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Intercultural Communicative Competence and Its Cultivation Based on Machine Learning

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ABSTRACT

With the construction of the national discourse power, the international communication of German-language has also attracted the attention of the public, and its own communication attributes and characteristics have also become a hot topic around the world. A machine learning development process includes operations such as data preprocessing, feature engineering, model design, and super parameter optimization. Changes in the configuration of each operation may affect the final quality of the model. Nor is it mainly the problem of teachers' teaching, but the communication barrier caused by cultural differences. We can see that there are still many obstacles and misunderstandings in language, thought, cross-cultural communication and knowledge in many communication occasions between China and Germany. Through reviewing and summarizing the previous studies on intercultural communication, this paper analyzes the current situation of intercultural communication studies, points out the problems existing in the current research, and tries to put forward the cultivation methods of intercultural communication.

Keywords: German-language, Intercultural communication ability, Stochastic Forest algorithm

1. Introduction

With the fierce competition in traditional fields such as politics and economy in the world pattern. Culture, as a country's apparent soft power, always shows a dynamic factor and becomes the core driving force that can affect international competition. It is well known that the positioning of language is no longer stagnant in the narrow level of the original "just a carrier of culture", but advances

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with the times to a new resource, which has injected fresh blood into the development of emerging economies and the external shaping of national image to a certain extent [11, 2]. The positioning of the language appearance of foreign publicity is inaccurate and the regional communication of Confucius Institute Lack of [8].

When scheduling the traffic of distributed applications, fully consider the requirements of the machine learning model development process [13]. A machine learning development process includes operations such as data preprocessing, feature engineering, model design, and super parameter optimization. Changes in the configuration of each operation may affect the final quality of the model [4, 16]. Developing a high-quality model to meet the needs usually requires different configurations of the above operations, then training the model, and adjusting these configurations according to the training feedback results to search for a configuration that can train high-quality models [7, 10]. The international communication of German-language is a new discipline, which is a phenomenon of language communication from China to the world, based on the needs of all countries in the world for German-language and following the law of language communication. "

The research on intercultural communication in China has made great achievements. However, due to the relatively late development, and there are many deficiencies in the existing research [14]. However, due to the insufficient emphasis on intercultural communicative competence, there are still problems in overseas teaching. In a word, this paper reviews the previous studies on intercultural communication in China, the necessity of cultivating intercultural communication competence. At the same time, it tries to put forward some strategies for cultivating intercultural communication competence [12, 3].

In 2016, Google adopted machine learning technology to achieve AlphaGo victory over the world champion of Go, which shocked the world with AI technology [5]. At present, many applications use distributed machine learning technology, including computer vision, natural language processing, audio recognition, etc. These applications using distributed machine learning technology are quietly penetrating people's daily life [6]. The core idea of distributed machine learning is to train a model to fit the input training data, deploy the trained model in the corresponding application, and expect the model to be able to accurately classify or predict the data generated during the application operation.

The above data show that the research on intercultural communication has made gratifying achievements in the foreign language teaching field, which has infiltrated into all levels of language teaching, such as vocabulary, grammar, discourse, pragmatics [15, 1]. There is also much research outside the language level, such as the research on culture, mode of thinking, communication style, communication ability and so on.

2. Optimization of Random Forest Algorithm

It mainly conducts classification training based on decision tree as a combination, and finally accurately classifies and predicts samples with unknown results through voting method. In general, there are two random processes in the random forest. The first random process is to use Bagging algorithm to randomly sample the original data for many times to form multiple random data sets. The second random process is to randomly select some features from the selected data, and finally form multiple random training sets. Then, the nodes are classified by information gain, Gini coefficient and other classification methods. Next, the detailed principal process of the random forest algorithm is introduced. The equation of the absolute majority voting method is:

$$H = \begin{cases} a_i, & \text{if} \quad Q_i > 0.5 a_{J=1}^{j} Q_J (1\#i \quad j), \\ \text{reject}, & \text{otherwise.} \end{cases} \tag{1}$$

The weighted voting method is to give a vote to all the results. The equation of weighted voting method is:

$$H = w_i a_i \left(w_i = \frac{Qi}{\underset{j=1}{\overset{a}{j}} Q_J}, 1\#i \quad j \right). \tag{2}$$

When the feature space is transformed into a new feature space, the corresponding classification function is:

$$f(x) = \operatorname{sgn}\left(\sum_{i=1}^{n} a_i^* y_i K(x_i, x) + b^* \right). \tag{3}$$

