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Research Article

Chinese Translation Errors in English Machine Translation Based on Wireless Sensor Network Communication Algorithm

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Globalization is a trend in the future, and the exchanges among countries in the world in economy, politics, and culture are becoming more and more frequent. In order to overcome the increasingly prominent language barriers, translation has become an indispensable "bridge" for communication between countries. Manual translation has long been unable to meet the growing needs of translation. So, machine translation came into being, especially in recent years, machine translation has developed rapidly. Compared with manual translation, machine translation has unique advantages, that is, fast translation speed and free access. With the gradual improvement of the quality of machine translation, the quality of translation has basically met the requirements of rough reading, which makes machine translation one of the hotspots in recent years. However, to achieve the level of intensive reading, the quality of machine translation needs to be further improved. A thorough study of translation error analysis is an important step to improve the quality of machine translation. At present, there are few studies on error analysis of business English in academic circles, and most of them are just simple classification of translation errors, lacking in in-depth empirical research. This study aims to study the advantages and disadvantages of machine translation in translation practice based on wireless sensor network communication algorithms, analyze the typical errors in machine translation, put forward the idea that posttranslation editing can make up for the shortcomings of machine translation, treat English machine translation more objectively, make full use of machine translation tools, combine machine translation with post-manual editing perfectly, improve translation speed, and guarantee translation quality at the same time.

1. Introduction

With the acceleration of globalization, the rapid development of the Internet and the increasing frequency of international exchanges, the cross-linguistic network information resources have been growing, which has changed the original ways of information dissemination and communication and also stimulated people to study machine translation and develop translation products. Machine translation refers to the translation from one natural language text to another through a computer [1]. Although this technology has been developed for many years, the reality is not as beautiful as it is imagined. The quality of machine translation has not made substantial progress so far, and many unresolved problems 50 years ago still exist today [2]. The translation quality of the practical machine translation system that has been introduced is not very satisfactory. For some long sentences or sentences with a slightly complex structure, the translation quality is unsatisfactory and sometimes simply unreadable [3]. Moreover, the formal description of the "complex features" of natural language is not a matter of quick success, and people need time to understand this complexity. Therefore, in order to solve the "complex features" of natural language with computer language, we must clearly analyze the current errors of computer language, find out the basic rules of errors, and then crack them one by one, so as to achieve the final progress. English and Chinese differ greatly from each other in terms of external form and internal structure. The similarity of semantics makes it possible to translate languages

into each other. Machine translation is different from human translation [4]. Translators can subtract and add to the translation, or they can sculpt and polish it as appropriate according to the situation, with considerable freedom and maneuverability. However, the machine has no thinking, reasoning, and judgment, cannot analyze the contextual factors of the original text, and can only make one-to-one choices within a limited range [5]. Therefore, there will inevitably be a lot of ridiculous translations.

With the continuous updating of the research methods and technical products of machine translation, the intelligibility and acceptability of machine translation are gradually improved. Since the beginning of the new century, the application of machine translation has been expanded rapidly. It involves many departments, such as linguistics, computer science, and mathematics. It is a typical interdisciplinary subject with multilateral edges [6]. In today's increasingly detailed division of labor, the challenges and difficulties faced by the Institute of Machine Translation are extraordinary. To overcome the language barrier thoroughly, linguists, mathematicians, computer experts, psychologists, and artificial intelligence experts should cooperate. There are some similarities between machine translation and artificial translation, that is, through dictionaries, source language analysis, and target language synthesis. Machine translation systems generally include four subsystems: dictionary, grammar analysis, semantic analysis, transformation, and synthesis [7]. Each system has its own functions. Machine dictionary is a bilingual or multilingual dictionary stored in a computer system, which provides the basis for translation. The grammatical analysis subsystem refers to the computer's grammatical analysis of the source sentence to find out the grammatical structure of the source sentence, that is, the grammatical relationship between the words in the clear sentence. Semantic analysis subsystem distinguishes different meanings of words and semantic relations between contexts on the premise that grammatical analysis subsystem guarantees grammatical structure, so as to ensure the certainty and accuracy of translation [8]. Conversion and synthesis subsystem synthesizes the final stage of translation by computer based on the obtained lexical, grammatical, and semantic information. Considering the differences in vocabulary and grammar between the source language and the target language, find out the corresponding rules, carry out the necessary lexical and grammatical structure transformation, and synthesize the translation conforming to the target language norms [9]. The transformation and synthesis subsystems are the main completers of the translation process, while the other subsystems provide necessary information for machine translation [10].

