Research on Business English Composition Automatic Scoring System Based on Text Clustering in Computer Network Environment

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Abstract: in the context of computer network, the study of automatic composition scoring is still in its infancy in china. For business English composition teaching, the scoring needs to be specific to unspecified topics and is universal. In terms of compositional content evaluation, it is possible to group together text clustering by classifying the vocabularies of composition vocabularies. This paper, by studying the problem of business English composition scoring, combines text clustering theory, perfects its application, and puts together less than one possible misunderstanding essay to be judged by the teacher, which can greatly reduce the work force of teachers and improve the accuracy of composition judgments. Sex and efficiency have a positive effect on business English composition teaching

1. Introduction

Since 2007, the ministry of education in the college English curriculum requirements (revised edition) explicitly proposed that strengthen computer application in college English teaching and computer college English teaching model based on class more than 170 universities nationwide took part in the reform, more than 30 colleges and universities become the reform pilot studies, by 2011, multimedia network foreign language teaching reform has achieved remarkable results computer assisted college English teaching model has been established, the national college computer multimedia classroom has been basically achieved and the popularity of campus network, all kinds of hear, read, foreign language courses are generally used the multimedia course and courseware, teaching means we still take the lead in introducing mt "computer aided translation teaching department "unification" and curriculum (Wang Lifei,201). At the same time, computer-aided foreign language testing is developing rapidly. Various kinds of computer-based foreign language tests, internet-based tests and automatic computer scoring systems have been continuously introduced, such as toefl, ielts and cet-4 computer-based tests. In addition, the training and popularization of computer-aided language research methods have been mastered and applied by many foreign language teachers (Wang Lifei, Wang Jinquan, 2008). Computer aided foreign language teaching and research is very active, Beijing foreign studies university network college, china foreign language education research center, foreign language teaching and research press first after that, we organized several academic conferences on the application of computer network in foreign language teaching. Since 2007, shanghai international studies university foreign language audiovisual education), shanghai: shanghai foreign language audiovisual publishing house several times newsroom hosted the "network information technology curriculum integration with foreign language academic seminar". China's foreign language education research center organizes "computer application in foreign language teaching and research" national college foreign language teacher development senior seminar. Machine auxiliary English writing teaching research in abroad attention (bloch, 2004; chapelle, 2008; jung. 2008), the latest research (Liou&Lee, 2011) found that based on the network English writing can help students writing conception, the writing process and depth. The domestic study of computer writing teaching software (yong-lin yang, etc., 2005) found that computer writing training for a role in promoting foreign language skills. Wu Songjiang, Xin-Min Zheng (2006) study found that graduate students interested in learning writing software used widely, reflection can help to clarify the train of thought, put forward ideas, structures, framework, overall planning, etc. From the research emphasis, both international and domestic

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researches on 12 writing focus on the application of writing teaching and computer-aided technology (atkinson,2003; matsuda,2003; wang lifei,2007). From the perspective of the development of writing theory, western writing teaching theory has experienced a development process from "writing result theory" to "writing process theory" to "metacognition theory" and "social cognition theory".scaffolding theory, starting from vygotsky's "recently developed regional theory", emphasizes that writing teaching should be assisted by teachers, textbooks, sample texts, etc., and writing tasks should be decomposed in stages, so that students can gradually get rid of the scaffolding and achieve independent writing. According to the theory of functional linguistics, "genre" emphasizes the function of contextual knowledge and the three elements of writing field, tenor and form. The field determines that the writing is dominated by common core vocabulary and structure. Language style determines the difference between spoken and written language in writing; tenor determines the tone of writing and attitudes. The social cognition theory puts forward the social cognition mode of writing teaching, determines the dynamic interaction among the author, subject and reader in writing, and regards the writing process as a cyclic nonlinear process and persuasion activity. The above writing theories and principles can be realized by computer information technology in the computer network environment, which provides a reliable theoretical basis and broad space for the development of computer-aided English writing teaching. However, the research and software development on the integration of English writing and computer technology are relatively weak in china. In recent years, only a few computer writing teaching systems or automatic writing scoring software have appeared in the market some design is too simple, the teaching concept is not advanced enough, some writing automatic scoring software can only be used independently, can not effectively combine the whole process of writing teaching and scientific research, the software does not have large specialized corpus support, computer-aided writing teaching system advantages far from being fully realized.

