

Research on Human-Computer Interactive Oral Translation Methods and Related Issues

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Abstract: With the development of computer information technology, the quality of machine translation has been greatly improved. However, some shortcomings, such as the poor coherence of machine translation, can easily lead to poor translation quality, especially the poor fluency of spoken texts, which makes the defects of machine translation more prominent. The human-machine interactive spoken translation mode can well combine the advantages of manual and machine translation modes. Human-computer interactive translation mainly uses fuzzy matching, combined classifiers, and manual discrimination to improve translation quality.

1. Introduction

1.1 Spoken Style and Its Characteristics

The translation of everyday spoken text has its particularity, and has many complex translation characteristics that are different from other texts. The most prominent feature of spoken text is its fluency in grammar and other aspects, as well as the existence of some additional words that are not in written text.

Because in the real daily speech act, people often use some filling words, wrong words, or irregular syntax in the process of speaking, which will lead to the fluency of spoken text.

In the actual use of spoken language, the speaker may unconsciously use some additional language. For example right, well, alright and other adjuncts. In the actual translation process of spoken text, these additional words need to be translated.

1.2 Interpretation Requirements

Since everyday spoken texts are informal texts, the content is random and its form is relatively simple. Therefore, in the translation process, the translator should show the unique style of the spoken text itself, while also taking care of the reader's full understanding. This requires translators to choose between texts based on the speaker's semantics and characteristics. Therefore, when translating spoken texts, the translator must carefully guess the semantics of the speaker, so as to be able to translate the original meaning of the text accurately, rather than only seeking "formal" translation.

1.3 Interpreting Strategy

In the face of the problems of fluency and adjunct that may be encountered in the process of oral text translation, translators must take different translation strategies according to the original meaning of the text.

1.3.1 Fluency of Spoken Text

It is a very common and prominent phenomenon that the fluency of spoken text is caused by oral errors or the speaker changes his mind temporarily. During the translation process, in order to allow the reader or listener to understand the meaning of the speaker accurately, the translator must translate the original text in a very smooth and smooth form.

1.3.2 Spoken Text Adjuncts

The adjuncts in spoken texts have their own specific meanings. Therefore, translators should not delete the adjuncts at will when translating spoken texts. Those adjuncts that do not affect the overall fluency of the text should be translated. In addition, retaining the adjuncts in the spoken text can help the reader or the audience to understand the speaker's intention accurately. At the same time, the adjuncts also reflect the speaker's unique language characteristics.

2. Machine Translation

2.1 Machine Translation and Its Principles

With the rapid development of Internet information technology, the level of mechanization of translation is getting higher and higher, and at the same time, a variety of translation software is emerging.

One of the most common machine translation models today is a model based on phrase statistical machine translation. This method treats any continuous string as a phrase, and uses the phrase as the basic unit of translation. Comparing this method with the word based translation model, we can find that the performance of statistical machine translation is greatly improved because the word order information inside the phrase is taken into account.

2.2 Advantages and Disadvantages of Machine Translation

2.2.1 Advantage

Compared with the traditional manual translation, machine translation has the characteristics of low cost, fast speed and high efficiency. All kinds of translation apps based on machine translation model are widely used in people's work, study and life, which can greatly improve people's work efficiency. Because it can be used through the network, it has great convenience. At the same time, because it is an automatic translation, it can help non-professionals who have translation needs to perform text translation on their own, reducing manpower and saving costs. In addition, due to its large memory and wide range of uses, machine translation is also favored by official text translations such as science and technology.

2.2.2 Disadvantage

As we all know, translation work is not a simple list of word-to-word and word-to-word. The texts we need to translate, especially the spoken texts, are alive, especially those of literary type, etc., which need to pay attention to artistic conception. However, the existing machine translation can not reflect the cultural color of the text.

In addition, there are word order problems and repetition problems in machine translation of spoken texts. Because in the decoding process of translation machine, the phrase matching accuracy will be too high. However, this exact phrase matching strategy is only suitable for the situation that it completely conforms to the word order of the translated phrase. However, the spoken text is extremely random, and there are problems such as repetition, reverse order, omission, etc. This will cause the situation in which the phrases in the translation phrase table cannot be fully used in the translation process, resulting in severe shortage of translation data. If you still choose to use this exact phrase translation strategy at this time, the quality of translation will be significantly reduced.

Because English texts attach great importance to logic, there must be a certain degree of coherence and cohesion between the words and words, words and words, and sentences and sentences of the text. Therefore, in the process of translation, especially in the translation of spoken texts, it is necessary to achieve a better geographical and logical relationship, and organize sentences in a way consistent with the logical thinking of the language of the audience. Compared with the traditional manual translation, machine translation is a very straightforward way of literal translation, lacking a certain logical relationship.

3. Human Computer Interactive Oral Translation

In order to solve some problems in the current process of machine translation of spoken texts, while maintaining the advantages of high efficiency, high speed and low cost of machine translation, and improving the quality of translation of spoken texts, there have been many studies at home and abroad. The following two main solutions are proposed here.