The development of the Internet, the improvement of computer hardware, and the advancement of language processing technology give machine translation a higher development platform. Language is the main carrier of information. Communication and information exchange among different language users is the mainstream of the development of the world. Breaking through language barriers and making communication unimpeded has become a common concern of language researchers and all mankind [11]. At present, various kinds of machine translation software are emerging in the market, but due to the complexity of translation itself, the complexity and ambiguity of natural language, and the limitations of machine itself, it is still difficult to achieve high-quality machine translation. The development of machine translation has gone through twists and turns, but the research results have been successful in some special fields [12]. Machine translation has been applied in limited professional fields, such as science and technology, instructions, legal contracts, and other nonliterary fields, and has achieved good results [13]. Therefore, the study of machine translation is very necessary. This study aims to solve errors in machine translation based on wireless sensor network communication algorithms and the differences between machine translation and manual translation. Through in-depth analysis of machine translation errors in terms of lexical discrimination and syntactic analysis, this study summarizes the specific characteristics of machine translation errors and analyses the advantages and disadvantages of English-Chinese machine translation. This study reveals the shortcomings of machine translation from English to Chinese and summarizes them scientifically so as to guide translation practice and assist machine translation to a certain extent.

2. Machine Translation Chinese Translation Errors Based on Wireless Sensor Network Communication Algorithms

In recent years, some free machine translation tools have emerged on the Internet. These machine translation tools are as small as words and sentences and even the whole web page can be translated. They bring great convenience to readers and, therefore, are favored by users [14]. The concept of machine translation tools is general and covers a wide range. This study introduces some powerful machine translation websites, including online electronic dictionaries and translation software, which are different from the electronic dictionaries and translation software that need to be downloaded and installed. Because they can be used without the network, downloading and installation are inconvenient, not real time, and many of them cannot be downloaded free of charge. The study distinguishes these translation methods similar to machine translation. Excluding them, we only study and analyze the translation provided by machine translation websites in machine translation tools; furthermore, paid machine translation websites are not universal, and they have fewer users; moreover, the operation process is troublesome, such as registration, landing, and acquisition of points' exchange. It wastes time in translation, and regardless of the quality of translation, the effect of fast translation is far away. According to our reputation and user reputation, we have selected five websites that offer free machine translation services: Google Translation, Baidu Translation, Yahoo Translation, Iciba Translation, and Youdao Translation. This study tests five machine translation websites from two aspects and finds out the advantages

and disadvantages. Operation is the hardware support of machine translation and the first step of machine translation. It determines the speed and effect of software operation. Open the interfaces of various machine translation software; there are certain differences in similarities. The following comparisons will be made between the interface presentation and the basic operation after software is opened.

2.1. Operational Comparison. From Table 1, we can see that the interface design of Google Translation, Baidu Dictionary, and YouDao Translation is very simple; ICIBA translation interface advertises more; Yahoo translation interface design has the best visualization effect; for user operation, these machine translation software are more humane and user friendly. Baidu Translation provides the option of detecting language so that users can judge automatically by the system without needing to make language choices for translation. Users only need to select the target language. Compatibility is good except Yahoo's translation performance is poor. Generally speaking, Google, Baidu, and Taodao have simple interface, easy operation, and good compatibility of web pages, which are slightly better than the other two translation software.

2.2. Conditional Limitation. After carefully observing the features and layout of the website to be used, the operator can place the text to be translated in the translation column and select the language type to obtain the translation [15]. However, sometimes there are hints that too many numbers cannot be translated, and some large-capacity software can interpret the material you give in one breath. Five major machine translations have more or less limited the content of translation: language limitation of translation, word limitation of translation, and so on [16].

From Table 2, we can see that Google Translation, Baidu Dictionary, and Youdao Translation do not limit the length of the translated content, but the other four machine translation services limit the length of the translated content to varying degrees. Yahoo Translation and Iciba Translation can only translate no more than 200 Chinese characters (400 characters) at a time, which is the worst performance. The reason why this phenomenon occurs is determined by the software's own characteristics and is also related to the emphasis and advantages of software translation. Some websites focus on vocabulary translation, such as ICIBA translation. Some websites focus on phrase and sentence translation, such as Yahoo translation. Text is an organic combination of vocabulary, phrases, and sentences, forming in a step-by-step manner. Text should also consider language situations, involving pragmatics, connectedness, and completeness. It is difficult to translate, and the effect of translation is certainly less accurate than that of a word or a sentence. This is also the bottleneck that restricts most websites and urgently needs to be improved.