In recent decades, the automatic scoring of compositions has made great progress abroad and has been widely used in practice. In recent years, automated essay scoring (aes) has gradually become a hotspot and a key research subject in natural language processing research. The automatic scoring is non-artificial and the composition is scored by the computer. Unlike other objective topics, composition scoring must include content evaluation. Of course, the aes system also includes the assessment of this blood, but it focuses on different content evaluations for different groups of people and different types of composition, and some even rely on content evaluation alone. In order to better evaluate business English composition, decibels are generally judged by content and language. The content of the evaluation can be analyzed by exploratory data analy-sis. This system can be used for similarity clustering evaluation and can be used to identify the composition of the topic.

2. The Significance of Automatic Scoring System

In China, the research on automatic composition scoring has lagged behind a little, and the earliest one involved in the field of automatic composition scoring is professor Liang Maocheng. In his research, 220 samples of graded compositions were used, of which 120 were used as training sets. After obtaining the scoring model on the basis of the training set, the reliability of the model was cross-validated by using the 100 pieces as the verification set. Then double cross validation is used, that is, the training set and test set are exchanged and the above steps are repeated. The correlation coefficient between this method and manual score is as high as 0837, but because of the narrow source range and small number of composition samples, the main features are extracted. It is a shallow feature of the text, which does not cover the deep structure of the text, and the results need to be further verified and strengthened. Li yanan 2 is another Chinese writer who studies automatic composition scoring. The study is based on the third level composition of ethnic Chinese proficiency test. In this study, two samples were used, one was 583 compositions with 7 composition topics and the other was 488 compositions with the same topic. Each sample was randomly divided into two groups with approximately the same number. Taking multiple linear regression as the research method, taking 45 quantifiable scoring elements as independent variables

and the composition scores given by the examiners as dependent variables, the stepwise regression is used. And forced input regression method to extract variables, multivariate linear regression analysis was carried out, and cross-validation was carried out between two random groups within the sample. Adopt the best of them for the composition score, the correlation with the artificial score reached 0.572.

Cao Yiwei and Yang Chen first used latent semantic analysis technology to score Chinese compositions automatically. Their research used 202 high school compositions as samples, and used latent semantic analysis techniques to evaluate compositions to get content scores. The correlation between this score and the content score of manual evaluation reached 0.47.

In our country's business English writing training, because of the large number of students brought by a teacher, the burden of correcting the composition of the composition has led to insufficient training for students and the level of composition has not been improved. At this time, it is a good idea to use an automatic composition score to modify composition. Compared with manual modification, the automatic composition scoring system has the following advantages:

(1) The computer will not become tired and more sustained and efficient. Each article will be evaluated more carefully and objectively than humans, without thoughts and feelings. It is fair and objective, and it is conducive to student progress. (2) It can greatly reduce the teacher's correction workload and enable the teacher to have more time for lesson preparation. ,explain. And the automatic scoring system can conveniently count the weak locations of students when they are scored, so that teachers can teach more specifically. (3) Students can write more essays in order to further evaluate their composition. In particular, after the English teaching reform, the English curriculum is subject to grading and class-based teaching reforms. Each literary and literary teacher faced with hundreds of students, how to enable students to obtain more writing opportunities, and received instructive feedback. Has become a pressing need for writing teaching.

3. Clustering Overview

At present, clustering technology has become a powerful tool for information retrieval and text mining. Its essence is to establish a goal and divide a group of objects into similar groups according to the similarity. This process can set the targets to be similar elements in the same group, or different groups of different elements, so as to achieve different purposes. This is a kind of Unguided learning methods. For example, given a set of sample data Y={Y1,Y2,Y3...,Yn}, this set of data is conditioned according to its similarity, and the process of {DL,D2Ds} is clustering. The group produced by this kind of cluster is called a cluster. Clustering makes each cluster member similar and different clusters have differences. The better the clustering method is, the higher the similarity within the cluster is, and the greater the difference between clusters is. Big. The clustering of textual information is Document Clustering, which was originally used only for information retrieval and improved accuracy. The first step is to translate the text into a form understood by the computer, that is, a vector space model. Preprocessing the text, such as extracting unnecessary information, such as some low-frequency words and some stop words, auxiliary words, retrieving high frequency of occurrences. Can represent the vocabulary of this document. Sometimes you need to name, electrogram text vectors. With the document vector connected to the meter, the similarity can be calculated. Since semantic content is difficult to calculate, it is generally

The calculation of frequency is a relatively mature method. The formula is based on the Euclidean distance or the angle between the vectors

Calculated by strings, the distance is near, the smaller the angle, the greater the degree of similarity.