The mathematical expectation of the entropy of conditional distribution of Y on X can be expressed as:

$$\operatorname{Info}(YIX) = -\underset{x,y}{\overset{n}{\mathbf{a}}} p_i \operatorname{Info}(YIX = x_i) = -a_{x,y} p(x,y) \log(p(y \mid x)). \tag{4}$$

Suppose there are two result multi value sets 1R and 2R, and their similarity formula is:

$$\text{similarity}(R_1, R_2) = \left[\frac{\text{same}(R_1, R_2) - \text{different}(R_1, R_2)}{\text{cardinality}(R_1, R_2)} + 1 \right] /2. \tag{5}$$

3. Methods

3.1. Data selection

When teaching language, we avoid talking about culture, just like teaching some meaningless symbols. If they lack cultural foundation, the most fluent language learners may misunderstand the information they get, thus misunderstood the purpose of communication, leading to communication failure. As a tool of cultural learning, language plays an irreplaceable role [9]. There is no culture without language, and of course there is no language without culture. Without the corresponding language as a carrier, culture is difficult to spread. Of course, without culture, language has no value to express meaning. Language and culture are inseparable, for machine learning, its principle is shown in Figure 1, input features, characteristics, attributes, predictive variables, and independent variables in a "machine" to output types, targets, response variables and dependent variables. According to the training of certain data, the "machine" uses algorithms, models, and technologies to automatically learn the rules of data, making the program more intelligent, so that it can classify, predict, and regress the data entered later.

Here, we first implement the algorithm and model the multi value attribute value under the condition of single class and multi value. Through the introduction of the previous algorithm, we know that in the case of multi value attribute value, we can use the method of improving information gain to classify and predict. The algorithm process is introduced below, as shown in Figure 2.

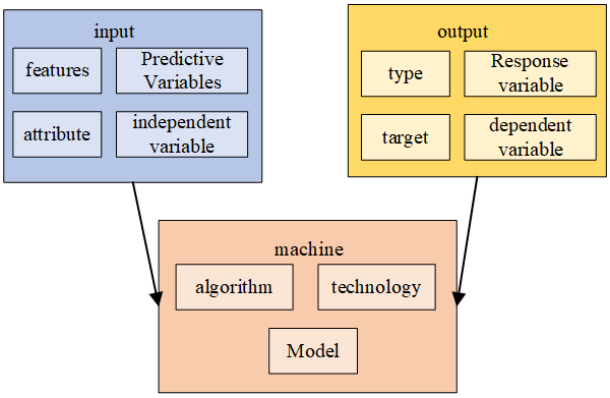

Fig. 1. Machine learning optimization model from the perspective of international communication of German-language

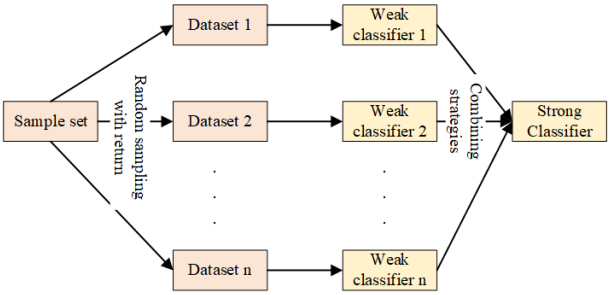

Fig. 2. Bagging algorithm optimization flow chart

3.2. Research assumptions

Compared with the case of multi value attribute values, the improved information gain method can no longer effectively classify and predict the classification and prediction of multi value category values. Therefore, the similarity method is introduced here for analysis. Next, we introduce the algorithm of decision tree, which is a basic machine learning classification, regression, and data mining method. And it is an unsupervised learning method using a tree structure, as shown in Figure 3.

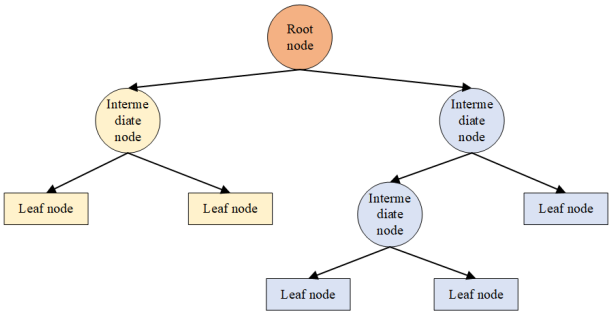

Fig. 3. Decision tree model optimization

The core idea of random forest is to drive data, that is, it does not need to make too many assumptions about the data, but only need to provide the corresponding training rules for the model. Therefore, random forest has good characteristics and classification prediction effect, which is used by many scholars, and is widely used in various fields. Figure 4 is a schematic diagram of the random forest model, and we can see its approximate structure.