2.3. Wireless Sensor Network. The wireless sensor network combines sensor technology, embedded system, wireless communication technology, and distributed information processing technology. It can collect monitoring information in the network coverage area in real time, and the information is processed in a coordinated manner and finally sent to the observer. Wireless sensor networks were first used in the military field. With the advancement of MEMS and microchip manufacturing technologies, the cost of sensor nodes has been greatly reduced, and the power consumption and volume have become smaller and smaller. A new wireless sensor network has emerged as the times require new applications of technology which has spread throughout daily life and social construction. Figure 1 is a diagram of the wireless sensor network architecture.

2.3.1. Wireless Sensor Network Communication Algorithm. The wireless sensor network is mainly composed of a large number of sensor nodes, targets to be monitored, and executive managers. The sensor node is a miniature embedded system, which plays the role of information collector, data transfer station, and class head node, and is the basic unit of network function realization.

Suppose A is an element in the node set, where s indicates that A can take every element in the element set, and the probability that the wth member is the information sender is y_w; then, the entropy function can be defined as

$$R(A) = -\sum_{n=1}^{i} y_w \log_2 (y_w), \tag{1}$$

where $R(A)$ is the entropy of the communication system and i is the number of users in the system.

$$w = 1 - \frac{R_m - R(A)}{R_m} = \frac{R(A)}{R_m}, \tag{2}$$

where R_m is the maximum entropy value that the network can reach when all nodes in the network have the same probability of the sender:

$$\begin{aligned} R_m &= \log_2 (i), \\ R(A) &= -\sum_{n=1}^{i-s} \frac{1}{i-s} \times \log_2 \left(\frac{1}{i-2}\right). \end{aligned} \tag{3}$$

At this time, the entropy value of the network, w, will decrease with the increase of S. When the number of controlled nodes increases, the communication capacity of the network will be lower:

$$\begin{aligned} w &= \frac{R(A)}{R_m} = \frac{\log_2 (i-s)}{\log_2 i}, \\ y_w &= \frac{(1-y)}{i-s-1}. \end{aligned} \tag{4}$$

At this time, the maximum entropy of the network is

$$R(A) = (1-y) \times \log_2 \frac{i-s-1}{1-y} - y * \log_2 y. \tag{5}$$

After deduction, the maximum entropy of the network is

Table 1: Comparisons of machine translation operations.

Test types	Google translation	Baidu translate	Yahoo translation	Iciba translation	YouDao translation
Operation	Convenient	Convenient	Convenient	Convenient	Simple
Interface	Concise	Concise	Concise visualization	More advertising	Concise
Compatibility	Good	Good	Bad	Good	Good

Table 2: Five restrictions on machine translation conditions.

Test types	Google	Baidu	Yahoo	Iciba	YouDao
Content length	Unlimited	Unlimited	200 words	150 words	Unlimited
Number of languages	34	32	15	22	2
Translation between English and Chinese	Yes	Yes	Yes	Yes	Yes

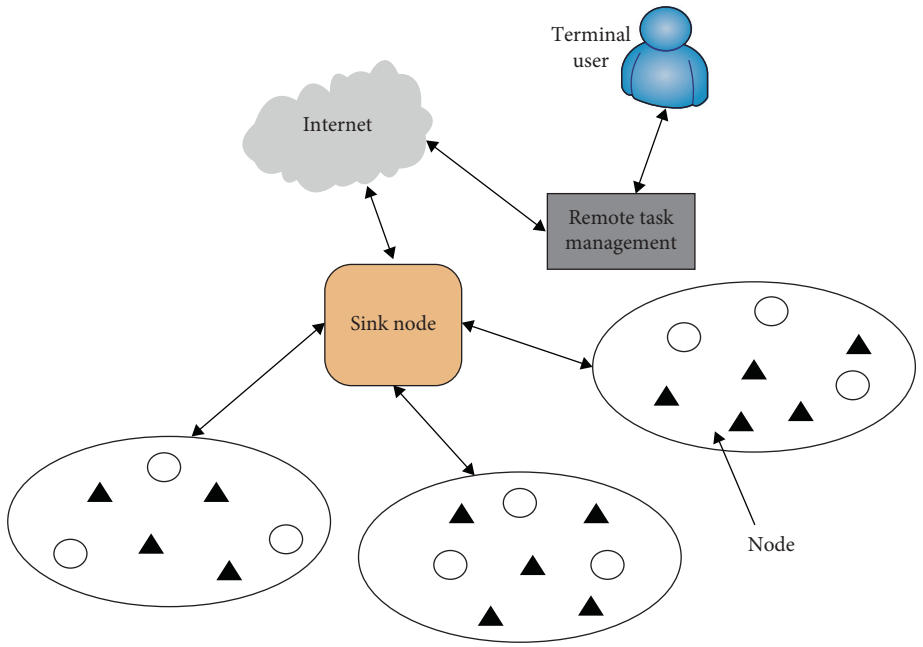

Figure 1: Wireless sensor network communication structure.