4. Text Clustering Results Evaluation Research

After the texts are clustered, the results are generally evaluated by manually classifying the clustered texts. After the clustering is completed, the clustered clusters are compared with the artificial classifications to determine the clustering quality. The evaluation of text clustering results

can use indicators such as accuracy rate and recall rate, purity, mutual information, class matching degree and running time.

(1) The two indicators, Precision and Recall, are usually used as a whole to evaluate the clustering results. The accuracy rate is the proportion of objects clustered correctly in the clustering result, and it is judged whether each piece of text is correctly classified into the category it should belong to. The greater the value of the clustering accuracy rate, the more the matching between the clustering results and the clustered texts, and the higher the effectiveness of the algorithm. The recall rate is the proportion of similar texts of the same topic merged into one class, and it is judged whether the text of each category is completely divided into the corresponding class. Calculated as follows:

Precision=
$$\frac{n_{ij}}{n_j}$$

Recall= $\frac{n_{ij}}{n_i}$

Where nij is the number of texts in the known class i in the cluster j, nj is the number of texts in the known class i, and nj is the number of texts in the cluster j. F-Measure is a harmonic average of Precision and Recall and is a composite indicator. The larger the F-measure, the better the clustering effect. F-Measure calculation formula is as follows:

$$F-Measure = \frac{2 \times Precision \times Recall}{(Precision + Recall)}$$

(2)Purity is a simple clustering evaluation method that calculates the proportion of correctly clustered texts to total texts. Calculated as follows:

purity
$$(\Omega, C) = \frac{1}{N} \sum_{k} \max_{j} | \omega_k \cap c_j |$$

Where $\Omega = \{\omega 1, \omega 2, ..., \omega k\}$ is a set of clusters and ωk represents a set of k-th clusters. C={C1,C2,...,Cj} is a text collection, Cj is the jth text, and N is the total number of texts. The value of purity is between 0 and 1, and the completely wrong clustering method value is 0, and the completely correct clustering method value is 1. However, if the clustering algorithm separates each piece of text into a single class, then the algorithm considers all the texts to be correctly classified, ie a purity of one. Therefore, this evaluation method is not very accurate.

(3)Normalized mutual information (NMI) is the standardization of mutual information between classes. Mutual in formation is an information measure in information theory. It refers to the correlation between two sets of events. NMI is superior to purity and entropy, and its value is between 0 and 1. The closer the NMI value is to 1, the better the clustering effect. Calculated as follows:

$$\text{NMI}(\Omega, C) = \frac{I(\Omega; C)}{[H(\Omega) + H(C)]/2}$$

Among them, I is mutual information, H is entropy, the formula is as follows:

$$I(\Omega, C) = \sum_{k} \sum_{j} P(\omega_{k} \cap c_{j}) \log \frac{P(\omega_{k} \cap c_{j})}{P(\omega_{k})P(c_{j})}$$
$$H(\Omega) = \sum_{k} P(\omega_{k}) \log P(\omega_{k})$$

When k=N, each text is a class with the largest mutual information, so mutual information will have the same problem as purity.

(4)Define the class matching degree of a certain class cj as follows: where m(cj) represents the degree of agreement between cj and c'j, and its value is between 0 and 1. Cj is a topic in the division of domain concept topics established manually by domain experts. i=1, 2,..., n, n is the number of topics. C'j is a class that is automatically obtained by the clustering method, j=1, 2, ..., n. $| ci \cap c' j |$ is the number of identical concepts in ci and c' j. The matching degree of the defined clustering result c' is:

$$\mathbf{m}(\mathbf{C},\mathbf{C}') = \sum_{i=1}^{n} \mathbf{m}(c_i) \mathbf{P}(c_i)$$

Among them, C and C' represent the result of the topic division and clustering method of the domain concept set artificially established by domain experts. m(C,C') reflects the degree of agreement between the two results, C and C', with a value between 0 and 1, where 1 stands for perfect agreement and 0 stands for complete disagreement. n The number of thematic topics divided by domain experts for field experts. P(ci) is the probability that ci occurs.