Therefore, the international communication of German-language is the demand for the survival and development of German-language itself. In the process of language communication and cultural

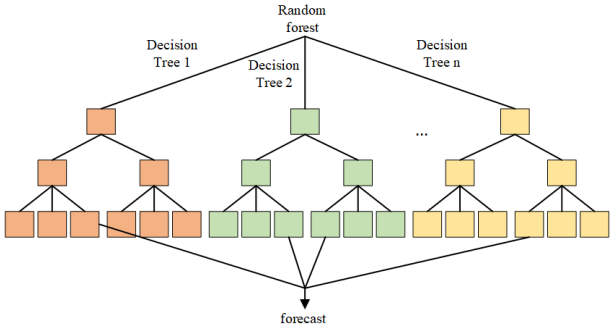

Fig. 4. Optimization of random forest model

dialogue, we can fully recognize ourselves by virtue of the nutrition of other cultures and by reviewing German-language culture and language from the perspective of others. Thirdly, in the era of globalization, world culture also shows an unbalanced trend. In the development process of western culture, it shows the opposition to nonwestern culture, especially eastern culture. The spread of non-Western languages is conducive to the Western maniacs' mastering of different languages, so that from understanding the information from different channels and the value of different cultures, they can finally get the German-language data of attribute values in the attribute language, as shown in Figure 5. Finally, they can classify all the two data.

Although there are historical differences in the international spread of German-language in different periods, the common features are obvious, mainly shown in: As one of the world languages, the spread of tattoo language is bound to be restricted by the world language environment system. On the contrary, due to the close political, economic, and cultural ties among countries in the world, social factors have become the main factors affecting the international spread of German-language. Therefore, in the face of changes in the natural and social environment, the international communication of German-language needs to make adaptability adjustments to achieve a systematic dynamic balance in the process of language communication. To sum up, the fundamental impetus

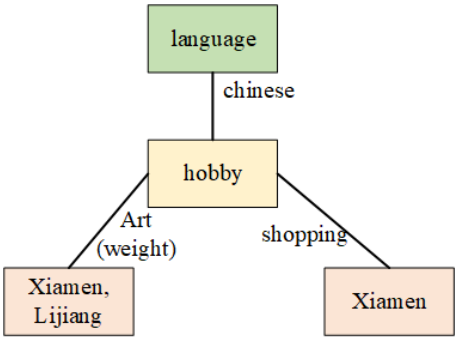

Fig. 5. Branch diagram of German-language branch data

for the international spread of German-language comes from the language value of German-language itself. In the state of natural selection of language without strong intervention of human factors, language value determines the breadth and speed of language transmission. The basic method of learning and studying cross-cultural communication is the comparative analysis of language and culture.

4. Case Study

4.1. Analysis of dual category and multi value environment

The ability to adapt to the environment means that teachers should have good psychological quality, have the sense of facing pressure and difficulties at any time, be prepared psychologically, and be able to learn from the failed teaching experience to improve their teaching. The ability of cross-cultural integration requires that teachers should understand German-language and foreign cultures, major religious sects and their philosophies, etiquette, festivals, and reflect them in teaching and communication. Self-regulation ability mainly refers to the ability of intercultural communicators to adjust themselves in time, overcome various obstacles in communication. In the position conversion of keywords, they can be converted into sentences with complete meaning and transmitted to users. Such conversion is called L–T. The rapid retrieval process of German-language words and sentences is shown in Figure 6.

4.2. Machine learning case analysis based on dual class multivalued random forest algorithm

It is not enough to use language as a communicative tool accurately and appropriately in cross-cultural communication, and nonverbal communication acts and means also play an important role. Because nonverbal communication not only runs through the whole communication process, but also best reflects a person's psychological activities, true attitudes, and values. It can maintain, replace, emphasize, and even save communication when verbal communication is blocked or needs to be emphasized. The guidelines for completing the indexing algorithm are as follows: the content in the reference can be accurate to each German-language character in the raw corpus, and the documents can be read in order. The specific location of the German-language character is stored in the German-language character indexing library; Idiom corpus has certain particularity, and indexing should be processed by filtering at the same time. Different from raw corpus, the part of speech of each word is extracted in order. When using the indexing algorithm, it is necessary to judge whether the character "/" exists in the system. It is the part of speech after the "/" and the indexing symbol. First, determine the root node. First, split all attribute values and all category values, and correspond them one by one in quantity (Table 1).