$$w = \frac{R(A) = (1-y) \times \log_2 (i - s - 1/1 - y) - y * \log_2 y}{\log_2 i}. \tag{6}$$

At this time, suppose that the control of the communication on the node is s, the nodes are randomly distributed, and the nodes in the node communication area are calculated as

$$R(A) = -\sum_{s-1}^{n} \frac{1}{n} \log_2 \left(\frac{1}{n}\right) = \log_2 n,$$
$$w = \frac{R(A)}{R_m} = \frac{\log_2 S}{\log_2 N}. \tag{7}$$

2.3.2. Distance Measurement of Communication Nodes. It is known that the coordinates of anchor nodes i, j, and l are, respectively, (a_i, b_i), (a_j, b_j), and (a_l, b_l), and their estimated coordinates to the unknown node Q are

$$W_{iq} = \sqrt{(a_i - a_q)^2 + (b_i - b_q)^2},$$
$$W_{jq} = \sqrt{(a_j - a_q)^2 + (b_j - b_q)^2}, \tag{8}$$
$$W_{lq} = \sqrt{(a_l - a_q)^2 + (b_l - b_q)^2},$$

where W is the distance to the unknown node Q.

Linearizing the above formula, the linear equation can be obtained as

$$i = \begin{bmatrix} 2(a_i - a_l)2(b_i - b_l) \\ 2(a_j - a_l)2(b_i - b_l) \end{bmatrix},$$
$$j = \begin{bmatrix} a_i^2 - a_l^2 + b_i^2 - b_l^2 + c_l^2 - c_i^2 \\ a_j^2 - a_l^2 + b_j^2 - b_l^2 + c_j^2 - c_i^2 \end{bmatrix}. \tag{9}$$

Use the standard least mean square error estimation method to get the Q coordinate:

$$A = \left(S \times S^{t}\right)^{-1} S^{W} b. \tag{10}$$

Relying on network connectivity and assuming that the unknown node Q has n anchor nodes, then

$$(a_i, b_i) = \left(\frac{a_1 + a_2 +, \ldots, a_n}{n}, \frac{b_1 + b_2 +, \ldots, b_n}{n}\right). \tag{11}$$

The number of common neighbor nodes of n_i and n_j is

$$A\left(\left|n_i \subset n_j\right|\right) = \gamma S(b). \tag{12}$$

The number of neighbor nodes of n_i and n_j is

$$A\left(\left|n_i\right|\right) = A\left(\left|n_j\right|\right) - \gamma \pi r^2 (b). \tag{13}$$

Since AAAA and BBBB are independent of each other, so

$$A\left(\left|n_i\right|\right) + A\left(\left|n_j\right|\right) = A\left(\left|n_i\right| + \left|n_j\right|\right) - \gamma \pi r^2 (b). \tag{14}$$

Each node in the cluster must send data in its data slot. In AESP, when a node needs to request a new pseudonym from the cluster head node, in order to avoid collisions, it sends a pseudonym ID request packet instead of data when the next time slot specified by it arrives. This type of data packet is not sent to the base station as data.

3. Machine Translation Experiment of Wireless Sensor Network Communication Algorithm

3.1. Experimental Design of Wireless Sensor Network Communication Algorithm. Because the wireless sensor network has its own advantages, it has technical advantages that the currently used network does not have, and it is more able to adapt to the needs of modern people for sensor networks. Measure the indicators of routing protocol design from these aspects: whether the algorithm design is simple amd whether the computing power is strong, use the least software and overhead to provide the most effective function; the routing algorithm must be flexible, fast, and accurate to adapt to various networks' environment; wireless sensor communication diagram is shown in Figure 2.

The amount of communication between any two nodes in the network is equal. If node A communicates to node B, node B can also communicate to node A, and the same amount of data transmission consumes the same amount of energy. The distribution of nodes is shown in Figure 3.

The established wireless sensor network model and basic parameter settings are shown in Table 3. The location coordinates of the base station (100,100); the unit is meters. The transmission distance of the amplifier is set to be less than or equal to d0, and the transmission energy consumption becomes a secondary attenuation model.

