

# Research on Intelligent Translation Strategy Based Human Machine Coupling

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**Abstract:** With the development of artificial intelligence technology, machine translation plays an increasingly important role in language service industry, and traditional language service enterprises are transforming to artificial intelligence. In view of the existing problems of AI + translation, this paper analyzes the representative technology applications, summarizes the development status of AI technology, and discusses the coupling path and development prospect of AI Artificial translation and machine translation.

**Keywords:** Artificial Intelligence; Machine Translation; Human Machine Coupling

## 1. Introduction

At present, the integration of big data, cloud computing and artificial intelligence technology has spawned many new formats and achievements, expanded the level of AI + translation, and improved the quality of artificial intelligence language services. As early as 2016, Google launched the GNMT translation system to start the research of artificial intelligence + translation; Microsoft Beijing and Redmond research laboratory jointly completed the newest 2017 artificial intelligence translation test, and the accuracy rate has been comparable with human translation results. In China, Baidu, NetEase, Xiaomi, iFLYTEK, China Mobile and other Internet giants have also joined in, actively laying out the field of artificial intelligence translation, and AI + translation has become the next wind of scientific and technological development.

## 2. Human Computer Interaction Translation Strategy

In a speech entitled "Application of IT technology in translation project management", Yan Lili mentioned that people have entered an era of competition with robots. In my opinion, at present, human and machine translation are in the stage of both cooperation and competition, in which cooperation is greater than competition, and human-computer interactive translation is a typical example of their cooperation. Human computer interaction translation is the combination of human and computer, which includes human-computer translation, computer-assisted human translation and self-learning of translation system. Human computer assisted translation is mainly reflected in the pre translation editing, such as the reduction of abbreviations in the source language, the replacement and standardization of special words; human computer assisted translation is reflected in the use of translation memory, term bank, online translation and translation dictionary, which greatly improves the efficiency and accuracy of translation; self-learning of translation system is reflected in the translation system from pre translation editing, term bank and memory bank. In order to improve the translation performance of the system, we need to learn how to process the translated materials automatically and manually. Conventional level texts are mostly practical translation materials. Due to the moderate quality requirements and high translation efficiency requirements, the translation memory (TM), term base, machine translation (MT), pre editing, post editing (PE) and human translation of computer-aided translation software can be used. Translation (HT) can improve translation efficiency and reduce unnecessary labor intensity and translation process cost<sup>[1]</sup>.

Computer aided translation (CAT) is the intersection of computer and translation. Translation memory and term bank are the two core technologies of CAT tools. Translation memory is to match the source language and the target language in sentence segments to form a translation memory. After manual translation, the computer stores the translation unit information of the original text and the translated text. When the same text is encountered again, the system will automatically compare and match the translated text with the memory. There are usually fuzzy match and perfect match, which

means that the translated text with high similarity or identical can be inserted into the new target text, and the translator can edit it according to the original text. Standard level texts are mostly domain specific texts, and the terms, sentence patterns and terms in the same domain are similar, with more repetitive content. Using translation memory can reduce unnecessary repetitive work and improve translation efficiency. A large number of terms are stored in the term library, and the terms can be supplemented and updated at any time. This can not only ensure the consistency of the previous and future terms, but also ensure the consistency of the translated terms after different translators share the term library, which greatly improves the accuracy and professionalism of the translation.

When translating conventional text materials, translators should make full use of the memory bank, term bank and machine translation of computer-aided translation, and at the same time, to further improve the quality of translation, they need to do a good job of pre translation editing and post translation editing. Pre translation editing usually involves two parts: format processing and language processing. The purpose of pre translation editing is to make the text concise and controllable, which is conducive to machine analysis and understanding, so as to produce high-quality machine translation, improve the accuracy and readability of translation, and reduce the workload of post translation editing. After the pre translation editing, the memory and term base are used for pre translation, and then the machine translation is used to get the initial target translation. Finally, the post translation is edited manually to ensure the quality. Post editing means that users modify the auxiliary translation provided by the translation system to produce a translation that meets the quality requirements.

Taking software localization translation as an example, human-computer interaction translation has been actively applied. With the rapid upgrading and updating of Microsoft Windows, a lot of translation memory and terms have been accumulated. The translation memory and term database of computer-aided translation tools can be used to save the previously translated sentences and terms. In the new version of translation process, the use of memory and term database can ensure the consistency of sentence and term translation before and after the version. At the same time, from the perspective of market, customer acceptance and product performance, the translation of "new" content is very important, which requires manual participation, strengthening post editing, and ensuring the quality of the new version.