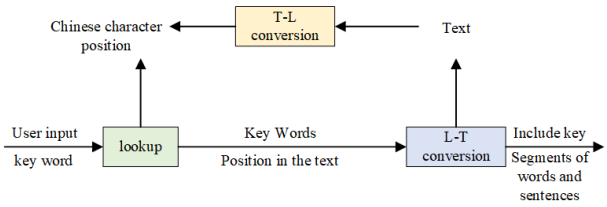

Fig. 6. Optimization of German-language words and sentences fast retrieval algorithm

Category	Gender/female	Gender/male	Hobby/Art	Hobby/shopping	Hobby /motion	Language/English	Language/ French	Language/German	Language/Korean	Language/ Japanese
Xiamen	3	4	6	5	0	4	2	2	2	0
Lijiang	5	3	6	3	2	6	3	1	2	1
Chengdu	4	2	5	2	1	4	2	1	2	0
Ratio	0.45	0.43	0.36	0.5	0.68	0.44	0.44	0.4	0.34	1

Table 1. Statistics of attribute values corresponding to category values

From the 40M or so comprehensive corpus (raw corpus), we first use the preprocessing module

in the word segmentation system to identify the sentences with overlapping ambiguous fields and propose them for testing the accuracy of the algorithm, and then manually proofread them. The test results are shown in Table 2:

Corpus category Test data scale	Number of intersection ambiguous fields	Number of correct	segmentations	Accuracy
comprehensive	93k	176	159	90.85%
Economics	45k	68	63	92.53%
education	56k	89	81	89.88%
military	61k	103	95	91.15%
average	-	-	-	91.22%

Table 2. HB algorithm optimization experiment results

The international communication of German-language in different periods is obviously different in terms of environmental factors and reception groups. However, the historical commonality of communication is more obvious. The fundamental impetus for the international spread of German-language comes from the language value of Humayun itself. The ups and downs of the international communication history of the silent language show that the depth and breadth of the international communication of German-language are affected by the value of the language itself. The appreciation of language value is achieved through the all-round development of the country's politics, economy, and culture. Second, although the specific communication routes of slave language have their own priorities, the international communication of language of speech is carried out in a flexible way. The test was divided into three groups, and the results obtained by different methods were compared. The first group uses the SVM based algorithm, the second group uses the rule-based method, and the third group uses the SR algorithm (the algorithm based on the combination of SVM and rules). The test results are shown in Table 3:

	Correct number	Number of errors	Accuracy	recall
SVM	149	59	71.84%	71.84%
rule	65	16	81.01%	31.06%
SR algorithm	164	44	79.12%	79.12%

Table 3. Comparison of three methods

The American Association for Foreign Language Teaching proposes that foreign language competence includes communicative competence, and clarifies that communicative competence includes five aspects. Therefore, we can see that intercultural language communication ability is an important language application ability. Although we constantly emphasize the importance of culture teaching, language skills and language ability are the focus and foundation of teaching. Only on this basis can we talk about the cultivation of communication skills and the strengthening of other abilities without a solid language foundation, it is impossible to obtain strong intercultural communication ability. The diachronic study of the international communication of German-language shows that the main environmental factors affecting the international communication of Diaoyu have changed from the natural geographical environment to the social international environment. With the economic development of countries all over the world, they have frequent contacts, and the competition between countries has also been strengthened. At present, social environmental factors have become the factors that need careful consideration in the international communication of German-language.

The constituent factors of social environment are numerous and complex, but as far as language communication activities are concerned, the influence of the language owning country on international politics, economy and culture, and the political, economic and cultural relations with the promoting country are the main cultural environmental factors. In the face of the changes in social environment, the international communication of German-language needs to make adaptability adjustments to achieve a systematic dynamic balance in the process of language communication. For example, their countries can reflect the impact of the international environment on the international spread of German-language.

5. Conclusion

The history of the international communication of German-language has proved that the international communication of German-language has not led to the decline of the national language but has promoted the healthy development of the local language. The spread of German-language characters is the most powerful proof of "co evolution" in the history of language communication. The international spread of language and language expansion are qualitatively different. The international spread of language does not necessarily mean that it will endanger the living space of other languages. the intercultural communicative competence is divided into five modules: cross-cultural awareness, cross-cultural language communication, cross-cultural nonverbal communication, cross-cultural empathy, and intercultural conflict resolution, each of these modules is outlined. Secondly, the experiment is designed, and the experimental results are presented in tables and figures. Thirdly, SPSS software is used to analyze the above results, verify the relationship. However, the use of distributed machine learning is not easy.

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