3.2. Advantages of Machine Translation. Firstly, machine translation can assist manual translation and improve translation speed. After importing the original text into the translation software and loading the machine translation tool, the first step is to click on the translation text box to produce the machine translation. If more than 19,000 words are used, the machine translation tool can produce the translation in nearly 30 minutes. According to official data, a qualified professional interpreter translates about 330 words per hour on average. However, if machine translation is used to produce machine-translated versions first and then to edit them manually, with the basic framework of machine translation, the translator will no longer have to spend as much time as the first manual translation, which greatly reduces the pressure of the translator's work, and at the same time, the translation speed is much faster than the simple

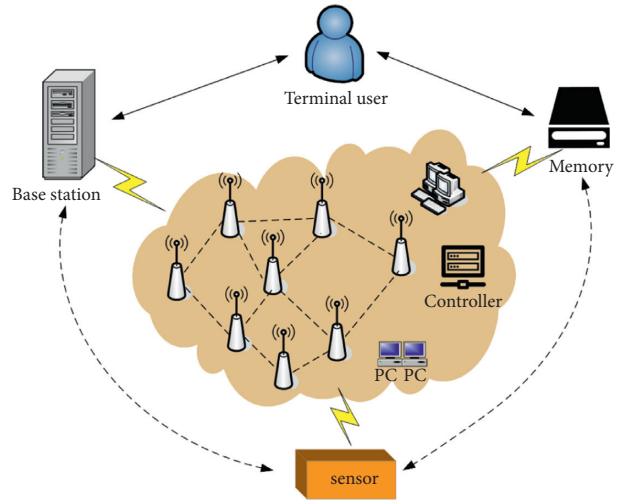

Figure 2: Schematic diagram of wireless sensor communication.

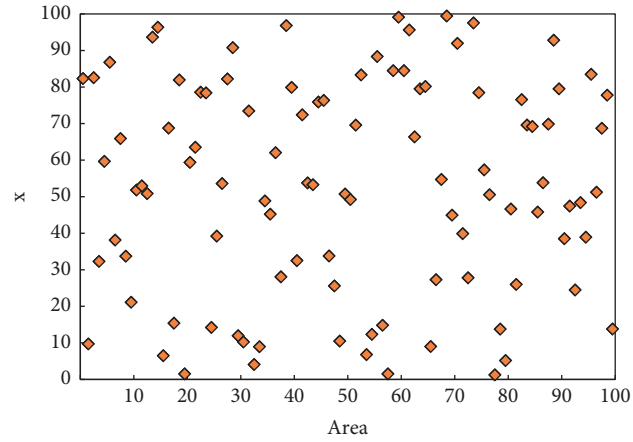

Figure 3: Node distribution graph.

Table 3: Experimental parameter design.

Object	Details	Parameter
Control packet length	Lctr	256 bit
Packet length	Ldata	2000 bit
Transmission/receiving circuit energy consumption	Etra, erec	40 bit
Data fusion energy consumption	Eda	60 bit
Transmission power amplifier	$d \le d0$	0.0016 p
Transmission power amplifier	$d \ge d0$	0.0012 p

manual translation. Furthermore, this is only one section of this project. If we face the huge translation workload in the vast translation market, we can foresee that using machine translation to assist human translation can save a lot of time.

Secondly, machine translation can reduce translation costs for translation companies. As far as translation companies are concerned, the cost of translation is concerned. Translation companies usually employ professional translators to complete translation projects because of their numerous translation projects and huge workload. At present, the salary of translators is usually based on the professional level, language, and word number of translators. If a translation project is translated entirely by a professional interpreter, the translation company will have to pay a high salary to the interpreter. However, thanks to the powerful functions of the Internet and the abundant shared resources, translation companies can make full use of machine translation tools without spending too much money. Therefore, the high cost of manual translation is also a reason why people turn to machine translation.

Moreover, machine translation is easy to use. Generally speaking, people can translate instantly through machine translation tools whenever they need. In this respect, human translation has great limitations. When employing interpreters, businessmen must first examine their professional level and professional accomplishment and also consider the working environment, working hours, and so on. Once the translation project is short of time, no translator can work all day, so the result will delay the translation process. Machine translation has no requirement for working time and place, so it is more convenient and fast.

