The Effect of Intelligent Machine Translation on the Necessity of Individual Foreign Language Study

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Abstract

With the world connecting unprecedentedly intimately, citizens of different ages are becoming increasingly passionate about foreign language study. At the meantime, AI (artificial intelligence) and machine translation technique have undergone rapid developments in recent years, which demonstrate the potential on replacing individuals learning of foreign languages. This study aims at investigating the relationship between AI translation and individual foreign language study and the development of AI translation. To be specified, this research deploys the method of questionnaire to collect residents' current situation of studying foreign languages and their attitudes towards AI translation, and analyze the characteristics and correlations between multiple variables. Key results indicate that human translators are more capable than AI translation and AI translation will not be able to prevent dwellers from studying foreign languages in the future.

Introduction

As the world becomes globalization, foreign language study has become unprecedentedly popular in each nation. Government of most countries have made foreign language a compulsory class in schools. In fact, passion about foreign language allows people of all ages to be involved in the campaign of foreign language study. This is mainly because foreign language study does bring residents numerous benefits in the long run, including improving the competitiveness in the job market, convenience for studying abroad and watching foreign movies without too many language barriers. At the meantime, Artificial Intelligence (AI) translation develops dramatically in the past decades, according to Yao (2020). Although the term of robot appeared in 1920 (Tsinghua university, 2014), latest robot is able to finish countless tasks perfectly, even sometimes it shows better performance than human does. AI translation, which merged in 1954, developed so dramatically that it has become an indispensable part of our daily lives and studies. Some people always argue that in the future, AI translation will have to capability to replace human translator, and at that time, there will be no longer essential for humans to study foreign languages anymore. On the other hand, others are convinced that this theory cannot hold water, since there are some advantages of foreign

language study that AI fails to replace and position of human translators will still exist although the AI translation develops. This study aims to explore the potential relationship between individual foreign language study and the development of AI translation.

This research deploys the method of questionnaire and analysis to explore the relationship between AI translation and individual foreign language study. A questionnaire is designed in order to collect some fundamental information of current situation of foreign language study, their appliance and attitudes about AI translation, as well as predicted trend of AI translation in the future. According to the results, a conclusion can be drawn that it is still necessary for citizens to learn foreign language in the future and AI translation will not be able to replace humans in the following decades. At the meantime, the significance of foreign language study will not be diminished as the AI translation develops.

Literature review
AI Translation and Influences
AI translation has been a hot topic recently. Google Translate, which is currently one of the most popular machine translation (MT) systems freely available online, is used to translate thirty trillion sentences annually across over 100 languages (Wu et al., 2016). Quantities of researchers have conducted abundant exploring in the field and achieve high achievements. Two of Chinese prominent specialists, Wang and Liu (2021), conducted ontology research of translation technology, covering language block-chain technology, human-computer interaction translation model, computer-aided translation, terminology and corpus construction, subtitle translation evaluation, technical writing object, etc. This team eventually discovered that technology related problems in multi-modal translation activities can be solved by AI translation. State-of-the-art AI translation methods typically use neural-network-based models, which take parallel corpus between source language and target language as input to learn a correlation and text-level mapping between pair of languages (Bahdanau et al.,

2014). As a result, AI translation models achieve powerful translation results on some evaluation benchmarks and even outperform human performance in some specific areas.

AI translation reveals some benefits and drawbacks in people's everyday lives, including individual's life, business event, and society. For individuals, people can have the opportunity to enjoy higher translation efficiency of AI, according to Wang (2019). To be specific, when people apply AI to help with translation, they will reap the translated texts in few seconds, which allows them to save a large amount of time, according to Yao (2020). This is particularly helpful under emergency conditions. Participants in the study expressed that there may be contexts where AI can be useful, including in emergency situations that require a fast response (Turner et al., 2015). Moreover, AI translation helps people to communicate in an easier way. For instance, when people travel in another country and are confronted with language barriers, AI translation online allows them to comprehend local languages rapidly. On the other hand, however, it does harm to abilities of individual language and thinking. People directly reap the harvest of AI translation without a deep consideration, which causes them less likely to form their own opinions. Drugan and Babych (2010) found that machine translation is difficult to properly handle the mutual translation of two languages that are far away from the language, and has limited impact on the language service industry. Cui (2014) pointed out that the original machine translation products still have many errors and omissions, so the post-editing link of machine translation is still indispensable. In the UK, medical defence organisations (i.e., bodies that specialise in medicine or dentistry-related legal complaints) have warned against the use of Machine technology systems, not least because MT fails to meet standards imposed by the National Health Service (Moberly, 2018). Interpreting and Translating guidance from NHS England simply mentions MT 'should be avoided' due to quality concerns (NHS England, 2018). Furthermore, results of quality assessments of MT for healthcare tend to be limited, as it is more favourable for language