(5)Running time refers to the time when a program is run or executed, through a programming language, to compare the performance of several clustering algorithms or the performance of different parameter clustering algorithms.

5. Automatic Scoring System Clustering Research

The current AES system scores on business English essay scores have been commensurate with the content and language quality. However, for foreign students only, there are still deficiencies in the scores of Chinese college business English essays.

(1) Most of the mature systems are used in commerce, and the prices are expensive.

(2) This system is mostly for foreign university students and it is not suitable for Chinese students.

(3) The AES scoring system first collects the cross-headed storage analysis of the scores that have been scored as a training set, then builds a model with these scored essays, and then performs a large batch of scores, which can be established before the scoring. The scoring training set compares the language and content to arrive at the final score. It is applicable to a large number of large-scale examinations or quizzes, and more than 200 sets of training sets for the establishment of artificial scores are required, and the total number of examination papers is tens of thousands. A teacher of Business English education has a maximum of 300 students and is far from the above tens of thousands. It is difficult to apply such a scoring system. Therefore, we have now exited a niche business English composition training scoring model. Its essence lies in; evaluating the content and language quality of the composition. In terms of language, it is not necessary to specifically evaluate a language evaluation model that has been accumulated through multiple trainings, and it is not necessary to specifically address a certain topic. Content can be automatically analyzed by analyzing texts without training. Clustering identifies and analyzes articles' lexical phrases, and automatically aggregates articles with similar words, content, and semantics into one category to make judgments. Especially for articles that agree with the title, the content is judged according to the gathered words and sentence similarities. However, it does not rule out the difference is particularly large, this time we will need to evaluate the artificial Jin Xing to see if it is out of the question, but have to say that this time has greatly reduced the workload of the teacher, of course, using content clustering to judge business English composition we One problem must also not be overlooked: the same subject will produce different content essays due to different angles. For example, in a business English test, the essay titled "Join the club". Different students have different perspectives on this essay topic. For example, some people write about the significance of joining a club. Some people write experiences and feelings about joining a certain type of club. For example, they join English clubs, baseball clubs, aerobics clubs, etc. Differently, because it is difficult to identify high-frequency words and other high-composition text clustering, the above process cannot be carried out. However, it is possible to use language quality and content separately to judge and re-aggregate different contents into different large categories. In each major category, automatic clustering is then used to judge the content, and feedback that is not of such similarity is not included. Reclassification or manual evaluation is therefore considered as the last level of the evaluation of the content of the computerized automatic scoring system. The text clustering method is still very useful.

6. Conclusion

In business English composition teaching, students' composition correction has been agreed by teachers and students as an effective means to improve their writing ability. However, considering the time, energy, writing, etc., we have to admit that efficiency is not high. In the large-scale language examination, composition is an essential question type, the work load and the reliability of marking paper have always failed us. In response to this problem, the computer intelligent automatic scoring system provides a reliable and desirable solution. In this paper, the text clustering is selected to study, the evaluation criteria are analyzed theoretically, and the compositions scored by them are followed up and evaluated, and the results are found. Through the method of responding and scoring students' composition according to a number of scoring criteria, it can solve the efficiency problem of composition scoring quickly and effectively, and the reliability and accuracy are no less than the level of manual grading. It can be used as a supplementary method for manual scoring. Therefore, the development of intelligent scoring system is worth looking forward to.

Self-acting text scores are in line with the teaching requirements of business English courses and follow the trend. Especially the application of text clustering makes the business English composition correction more convenient, objective and fast, saving manpower and material resources, and providing more for business English teaching for teachers. Make profits, but also enable students to get more opportunities for business English writing skills, learning is not limited by time and place, can develop in the direction of self-learning. Although this technology is not mature enough recently, this technology has been able to solve problems in practical use. We must use it exploratively to help avoid problems and allow it to better serve business English writing.

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