3.3. Disadvantages of Machine Translation. Since machine translation is an automatic translation technology developed with the help of computer technology, programming technology, and corpus technology, as well as the complexity of human language itself, there will inevitably be some defects in the translated text produced by machine translation, and the quality of the translated text cannot reach the desired level, which mainly includes lexical errors, syntactic errors, and punctuation errors. Among them, lexical mistranslation is also obvious. Lexical mistranslation refers to the errors in machine translation due to inappropriate understanding of lexical meanings, parts of speech, color, and so on. As far as the meaning of words is concerned, many English words have multiple meanings. How to choose the meaning of words requires context analysis. Machine translation often neglects this point and makes mistakes. As far as parts of speech are concerned, machine translation often involves mistranslation of nouns, verbs, and adjectives. As far as word color is concerned, machine translation often fails to recognize the emotional color of words and leads to mistranslation. Among them, the most common phenomena of word mistranslation mainly focus on word meaning mistranslation and part-of-speech mistranslation.

4. Error Types in Machine Translation Based on Wireless Sensor Network Communication Algorithms

4.1. Experimental Comparison Results of Wireless Sensor Network Communication Algorithms. In order to test the effectiveness of the algorithm, experiments are performed to generate test results, and three sets of experiments are performed to compare the error of each experiment. The error of the wireless sensor communication network algorithm node is shown in Table 4.

As shown in Figure 4, the accuracy of the algorithm in this study is the best. With the increase of nodes, the average error drops to 0.106, the density of nodes increases, the network connectivity is enhanced, the shortest path deviation is reduced, and the average hop distance is more accurate, which helps to improve the measurement.

Figure 5 shows the influence of the number of anchor nodes on the ranging error. When the proportion of anchor nodes increases, the three algorithms will change as the proportion of nodes changes. For the influence of node density on network performance errors, as long as they have appropriate connectivity, reasonable results can be obtained.

Figure 6 shows the number of surviving nodes in the entire network. As the life cycle progresses, the number of surviving nodes in the entire network decreases slowly, and the life cycle is also extended. The energy loss will gradually increase as the network life cycle progresses. Control loss speed can extend the life cycle of the network.

4.2. Error Types in Machine Translation. Language is a tool for people to communicate. Any language has its own characteristics. Even when friends from English-speaking countries talk and write articles in Chinese, they should follow the grammatical rules of Chinese and conform to the norms of Chinese. That is to see whether the use of each type of words accords with their own grammatical characteristics, whether the collocation of words and words is appropriate, whether the order of words is reasonable, whether the structure and use of sentences are affected by English, whether there are logical errors in the content of sentences, and so on. If the words spoken and the sentences written violate the rules of Chinese combination or the facts of objective things and hinder communication, such sentences are ill sentences, which are ubiquitous in online English-Chinese translation. The author will refer to the results of the analysis of Chinese language diseases, take relevant college English profiles as corpus, take Chinese profiles as reference, take personal English proficiency as supervision, and analyze and summarize these errors from vocabulary, grammar. and other aspects.

4.3. The Method Used in the Experiment. In the first section, the first two English translation copies of the original text are pasted into machine translation for automatic machine translation without human intervention. Machine translation takes only a few seconds. After completion, the results

Table 4: Algorithm node error of wireless sensor communication network.

Network number	Experiment 1	Experiment 2	Experiment 3
1	0.1661	0.1326	0.1304
2	0.1842	0.1177	0.1166
3	0.1862	0.1355	0.1368
4	0.1753	0.1172	0.1178
5	0.1929	0.1282	0.1258
6	0.1862	0.1202	0.1192
7	0.1851	0.1182	0.1169
8	0.1861	0.1248	0.1246
9	0.1725	0.1212	0.1154
10	0.1899	0.147	0.1402

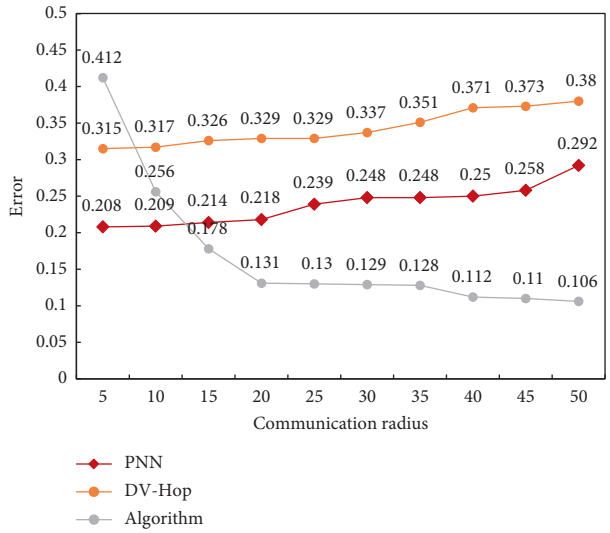

Figure 4: The influence of communication radius on the ranging error.