pairs involving English and other Western European languages (Dew et al., 2018). Another recent study examines the use of Google Translate for translating emergency department discharge instructions from English into Chinese and Spanish (Khoong et al., 2019). The results showed that 2% of Spanish translations and 8% of translations into Chinese were inaccurate and could potentially cause significant harm. The level of accuracy of the back translations was unsurprisingly lower (Shigenobu, 2007). Low awareness of the risks posed by machine translation (MT) can have striking legal consequences. In two recently reported cases, transport police officers in the US used Google Translate to ask Spanish-speaking motorists for consent to search their vehicles (Grosdidier, 2019). In both cases, the police found illegal substances in the vehicle and charged the motorists with a crime. However, in efforts to nullify the search consent, the use of Google Translate was later challenged in court as not enough to overcome the language barrier. As mentioned in the Introduction, in one case the motion was dismissed. In the other, however, the evidence was suppressed (Grosdidier, 2019).

Situation of Current Individual Foreign Language Study and Future Trend Previewing
Since the last decades, individuals throughout the world began to learn foreign language for different purposes. Globalization particularly promotes people's enthusiasm about language learning. However, at the meantime, learners are confronted with numerous obstacles during their study journey.

Reasons for Being Bilingual or Multilingual
Benefits for individuals and the society motivate people to start their journey of foreign language. For people themselves, John McWhorter in TED program (2016) indicated that several reasons. To begin with, a language channel of people's thoughts, that the vocabulary and the grammar of different languages gives everybody a different kind of acid trip, so to speak. For instance, in French and Spanish the word for table is marked as feminine, called "la table", "la mesa", respectively. According to John (2016), another reason to learn foreign language is that languages are tickets to being able to participate in the

culture of the people who speak them, just by virtue of the fact that it is their code. If people are able to speak two languages, dementia is less likely to set in, according to Thomas Bak (2016), a doctor at the university of Edinburgh. The achievement of studying foreign languages also allows students and individuals to be involved, according to Xiao (1999).

Problems Faced in Language Study
Although people in today's society are particularly in favour of foreign language study, they are confronted with several intractable problems alongside the study journey.

Language learners are easy to forget what they have learned about this language, including the vocabulary, expressions and grammar, according to Ebbinghaus Forgetting Curve (1885). According to Han (2007), today's young people are lack of internal motivations in terms of foreign language study. The factor for most of them to study foreign language is that they are obliged by their parents and school teachers in order to acquire better scores. Han also indicated that many students are likely to lose confidence when they do not perform very well in the examination frequently. Last but not least, lack of scientific learning strategy results in poor performance. They will reap lower study efficiency at the process of study. (Han, 2007)

Relationship between AI Translation and Education
The magazine of Economist (2019) concluded that "recent developments in machine learning will put a substantial share of employment, across a wide range of occupations, at risk in the near future." Subsequent studies put the equivalent figure at 35% of the workforce for Britain (where more people work in creative fields less susceptible to automation) and 49% for Japan. However, AI translation will not be able to replace human translators. Google Translate is not accurate enough for widespread use, it mentioned the technology as potentially useful in situations where human interpreters are not available (Beh & Canty, 2015). The development of AI translation will lay more emphasis on foreign language study because the capacity people gained during the process of learning foreign language. The development of

AI translation will actually be able to assist human translators. (Wang & Xu, 2022). Under the background of dramatic development of AI translation, undergraduate students who study foreign language should lay an excellent professional foundation, increase practical experience, and study multi-fields, according to Lu (2021).

Method
Questionnaire Design
This study employs an online survey to investigate people's attitude on AI translation and foreign language learning in current society. In order to gain a deep understanding about people's opinions about the future of AI translation, three-sub focuses are included in this questionnaire, i.e., current situation of individual foreign languages study, people's thoughts about the appliance of AI translation and people's attitudes toward the replacement of AI translation on human foreign language study.

Current Situation of Individual Foreign Languages Study
In order to acquire the fundamental information about the participants, the initial nine questions are designed in the questionnaire. Preliminary information about themselves, such as the collection of their identities, their motivations of individual foreign language learning, their attitudes towards language learning as well as the corresponding average grades in the exams will be collected. As a result, a clear idea about how many foreign languages they study, the target of foreign language study and obstacles they are confronted in the process of foreign language study, either in the past, or at present will be possessed and exploited for the further analysis. To emphasis the target of the questionnaire is students, questions are involved words "you", "your child", and "your students".