For example, after the launch of the simplified Chinese localization test version of Microsoft Windows 10, some people in the industry think that the translation has obvious traces of machine translation and lacks reasonable post editing. "Roll back to the previous version" in the interface makes people laugh and cry. A reasonable translation should be to roll back to the previous version. Although "roll back" and "roll back" are not the same word, the former is a vulgar expression, while the latter reflects the context of civilization. Translators need to strengthen post editing to make the translation conform to the expression habits of written language in the target culture, so as to be more easily accepted by readers. Therefore, the importance of post editing can not be underestimated. In his dissertation "Research on the improvement of English Chinese translation efficiency by post editing in machine translation", Zhang Lulu (2014:44), a 2012 computer-aided translation graduate student from Peking University, took the translation method of machine translation plus post editing as the research object, and obtained the conclusion that "post editing can save 25.6% ~ 3.5% of the total cost" 4% of the translation time, 34.4% - 43.7% of the translation efficiency. She used experimental data to verify the importance of post editing in improving translation efficiency.

In the process of post editing, the modified process information is fed back to the translation system. The system needs to identify and use this feedback information, constantly improve its own translation knowledge system, improve the performance of translation, and avoid the same mistakes next time (Ye Na et al., 2012). This kind of feedback is not limited to post editing. The translation system should also automatically obtain feedback information from the production and improvement of pre editing, memory database and term database, so as to continuously improve the quality of translation and the performance of machine translation. The ability of translation system to learn from feedback is an important feature of human-computer interactive translation.

### **3. Comparison of Advantages and Disadvantages of AI + Translation Application in China**

#### ***3.1 The background of domestic AI + translation application enterprises is divided into technology and application***

One is the technical school. Represented by iFLYTEK and Sogou travel translation treasure. These

enterprises either have advantages in speech recognition and machine translation, or have foundation in search engine and technology platform, and can quickly intervene and lead the industry. The second is the applied schools. Represented by the application of "Migu Lingxi" AI technology and Netease Youdao translation Wang 2.0 pro, they either have broad market resources, or set foot in online translation on the traditional website, and carry out intelligent upgrading and transformation. It is precisely because of the above different backgrounds that AI + translation applications are in full bloom.

### ***3.2 The application of AI + translation in China is reflected in two aspects: Sales and leasing***

Among them, sales are the mainstream. Similar to Netease Youdao and Sogou Yibao, they are sold to ordinary consumers, and the prices are high and low. Most of the prices are around 1000 yuan, which can be accepted by ordinary consumers. Baidu WiFi is a typical representative of leasing, the price is 29 yuan / day, close to the price of portable WiFi, not cheap.

### ***3.3 The forms of domestic AI + translation application products are embodied in two levels: with screen and without screen***

Netease Youdao and Sogou translation treasure all have screen settings. Users can take photos and translate according to the menu. The latter is represented by iFLYTEK, which supports offline translation, but requires more networking with mobile app. Objectively speaking, the application supporting photo translation is relatively more practical. Therefore, iFLYTEK has also added camera photo function in the new generation of products.

### ***3.4 AI + translation application market in China***

On the one hand, iFLYTEK, represented by the leader, is in the leading position with annual sales of 200000. Netease Youdao and Sogou Yibao follow closely with their high-quality market expectations. On the other hand, the market performance of other AI + translation applications is not satisfactory. This is not only due to the difference of product quality, but also due to the promotion of marketing and other aspects. After all, AI + translation is still facing a small market, and there is still a lot of room for improvement.

### ***3.5 Domestic AI + translation applications have their own merits***

Offline translation is the main competitive field. Take Netease Youdao and Sogou travel translator as examples. Both of them support offline and online translation of Chinese and English, while the translation of other languages needs to be online. Now, Sogou does Chinese English offline translation, and Netease version 2.0 also uses offline technology<sup>[2]</sup>. From the translation results, both of them can meet the basic needs of users. However, in the poor network or offline mode, the translation performance of Sogou travel translation treasure seems to be better, the switching speed is faster, the translation results are basically the same as the online status, and the thesaurus is richer.