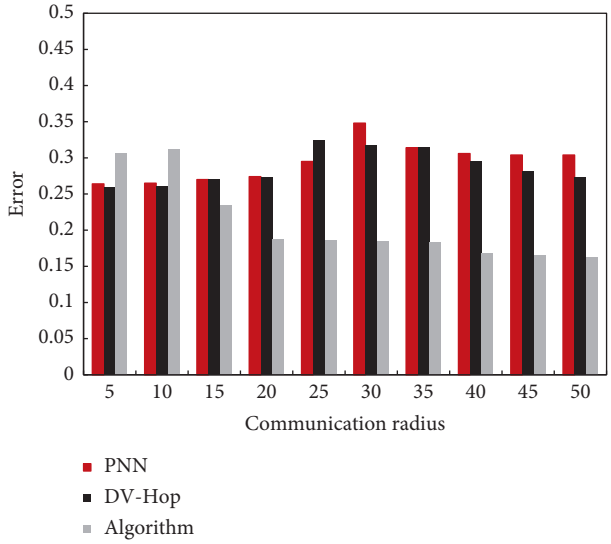

Figure 5: The influence of node density on network performance error.

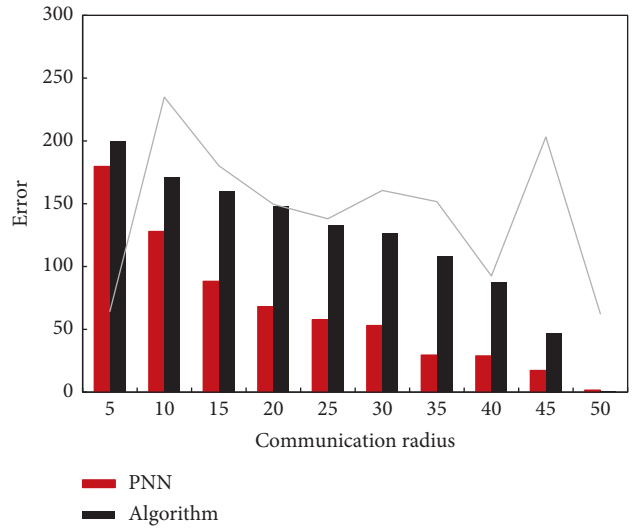

Figure 6: Survival number of communication nodes in wireless sensor network.

are arranged in the order of Chinese, English, and machine translation, so as to facilitate manual modification. In the second section, the English translation of nearly 20,000 Chinese words corresponds to about 10,000 words. Machine translation can translate no more than 5,000 words at a time, so the whole text is translated three times. The time to get the translation is very fast, basically instantaneous, so the time of machine translation can be neglected.

After pasting the translation of machine translation into the document, the author has made careful manual modifications to the translation. Although the direct source language of French translation is English translation, because English translation only serves as a bridge and the original text is Chinese article, the author regards English original as the original text and Chinese as the reference for proofreading. Verbatim-by-verbatim proofreading of the translated text according to the Chinese source text, correcting and revising it to ensure the accuracy and completeness of the translated text, and recording the types and causes of errors after each revision are carried out. For errors, the original English text is searched to see if the translation errors are caused by the inaccuracy of the English translation rather than the problems of machine translation itself. After completing the above work, the author will read the original text thoroughly and then revise the translation twice to make the translation more natural and smooth. Specifically, the strategies of editing after manual translation are as follows: (1) to find out the missing words and add the correct translation, (2) to read the translation thoroughly and to find and correct the errors in translation and mistranslation, (3) to proofread grammatical errors, word order errors, and syntactic errors, and (4) to edit and proofread the full text to ensure the consistency of words and styles.

Full-text list uses AST standard, namely, integrity, coherence, and translator preference, to analyze the number of errors in detail and get the proportion of errors through different tables to get the correct rate of translation. Errors

affecting integrity are the most serious ones because they can affect the accuracy of the translation. The errors affecting coherence are minor ones because they do not affect comprehension and are easier for translators to modify. If there are fewer integrity errors, the translation quality will be higher. It is feasible for machine translation to assist translators in translation. If there are more integrity errors, the time for the translator to revise is not shorter than that for the direct translation; then, it is not feasible for the machine translation to assist the translator in translation.

4.4. A Comparative Study of Error Rates. Comparing several commonly used translation machines for translation, the types of translation errors and the translation results are shown in Figure 7.