People's Current Usage of AI Translation
The question 10 to 12 mainly focuses on individual's present appliance as well as attitudes towards AI translation. The first question is targeted to learn about the reliance of the public on AI translation, including whether AI translation has played an indispensable role in their daily lives. Question number 11 collects

people's purposes of using AI translation, which is particularly useful and significant in the analysis. This is mainly because that purposes can be divided into two groups when being analysed, whether they are able to be replaced by the AI translation or not. In this way, gaining a deeper understanding about the potential relationship between individual foreign language study and AI translation will be easier. The last question in this part aims to collect people's complaints about AI translation, i.e., the low accuracy of AI translation, extremely informal expressions, and the difficulty conveying the implications perfectly. Perceptions about the drawbacks of AI translation can be depicted vividly by investigating the obstacles for them when applying AI translation.

People's Attitudes towards AI Translation
The questions from 13 to 20 target at investigating individual's opinions about AI translation, whether they possess an optimistic, neutral, or negative attitude. The design of marking questions can directly acquire people' explicit idea about AI and human translation respectively. This is mainly because of the comparison between two translated contexts by human translator and Google translation correspondingly in terms of the same original sentences, allowing the participants to possess more explicit ideas that which one, human or AI translator, is good at translating. In fact, this part lays a solid foundation for the appearance of the following questions in the next part of the questionnaire in order to prevent the participants from feeling sudden as they continue to finish the questionnaire.

Trend Forecasting of AI translation in the Future
Questions 21 to 26 are expected to learn about people's perceptions regarding the development of AI translation in the coming decades, including the future tendency. From two major aspects in terms of collecting information, in what aspect they prefer AI translation and the undeniable drawbacks of AI translation in order to reap their perceptions about the necessity of foreign language learning given that the dramatic development of AI translation and the percentage

possibility that AI translation is capable to replace human translators.

[A total number of 26 questions are questioned in the questionnaire. Please refer to Appendix Section for the full version of it.]

Questionnaire Collection and Statistics
Questionnaire Collection
An online questionnaire system called Wenjuanxing is applied for questionnaire collection. The questionnaire is separated among five Wechat groups, which includes parents' groups, high school students' groups, and the teacher groups. Moreover, the questionnaire is also touched in Wechat moments through QR code in order to allow more people involved in this project. It totally takes two weeks to invite a number of 108 participants involved in this project.

Questionnaire Statistics
A total number of 108 questionnaires are collected after spending a great deal of efforts. All the participants complete the questionnaires by WeChat application on mobile phones. Most of the participants spend from 150 seconds to 300 seconds totally to complete the questionnaire, which is a proper time cost for filling this questionnaire with staidness, thus ensuring the high quality of collected questionnaires. Nearly all of them (98%) come from Liaoning province, China.

Data Collection and Analysis
Basic Statistics of Questionnaires
Statistics of participants. In this project, 28.7% of the participants are students, 62.96% are parents and 8.33% of the total number of questionnaires is received from teachers. The parents and teachers involved in this study are asked to offer information and students correspondingly. Most of the students investigated are teenagers and the proportion of secondary school and university students is higher, which account for 64.82 percent among all the students.

Statistics of individuals' current situation of foreign languages study. It can be inferred that the bilingual campaign launched by the government and the ministry of education are progressed smoothly. According to the bar chart in Figure 1, nearly all of students (93.52%) currently study one or two foreign languages in their schools, including English, with only 2.78% of students not studying foreign languages in their schools.
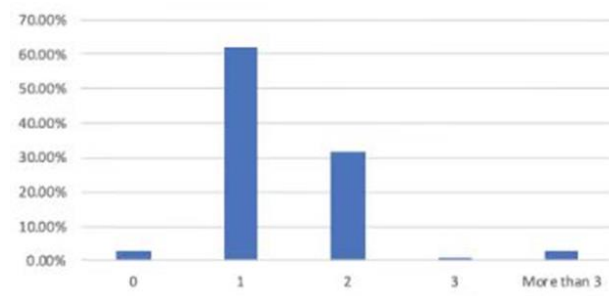

Figure 1. Distribution of number of foreign language studied by the students

Moreover, what can be inferred from the results is that most of the students started to learn a second or more languages in their elementary schools. This is mainly because the number of students who have been studying foreign languages for 10 years or longer is particularly noticeable among all the students, indicating that secondary school students and the college students, who constitute a large proportion in the total number correspondingly, belong to the group.

