

Preliminary Exploration on the Dilemmas of Computer-aided Interpretation*

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Abstract—In recent years, machine interpretation technology has made great progress, and its transcription results have been able to achieve quite high recognition accuracy. This paper explores the dilemmas of computer-aided interpretation with the methods of examples and theoretical research. It can be concluded that in the face of the huge impact brought by the development of computer technology, interpreters should not regard it as a monster, but should take the initiative to use these new technologies to help them better complete the task of interpretation. However, computer-aided interpretation still has some dilemmas and limitations of techniques, which needs to be improved in the future. The author also makes some predictions about the development of computer-aided interpretation technologies in the future, it is believed that the computer-aided interpretation will become more and more intelligent with the continuous upgrading of technology.

Keywords—Computer-aided interpretation; dilemma; CAI technology

I. INTRODUCTION

A. Background

In 2014, Microsoft demonstrated the real-time voice interpretation function of its Skype instant messaging software at WPC 2014. Microsoft says users can use the computer's simultaneous interpretation technology to communicate with each other across language barriers. In fact, Microsoft's Skype interpreter isn't the only interpretation software springing up, such as Intertalk, iSpeak and iVoice. Compared with human brain, computer has the advantages of quick response and accurate memory. In interpreting practice, the computer can quickly obtain the source text through speech recognition, and make use of corpus, glossary and cloud resources to quickly get the interpretation. The target language displayed on the screen can provide reference for the interpreter. Taking numbers as a case, they are hard to remember by the human brain, the computer can translate and display them accurately after accurate recognition, reducing the burden of memory for interpreters. By sharing the task of memory with the human

brain, the computer enables interpreters to ensure the quality of number interpretation, and at the same time helps interpreters increase the energy allocated to understanding and expression, improve the accuracy and fluency of interpretation, and thus improve the quality of interpretation. [1] Therefore, it is of great significance to exploration computer-aided English interpretation.

B. The Development of Computer-aided Interpretation Technology

CAI means computer-aided interpretation. From the perspective of function, there are three kinds of CAI technologies: pre-interpretation technology, in-interpretation technology and post-interpretation technology. CAI technology provides interpreters with auxiliary functions such as pre-interpretation query, glossary establishment and management, and knowledge base resource management by combining speech recognition technology, machine interpretation, bilingual corpus, and translation memory and glossary platform.

Before interpretation, some technologies are needed to deal with pre-interpretation tasks, including office related software, search engine, glossary, special vocabulary management software for interpreters, online interpretation and so on. Examples include a range of assistant softwares for interpreter and integrated platforms for interpreters (such as Interplex and Interpret Bank that developed by the University of Mainz in Germany). The platform includes real corpus of large conference, knowledge base, and term base in different fields and so on, which can realize the function of offline pre- interpretation document management and online information query during interpretation (Stull 2009; Jiang 2013; Fantinuoli 2013). These softwares that mainly based on database tools provide comprehensive support for interpreters to meet the needs of knowledge management, terminology management, interpretation reference and so on.

During interpretation period, technologies that human need mainly include automatic language recognition and interpretation information storage equipment. Among them, the basic speech recognition technology has developed rapidly in recent years. Some foreign or domestic softwares such as iFlyTek voice input method can achieve quite high recognition accuracy without heavy accent or external sound

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interference. However, as the core function, computer interpretation still has many deficiencies, which is the main reason to hinder the application and promotion of machine interpretation.

After interpretation, some technologies are still needed to sum up experience, such as terminology updating and management software based on term management technology, recording and transcoding of interpreting corpus based on speech recognition technology, multimodal interpreting corpus classification and management technology based on multimodal corpus technology, and user feedback management based on automatic evaluation system and so on.

Electronic notebook technology has also developed rapidly, and specialized electronic notebook and corresponding software have become very mature. For example, Evernote which supports instant search, Shotnote which can be installed on a tablet or mobile phone and domestic Hanwang electronic handwritten notebook.

At present, with great progress in deep learning, neural machine translation (NMT) based on artificial neural network has emerged and Machine interpretation has entered a new stage. There are many products which shock the interpretation field, such as artificial intelligence simultaneous interpretation of Skype, interpretation machine of Iflytek Co., Ltd, real-time voice interpretation of Sogou, Tencent interpreter and real-time translation Microsoft interpreter of Microsoft, and they are displayed in many application scenarios. For instance, based on big data and deep learning, the "AI translation" was launched by the Sogou mobile phone browser which consists of voice dialogue interpretation, AR real-time translation, photo translation and many other common functions. And Sogou voice interpretation has intelligent sentence segmentation function and can be used in speech, travel, small talk, daily speaking and other fields, it even can reach a score of 4.4 in a five-point manual score system. At the same time, Microsoft uses the research results of deep neural network to accelerate the deep learning of machines on human language habits.