## **4. Practical Analysis of AI + Translation Application in China**

### ***4.1 Application of "Migu Lingxi" AI technology***

#### ***4.1.1 Highlight machine translation and speech recognition***

"Migu Lingxi" adopts NMT translation framework, supports real-time translation, dialogue translation, text translation and image translation, solves user portrait and content matching problems through user analysis and intelligent recommendation, and realizes intelligent recommendation. "Migu Lingxi" focuses on the common scenes of overseas tourism and provides practical oral expression. We have developed sound recording, voice reminder and other functions, launched English audio content online, provided interesting English environment, strengthened the direction of "artificial replacement", "seeing and listening" and "machine creation", and realized the big data operation effect of artificial intelligence.

#### ***4.1.2 Strengthen product iterative upgrade***

"Migu Lingxi" understands the importance of version iteration and puts forward the fast iterative

development mode of main products. In December 2012, "Migu Lingxi" launched a cloud based architecture to build a version 1.0 product integrating language control and chat service, named Lingxi voice assistant. From 2013 to 2017, "Migu Lingxi" successively launched 2.0 to 5.0 versions of products. Lingxi brand was gradually upgraded, and Lingxi voice assistant was officially renamed "Migu Lingxi"<sup>[3]</sup>. In particular, in May 2018, "Migu Lingxi" launched the 6.0 version of deep intelligent control product based on aiui engine, giving full play to the functions of understanding and memory. Fast iterative products conform to the characteristics of R & D in the Internet era and the essence of user oriented marketing.

#### ***4.1.3 Implementation of paper data integration derivative operation***

"Migu Lingxi" adopts the Internet, mobile terminal and other diversified ways to ensure that it provides all-round and multi angle technical support and protection for the production, processing, storage, release and use of digital AI translation. Based on this, Migu Lingxi provides AI translation tracking and management system for China Mobile, Changjiang literature and art group and many other ai r & D management institutions. In November 2018, banyuetan and Migu digital media signed the "paper digital media integration" agreement to carry out high-quality content and multi-channel cooperation, bring authoritative information, user interaction and immersive experience to users, drive digital media with paper media, integrate paper media with digital media, and enlarge the derivative effect of paper digital integration.

#### ***4.2 Konjac AI translator***

As the first translation machine for the ecological chain of millet, konjac AI translation machine is produced by the technology of banana (travel) technology, one of the enterprises of the ecological chain of millet, and the main tourism product is "mobile Internet plus tourist attractions + intelligent hardware". On the one hand, the basic configuration of konjac AI translator is relatively simple. Konjac AI translator is small in size, light in weight, integrated with aluminum alloy, beautiful in shape, easy to carry, simple in design, and has three solid buttons. Konjac AI translator defaults to English Chinese translation, can switch 14 languages, built-in Microsoft artificial intelligence translation engine, support translation view, built-in "Xiaoai classmate" artificial intelligence voice, ask the weather, listen to music through voice control, sound quality effect is better. On the other hand, konjac AI translator is an important product of Xiaomi AI, which is closely related to Xiaomi AI strategy. At the world artificial intelligence conference held in September 2018, Lei Jun said that human beings have entered the era of artificial intelligence. Similar to Google's AI first strategy, Xiaomi has put forward the development strategy of artificial intelligence as its core since 2016<sup>[4]</sup>. Xiaomi has positioned its strategic core at the level of "Ai + IOT", so as to realize intelligent communication, communication and processing in the layer of Internet of things. Based on this, Xiaomi company has given full play to its hardware capabilities, big data and product line layout advantages in the AI field, and launched konjac AI translator with the help of AI laboratory, AI platform and "Xiaoai classmate".

#### ***4.3 Netease Youdao translator Wang 2.0 Pro***

Netease Youdao translator Wang 2.0 Pro is an upgraded product of Youdao translator egg, which has been greatly improved in translation technology, performance and level. First, realize the combination of strong technology. As the first company involved in translation research in China, Netease machine translation technology is obvious to all. Youdao dictionary, Youdao translator and other products have more than 800 million users. In particular, Netease's self-developed Youdao neural network translation technology is organically integrated with Qingdao Guanyi technology's intelligent voice translation intelligent device technology, making Youdao translation Wang a leader in the AI translation industry. Second, the technical performance of the product is superior. The new generation of Youdao translator Wang 2.0 Pro supports offline neural network translation and 27 languages translation with high cost performance. The product introduces off-line neural network translation technology, supports off-line translation of 4 languages and on-line translation of 43 languages, covering 200 countries and regions around the world. The new product also supports photo translation in seven languages, adds voice assistant and voice note keeping function, and supports real-time question answering, language wake-up, weather exchange rate and other query services under voice command. Third, youdao cloud technology platform has a solid foundation. The backstage support of the product is the integrated technology output platform of Youdao Zhiyun, which realizes character recognition (OCR), speech recognition (ASR), speech synthesis (TTS), neural network translation (NMT) and terminal side offline technology, and can meet the needs of users to the maximum extent.