Purposes of studying foreign languages. The study also investigates different purposes of students in terms of individual foreign language study, and several options were given to the participants, i.e., passing the exams in schools, daily communication, personal interests, as well as plans for studying abroad. According to the data collected, nearly half of the students (42.59%) do not possess the real interest towards the foreign language study, and only purpose for them to learn foreign languages is nothing but for obtaining higher grades in the daily exams in their schools. The proportions of students who pursue further education abroad and study for daily communication are high as well, which reach 37.04% and 35.19% respectively. Most of the individuals holds positive attitudes towards foreign language learning. According to collected results of Q6, all the participants give

an average score of 7.6 with a full score of 10, which proves this view. People also mention benefits of foreign languages. The top three are enhancing the confidence of individuals (47.22%), allowing them to study abroad (49.52%) and improving the competitiveness in the job market (55.56%). Some still pointed out the convenience of travelling abroad, which can be replaced by AI translation easily. After all, it is easier for the masses to check online translation applications when travelling in another country. In conclusion, some purposes of foreign language study, i.e., the convenience of travelling abroad, can be replaced by AI translation while some others cannot.

Opinions About the Drawbacks of AI translation
The public's opinions about the drawbacks of AI translation were also investigated in this study. (Q12 is related to this topic). Their negative feedback is relevant to the difficulties expressing implications (53.7% of the participants are in favour of), accuracy of translation (30.56% of the individuals support), the poor link between graphs of translated works (25.93% agree with), and informal expressions conveyed by AI translation (10.19%). Most participants are convinced that AI translation always fail to comprehend and convey the implications of the words and expressions, as well as the feelings of the authors perfectly, like the human translator manages to do. A lack of adequate corpus caused over 30 percent of the participants to complain about the extremely low accuracy of the contexts, including the translation of polysemy properly. Some participants also indicated that the informal translated work by AI translation has already brought several problems in their daily formal occasions, for instance, at the meetings at their workplaces.

Quality Comparison between AI Translation and Human Translation
This part contains the analysis of the eight marking questions in the questionnaire, which can be categorized into four groups. Each adjacent two questions belong to the same context, but they are different versions of translation by Google and human translators respectively. Significant analysis on comparing translation quality between AI translation and

human translation are conducted in this study, and results is shown in the table below. It can be seen from the table that the p-values of all the four pairs are lower than 0.05, indicating the significant quality differences between AI translation and human translation. According to the statistical results, there is a significant difference between the outputs of AI and human translation. For the four groups, the p values are 1.85×10^{-4}, 5.7×10^{-5}, 1×10^{-4}, and 2.5×10^{-5} respectively. At the meantime, it can be inferred that the public hold more positive attitudes towards human translators than AI translation, because from the results, the mean value of the grades of AI translation (7.79) is lower than the figure for human translators (6.54). The average of four variances and the standard deviation of AI translation are larger than the numbers of human translation obviously, indicating the dispersion of the data in AI translation is wider. This table offers more details in terms of the grades of AI and human translator respectively. In conclusion, the majority of the public gave higher evaluation to human translation.

The grades gained by AI translation and human translators respectively	Pair1	Pair2	Pair3	Pair4
Mean value for AI and human translator respectively	6.45 7.72	6.56 7.80	6.60 7.79	6.58 7.88
Std. Value for AI and human translator respectively	7.26 4.74	6.88 3.86	6.88 3.72	6.88 3.79

P value	1.85×10^-4	5.7×10^-5	1×10^-4	2.5×10^-5

Figure 1. Significant analysis results for comparing AI translator and human translator.

The Relationship between the Attitudes and Their Corresponding Grades

The correlation analysis is between the attitudes of the students and their grades of foreign languages at their schools. Students who possess optimistic attitudes towards foreign language study are likely to achieve better grades in examinations. According to the data collected from the questionnaires, the students' attitudes towards foreign language can be categorized into three different groups. 19.46%, 21.29%, and 59.27% of the students held negative, neutral and optimistic attitudes in terms of exotic languages. And correspondingly, nearly 35% of the students obtained lower grades. 36% and 29% of the students involved managed to achieve average and excellent results. Therefore, a conclusion can be drawn that the more positive attitude that a student has, the better grade he or she is likely to acquire.

