emphasize more on continuous assessment. The descriptive examination test paper when compared to objective test paper acts as a better aid in continuous assessment for testing the progress of a student under various cognitive levels at different stages of learning. Unfortunately, assessment of descriptive answers is found to be tedious and time-consuming by instructors due to the increase in number of examinations in continuous assessment system. In this chapter, an attempt has been made to address the problem of automatic evaluation of descriptive answer using vector-based similarity matrix with order-based word-to-word syntactic similarity measure. Word order similarity measure remains as one of the best measures to find the similarity between sequential words in sentences and is increasing its popularity due to its simple interpretation and easy computation.

RELATED WORK

The descriptive answers of short answer questions generally include four or five sentences and therefore similarity determination between descriptive answer content and its solution content has been identified as a demanding task. The descriptive answers of short answer questions can always be subjectively verified with the content of specified text book. The manual descriptive answer paper evaluation system commonly uses the master key

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or the question solution key. Solution key for every question are prepared by the instructor or paper-setter who frames the examination test paper. The points in the solution key are collected from the specified text book and are used as a baseline in evaluating the student answer.

Assessment of objective answer by the computer is moderately easy and well supported in many automated systems. But, in case of descriptive answer, it is an open problem (Kaur, A., Sasikumar, M, Nema, S. & Pawar, S. 2013 & Chakraborty, P. 2012). The assessment of descriptive an- answers is found to be tedious and time consuming by instructors due to the increase in number of examinations in continuous assessment system. Latent Semantic Analysis (LSA) is a commonly used technique for automatic determination of document similarity. When measuring the similarity between text documents, LSA s accuracy improves with the size of the documents. Unfortunately, it does not take into account the word order and hence very short documents may not be able to receive the benefit of LSA (Kanejiya, D., Kumar, A. & Prasad, S. 2003 & Wiemer-Hastings, et.al 1999). Hence it is necessary to identify better approaches for automatic determination of similarity in short documents having its length ranging from one or two sentences to few sentences. Even though there are few attempts in automation or semi-automation of descriptive answer paper evaluation (Lin, C. and Och, F.J. 2004; Papineni, K., e.al.2002; Chodorow, M. 2003 & Wiemer-Hastings, P.2004), to the best of our knowledge none of them focuses on finding the co-occurrence match of multiple words in the student answer content as well as in the question solution key content. Hence, an attempt has been made to solve the problem of automatic evaluation of descriptive answer using vector-based similarity matrix with order-based word-to-word syntactic similarity measure.

TERMINOLOGY USED

The terminology used in this chapter for finding similarity between answer content and solution key content is represented in Table 1 below.