At the same time, it is fully open to the industry through the Zhiyun platform.

#### Sogou travel translator

Sogou travel translation treasure is a strategic product of Sogou's artificial intelligence. As a core intelligent hardware product, translatable treasure carries the mission of Sogou AI technology client landing. The application of translation treasure benefits from the diversified development path of Sogou. First, it is a comprehensive layout. As early as 2016, Sogou developed machine simultaneous interpreting, realized Machine Translation landing, and provided simultaneous interpreting for meetings such as the Davos Forum; Sogou translation and search, input method, on-line cross language search engine, input method joined translation function, etc. in June 2017, Sogou online supported text, dialogue, voice and photo translation APP, and quickly entered the forefront of the industry. It can be said that Sogou has achieved a comprehensive flowering of software and hardware layout in the field of translation. Second, the leading technical strength. Sogou translation technology has obvious advantages due to its data advantages and natural language advantages. As a search engine, Sogou has a large amount of data, which can be updated in time. At the same time, Sogou input method has strong ability to understand natural language. In addition, Sogou neural network machine translation technology, coupled with the intelligent integration of software and hardware, gives birth to the intelligent experience of artificial intelligence and machine translation. In 2017, Sogou machine translation technology won the champion of Chinese English and English Chinese translation in WMT competition. The third is the vision of "Chinese goes all over the world". Machine translation is of great significance. "The community of human destiny is human communication. With the help of machine translation, we can communicate with the world in Chinese. In order to connect the world with translation, Sogou set up the IOT department and launched two AI translation hardware, translation treasure and Sogou recording translation pen.

## 5. Prospect of AI + Translation Practice in China

### 5.1 Expanding and renovating machine learning application scenarios

According to incomplete statistics, in 2018, global AI technology spending reached US \$24 billion, while China's market share reached US \$2.2 billion, accounting for 9.2% of global technology spending. The key to boosting the above data is machine deep learning, the basic core technology of artificial intelligence. Therefore, the future development of domestic AI + translation applications should also expand from content ecology to application scenarios, and constantly create vertical categories and various ecological closed loops. For example, in the field of tourism, China's outbound tourism market is booming, and AI translation ability is the best application scenario in this field<sup>[5]</sup>. Moreover, outbound tourism not only continues to grow in the overall scale, but also develops the trend of free travel, niche routes, customized tourism and so on. To meet the needs of these scenarios, domestic AI + translation applications need to increase research and development efforts, enhance the awareness of machine deep learning, and develop targeted products for them. In addition, exhibitions and media are also important landing scenes. This also requires domestic AI + translation applications to carry out AI enabling development for more industries through deep cultivation of AI technology, exploration of AI actual combat mode, and real solution to the problems faced by exhibition and media.

### 5.2 The reform path of user oriented subdivision

In the era of artificial intelligence, only by following the changes of user needs and making product iterations, can we not be eliminated by the times. For domestic AI + translation applications, player level and audience are the premise of their existence and development. To this end, the development of artificial intelligence language services, with the help of big data, cloud computing and other digital technologies, increase the collection and analysis of user groups' consumption habits and use experience, and determine the main user categories of artificial intelligence language services integration through user portrait sketch. For example, market research shows that the elderly and business people with money and leisure are important users of translation machines<sup>[6]</sup>. The use experience of product simplification is the core demand of the former, while the internal demand of the latter is high recognition efficiency and semantic understanding accuracy. According to the above needs, we should strengthen the concept of product service, so that users can get the greatest degree of spiritual comfort, and more convenient technology can be used and recognized by the broadest age groups.

## 6. Conclusion

The integration of big data, cloud computing and artificial intelligence technology has spawned many new formats and achievements. Under the artificial intelligence technology, AI translator has become another intelligent derivative, and domestic technology giants have launched corresponding products. Among them, "Migu Lingxi" AI technology application, iFLYTEK Xiaoyi translator, konjac AI translator, Sogou travel translator, Netease Youdao translator Wang 2.0 Pro are important representatives. Domestic AI + translation applications have their own advantages in terms of enterprise background, ways of use, product form, market performance, translation function and development prospect. In the future, domestic AI + translation applications will develop in the direction of scene expansion and crowd segmentation. Only when the translation is more accurate, faster, more convenient, and the price is more advantageous, is the key to enhance user stickiness.

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