In the future, the technology of simulating human brain with deep neural network will be perfect day by day. Computers can simulate most activities of human brain through deep learning, and interpretation technology will become more intelligent and machine interpretation will become possible. [2] Interpretation is a process of information acquisition, processing and spread, so it has a lot to do with the development of information technology. With the continuous upgrading of information technology, interpretation technology has also developed from instrumentalization to interactivity and become intelligent with the development of artificial intelligence technology.

II. DILEMMAS IN COMPUTER-AIDED INTERPRETATION

Computer-Aided Interpretation technologies have made remarkable progress these years, however, challenge as it is, there are still many things CAI fails to do. Here we have four difficulties that CAI are faced with in interpretation.

A. *The Dilemma in Digital Interpretation*

Chinese and English have different counting habits, different base unit, and different language expression. Therefore, when translating numbers between English and Chinese, there exists the difficulty of number conversion, which brings great interference and obstacles to number interpretation. For example, in Chinese, the digits above 10,000 are divided into a group of four decimal units, such as 10 "wan" (100000), 100 "wan" (million), 1000 "wan" (ten million), 1 "yi" (hundred million) and so on while English is divided into three decimal units. When it comes to the most common number which is below 10000, it is easy to translate. Otherwise, it's really easy to make mistakes. [3]

B. *The Dilemma in Cultural Differences Interpretation*

There are many cultural differences between Chinese and English expressions. Due to the differences on culture, customs, regions and historical development between china and the west, many numbers have specific meanings. For example, both China and the west have specific numerical expressions of worship and belief. Westerners are very concerned about the numbers "7" and "3", they think it is sacred. While in China, people prefer the Numbers 8, 6 and 9. [4] These differences are of great significance to Chinese and westerners.

C. *The Dilemma in Canonical Speech Interpretation*

Canonical speech is difficult to translate even for professional translators, let alone for machine interpretation. For canonical speech, you need to know the culture, customs, history and much other knowledge in both countries before you translate, meanwhile, you should express the thought and writing style exactly the same with the writer. For instance, owing to the rhythm, artistic conception and many other aspects, the interpretation of poetry always cannot express the same feelings of original work to readers. Therefore, it is a huge challenge for CAI.

D. *The Dilemma in Tone Interpretation*

Tone is usually ignored by machine interpretation. Tone seems trivial, but it plays some roles in different contexts, such as stress, twist, hint and so on. Although it is very short, sometimes it can play a key role. [5] For CAI, it can just translate sentences word for word, but fails to understand the meaning of the tone and expresses human emotions, leading to misunderstanding in communication even some important occasions.

III. THE LIMITATIONS OF COMPUTER-AIDED INTERPRETATION TECHNIQUES

In the pre-interpretation preparation stage, the corpus construction of computer-aided interpretation technology is not comprehensive enough. Few softwares can possess all the corpus in different fields. And the procedure of corpus establishment also needs to be further simplified. In addition, many computer-aided interpretation tools lack the function of corpus sharing. If the function of Sharing corpus is added, time will be greatly saved in the interpretation preparation

stage. What's more, the design of corpus management should be more user-friendly, which is helpful to find and manage data more efficiently.

At present, in the process of interpretation, speech recognition technology assisting interpretation has two major disadvantages. First of all, speech recognition technology is restricted by the development of technology, so insufficient accuracy, information omission and error recording may occur. Even with the help of cloud computing, speech recognition still requires the help of large text storage and a huge amount of training of behind-the-scenes workers (Zhan Xinming, 2008). In the short term, the accuracy rate cannot meet the standards required for interpretation. Therefore, if interpreter completely relies on speech recognition technology, it will lead to interpretation omission and mistranslation. This is especially risky given that interpreters usually work in formal meetings or professional meetings. Secondly, various current speech recognition technologies do not screen transcribed information, but only present transcribed information in exactly the same way whether it's importance or not, which will lead to the phenomenon of information stacking. Different from software transcription, the interpreter will select the information when interpreting, leaving the useful information and discarding the useless information through short-term memory and notes. However, if the interpreter completely relies on speech recognition technology, he/she needs to devote a lot of extra energy to watching the transcribed text and then screens the information while listening by himself/herself. In addition, speakers often have a variety of verbose or meaningless repetitions, and this trivial information will be recorded by speech recognition technology and put together with the important information. It will distract interpreters and affect the interpretation quality. [6]

At present, the accuracy rate of computer interpretation is even lower than that of speech recognition. For interpreting, the join of computers adds another task — screen reading — to the original four interpretation steps: listening comprehension, short-term memory, note-taking and expression. It means that interpreters need to interpret with screen and notes after completing listening comprehension. Therefore, the content of computer display interface needs to be well combined with the notes of interpreters; otherwise it will play a negative role. At the same time, the interface design, display language and display speed of the computer aided interpretation system all affect the interpreter's performance. [7]

Feedback after interpretation is also a very important step. Some interpretation assessment functions should be developed by computer-aided tools, which can be used to score the quality of interpretation. However, many CAI tools lack of this function. At the same time, different account login functions are supposed be designed to enable interpreters to check their own learning records so as to learn and summarize for improving their interpretation ability.