(1) Expand the scale of the phrase list. However, this solution will cause an excessive load on the decoding system, and the operability is small under the current conditions, so it is not adopted.

(2) Interactive oral translation with human-computer interaction. Due to the related research of phrase knowledge, for example, there are a lot of phrases that can't match exactly but have similar semantics or the same phrases in the phrase table, so we should make full use of these synonymous or near meaning phrases in translation, in order to improve the translation quality of the oral Chinese. However, it is difficult for the machine to distinguish the semantic similarity of phrases in the process of translating Chinese texts. Therefore, it is necessary to make artificial judgment, that is, to use the method of human-computer interactive oral translation to improve the translation quality of spoken texts as much as possible.

3.1 Principle

Human computer interaction, which is a special study of the interaction between the system and users. In human-computer interactive oral translation, system refers to various translation systems, translation software, etc., while user refers to translator.

The main principles of human-machine interactive oral translation are:

- (1) Use combination classifiers to find similar phrases and improve sentence translation quality
- (2) Through the method of human-computer interaction, we can determine whether the semantics of similar phrases and original phrases are the same.

3.2 Method

3.2.1 Preprocessing

The pre-processing of spoken language translation refers to the correction of errors in speech recognition results. This method can only guarantee the correctness of the input results of the translation system, but it can not solve the difficulties of translation itself.

3.2.2 Source Language Phrase Division

After preprocessing the spoken speech input, it is the premise and guarantee that the translation system can correctly translate the input text. After we input the original Chinese into the translation system, the translation system will automatically divide all the phrases in the sentences of the original spoken text, and then compare the divided phrases with the phrase sequence. If the source phrase can be found in the phrase list, it will be directly translated and the translation result will be directly output. However, if all source phrases cannot be found in the phrase table, the phrase "fuzzy matching" will be adopted, and the sentences in the source spoken text will be expanded and then translated. After that, the group "combined classifier" is used to select the results that can improve the translation quality. Finally, it is left to the human to make a judgment, select the final translation result, and output the final high-quality translation result.

3.2.3 Fuzzy Matching

One is to calculate the similarity between two similar "phrases", and the other is to determine the "semantic" similarity. In addition, in order to improve the speed of calculation, it is necessary to filter the irrelevant phrases to get the set of phrases that can meet the corresponding conditions, and further improve the quality and efficiency of translation. In addition, unlisted phrases need to find similar phrases in the phrase table.

In the current research of phrase fuzzy matching, there are two most popular methods:

The first method is based on the principle of string similarity, that is, taking two phrases as strings to calculate the similarity between two corresponding strings;

The second method is based on the principle of semantic similarity. In this method, some semantic resources, such as Wanfang, HowNet, WordNet, and Weipu, need to be used to calculate the similarity between the semantics of two phrases. At present, this method based on semantic comparison of phrases has been studied deeply by researchers at home and abroad, and many methods have been proposed. For example, based on HowNet phrase semantic similarity calculation method.

3.2.4 Ensemble Classifier

This method is usually used before human intervention in oral translation. In this stage, the translation machine will screen the text sentences. After the screening step, the sentences with improved translation quality will be submitted to the translator for subsequent judgment. For example, the “SVM classifier” is used as the basic classifier, and then the sentences generated by machine translation are discriminated, and the translated sentences are divided into two categories: improved translation quality and not improved translation quality. It should be noted that when we use the combined classifier for oral text testing, we mainly refer to the original translation results.

3.2.5 Interactive Translation

After the combination classifier selects those translation sentences with higher translation quality, it is then handed over to human translation for selection and discrimination, and finally the final result is output manually. But because the method of phrase fuzzy matching cannot fully guarantee the semantic consistency of phrases, in order to ensure the high quality of the final output translation results. It is necessary to adopt a human-computer interactive translation method to select the best translation quality of the export text and finally complete the translation task. The interactive human-computer oral text translation is to use dialogue management to complete the translation task, and output the optimal text translation results by the way of manual selection. What we need to pay attention to is that in the process of human-computer interactive oral translation, we must take full account of the translator's burden when translating manually. That is to say, the translation machine should improve the interaction efficiency, so as to avoid the impatience, boredom and other emotions of the translator, which are all adverse factors to improve the translation quality.

3.3 Development Direction of Interactive Translation

At present, there are still some problems in human-computer interactive oral translation, which need to be solved by later researchers. For example, in oral translation, there is sometimes the problem of key information loss. There is also the problem of the way of automatic evaluation in the evaluation process of machine translation; and the problem of the order of spoken text.

Although there are some unresolved problems in the current human-machine interactive oral text translation method, this method is still more and more popular. Because machine translation is still widely used, when developing translation machine tools, it should be based on the user's point of view, so that the machine translation process can be more user-friendly and meet the diverse needs of translators. In addition, translation machines should be based on big data on the Internet to obtain a larger scale of spoken language resources, and use resource sharing to promote the development of machine translation. In the process of translating spoken texts, we should combine the two effectively, and improve the quality of machine translation by using the traditional manual translation method with higher accuracy and completion, which will still be the main research direction at home and abroad for a long time in the future.

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