Discussion on the Predicted Developing Trend of AI Translation

According to the results, nearly half of them rarely spend time on AI translation (43.52%). For those who have habits of using machine translation, the proportion of people who use it every day accounts for the largest figure, with a share of 22.22%. Although AI translation develops dramatically in the past decades, the participants believe the statement that AI translation will replace human translators or prevent people from studying foreign languages cannot hold water. The bar chart in Figure 2 represents the possibility that people believe that advanced AI translation will replace human translator in the future and the chart in Figure 3 indicates the necessity of foreign language study in the future should not be neglected, as the majority of the participants offered scores larger than 5 (out of 10) in terms of the necessity of foreign language study of the individuals. From the previous statistics we can observe that limited number of individuals currently rely on AI translation and most people are not convinced

that AI translation will have a brighter future than human translators.
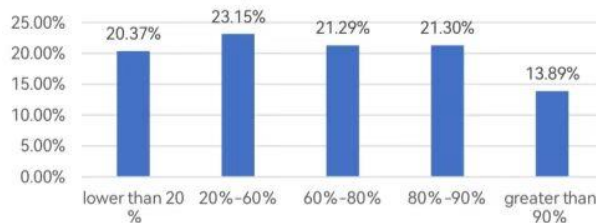

Figure 2. Distribution of participants in terms of the probability that AI translation will replace human translators
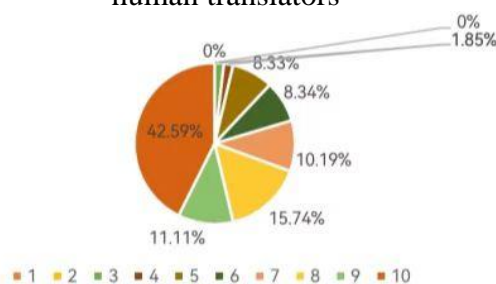

Figure 3. Attitudes of people towards the necessity of future foreign language study

According to the data collected, nearly all the students are studying at least one foreign language at their schools, indicating more individuals are going to be bilingual and multi-lingual in the long run. At the meantime, the more optimistic attitude that students are currently holding towards foreign language, the higher grades they are likely to obtain. In others words, personal interest gives students motivations to overcome difficulties merged in the process of foreign language study. Although AI translation developed dramatically in the past few decades, the purposes for individuals to study foreign languages cannot be replaced. Given that AI translation still has some undeniable drawbacks, in the future, the working positions of human translators will still exist and necessity of studying foreign languages will not be easily neglected by residents, although the AI translation brings them so many conveniences.

Conclusion

The relationship between AI translation and human translators has become a disputable topic and the dramatic development of AI translation's influence on the necessity of learning foreign

language has attracted public attentions in the recent decades as well.

This study aims to investigate these complicated relationships. In practice, a questionnaire is deployed to collect fundamental information of individuals, including their situation with regards to foreign language study, their attitudes towards AI translation and future of foreign language study. The majority of the participants are students, and most of them are studying foreign language at schools. Therefore, it will be relatively for them to complete the questionnaires, since most of the questions are relevant to the study of foreign languages. At the meantime, several parents and teachers who are familiar with the students' study situations are also involved.

Appliance and attitudes towards AI translation from people of different age group are collected, thus allowing final results to be more convincing. From the data collected, most students are studying at least one foreign language study in their schools, and they hold distinct purposes and attitudes towards foreign language study. One aspect noticeable is that students with optimistic attitudes towards foreign language study are more likely to achieve higher grades in the daily exams. They also believe AI translation has more drawbacks compared with human translators, so it is unlikely for AI translation to replace human translators, and the necessity of foreign language study should not be neglected in the future as well. Their attitudes indicate that AI translation fails to replace human translators and the growth of AI translation is not able to diminish the significance of foreign language in the future.

In a nutshell, the campaign of the government in terms of foreign language has progressed smoothly, as nearly all the students, except those in kindergarten, are acquiring knowledge of exotic languages. Studying foreign language allows dwellers of different age groups to reap numerous benefits. Although people are determined to pursue different goals in terms of foreign language, some purposes can be replaced by AI translation. The inconvenience of AI translation causes the public to hold an opinion that it will not replace human translators, and residents are still expected to learn foreign language as more advantages cannot be replaced by machines. Personally, the necessity of future foreign language study is supported and the significance of human translators are emphasized in this paper.

The project is relevant to fields of AI and linguistics, and the attention is also paid on exploring relationships between these two aspects. Results of my study reveal drawbacks of AI translation so it is far from being able to replace human translators. Therefore, the results obtained in my thesis will support future further studies with purposes of explaining the unique advantages of human translators and dismissing that AI is always perfect.

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