IV. THE SIGNIFICANCE OF COMPUTER-AIDED INTERPRETATION

The significance of studying computer-assisted interpreting is mainly embodied in three aspects.

First of all, with the increasing of interpreters in recent years, the market competition is becoming increasingly fierce, and the quality requirements of interpreters are becoming more and more demanding. Users not only require interpreters to interpret the main information, but also require the interpretation to be more accurate, concise and in line with the expression habits of professional terms. Therefore, the research of computer-aided can help interpreters to improve their listening interpretation and speaking ability while reserving professional knowledge in the field concerned. Interpreters can deal with their blind spots of understanding and expression in a more efficient way during their daily independent learning and practice, which further consolidate their language foundation and knowledge reserve so as to complete interpreting tasks with higher quality. [8]

Secondly, more and more colleges and universities offer interpreting major due to the increasing demand for interpretation work. However, interpretation is a special subject with strong practicality, so practical training is more important than theoretical knowledge in class. Larger class capacity leads to the decrease of training time of students in class, and the class time is also limited. As a result, the training efficiency and effect of students' interpretation are greatly reduced. If there is a good computer interpretation tool in the classroom to assist teachers in teaching, it could help teachers improve the teaching effect, evaluate students' learning timely and conveniently, and improve students' learning efficiency and interest.

Finally, it is well known that it needs a lot of practice to become a qualified interpreter, so learning independently after class has become the main way to improve the interpreting ability. There are many sorts of problems during interpreting learning, usually including hearing different accent, understanding some knowledge, dealing with some special terms and so on. These problems directly affect the interpretation learning and training effect, and must be taken effective methods to overcome. CAI tools can greatly reduce repetitive and ineffective labor, accurately find and mark problems, and make the whole learning process more efficient and organized.

To sum up, the research on computer-aided interpretation is very meaningful. With the further development of relevant research, software would greatly promote the improvement of interpretation.

V. THE PROSPECT OF COMPUTER-AIDED INTERPRETATION TECHNOLOGY

Based on the rapid development of society and technology, computer interpretation, speech recognition, transliteration, translation memory and other technologies will be greatly improved in the future. The author also makes

some predictions about the development of computer-aided interpretation technologies in the future.

First, it is necessary to establish large shared interpretation materials and corpus. The interpretation textbooks, interpretation research results and interpretation corpus from all kinds of fields could be shared by companies, schools or individuals, no matter public or private accounts. English teachers can use these materials for online interpretation teaching by linking students' accounts, or carry out English research based on various information provided. Students can use these materials to enrich their own database for after-class study. The steps of data management should also be more user-friendly, enable users to carry out detailed classification and sort data.

Secondly, computer-aided interpretation system is supposed to be combined with electronic note-taking software. The principle is simple which combines speech recognition technology, machine interpretation technology and electronic note-taking technology to provide accurate and effective captions for interpreters. It is also a practical tool which can be installed on a handwritten electronic notebook or tablet computer to combine the notes of interpreter with the translation text of the speech recognition. And the screen display of language, style, content and many others all can be set by interpreters themselves. What's more, the system could also have real-time monitor function. When problems occur (such as closing microphone, noise, wrong channel selection, insufficient power), the system can provide hints and even solutions on the screen for the interpreter. [9]

Last but not the least, it is necessary to provide feedback and summary function after interpretation. The computer-aided interpretation system would record the content of each interpretation, and it could evaluate and give suggestions on the quality of interpretation practice, involving expression, pronunciation, coherence, and information fidelity. [10]

VI. CONCLUSION

In a word, the research on computer-aided interpretation is very meaningful. In the process of interpreting practice, CAI tools can help interpreters improve the accuracy and fluency of interpretation, greatly reducing repetitive and ineffective labor. What's more, computer-aided tools can also assist teachers and students in teaching and practice process, as well as related academic research.

However, CAI is still faced with many dilemmas in digital interpretation, culture differences interpretation, canonical speech interpretation and tone interpretation because of differences between two countries. In addition, it also has some limitations in speech recognition, machine interpretation, terminology corpus, in-translation assistance, post-translation feedback, interface design and other technologies.

Although it is unrealistic to completely replace interpreters with machines due to the limitations of computer technology in a short time, it is believed that the use of

computer assistance will help interpreters better complete the task of interpretation.

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