From Figure 7, it can be seen that there is no obvious difference between the types of errors and the translation tools. Even if all translations are inaccurate, a small amount of lexical phenomena or syntactic structures will not cause such high frequency of errors. In view of this, the low frequency error is also worth noting.

This study makes a sentence-by-sentence comparison of 4000 sentences of original English corpus, machine translation, and manual translation. Before the comparison, errors in machine translation are classified according to the experience of predecessors. After a one-to-one comparative labeling of 4000 sentences, the labeling results are statistically analyzed. The statistical results are shown in Figure 8.

The limitation of machine translation is that, in most cases, there is more than one error in a sentence, so the statistical method is as follows: as long as there is an error in this sentence, it is classified as a wrong translation, so the accurate translation only accounts for 17.8% of the 4000 sentences, that is, only 712 sentences are basically or completely correct (see Figure 8). When further counting the types of errors in the wrong sentences, if the same type of machine translation errors occurs many times in a sentence, only one annotation and statistics are made. Different types of errors need to be marked and counted. So, the total number of errors is 6865, which is far more than the total number of sentences. The incidence of three types of errors in machine translation is shown in Figure 9.

According to error classification and data collection procedures, identify and count the vocabulary and grammatical errors in each output. In addition, the total number and frequency of each error pattern in the output of the three translation tools are calculated, and the lexical error and the distance method error are compared. The results are shown in Table 5.

The corresponding data show that there is a significant difference between lexical errors and syntactic errors in machine translation.

Since one-way analysis of variance can detect whether there are differences between multiple dependent variables of a fixed independent variable, one-way analysis of variance is used to test whether there are significant differences between different types of errors. The results are shown in Table 6.

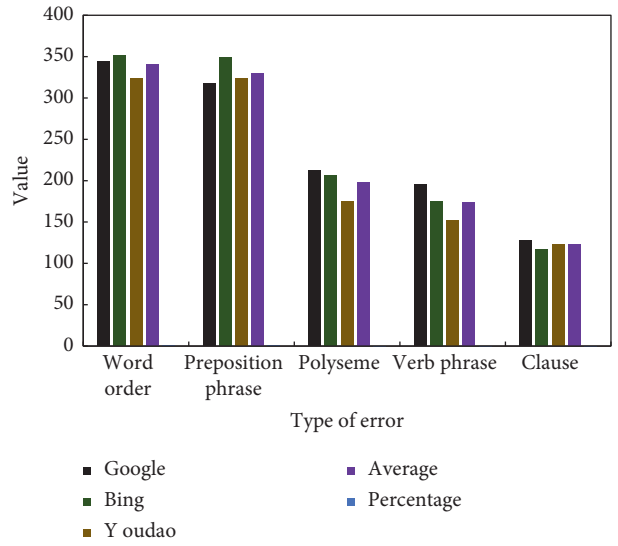

Figure 7: Average frequency of translation errors by translation tools.

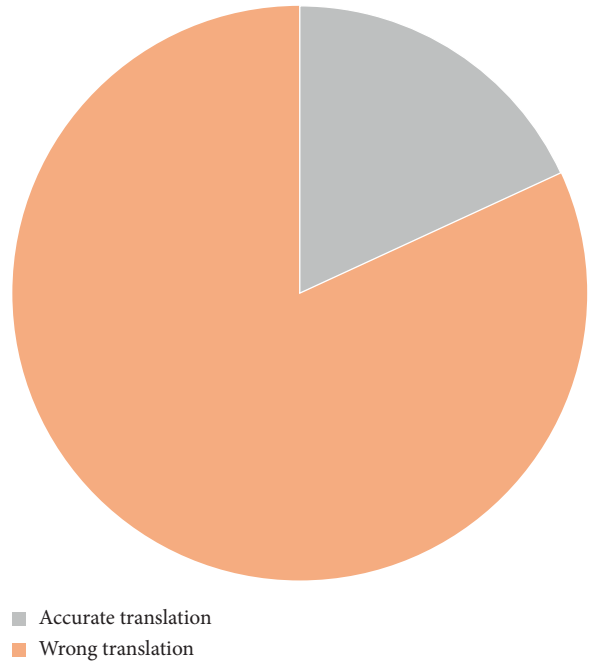

Figure 8: Machine translation error rate.

4.5. Error Analysis of Vocabulary Translation. Vocabulary is the most basic element of a sentence, so it is also the key to measure the quality of machine translation. In the statistical data of Figure 9, the highest proportion of word mistranslation is 57.2%. In Figure 10, the incidence of mistranslation of vocabulary terms is the highest, reaching 84.9%.

Independent sample T test is used to test whether there are significant differences in the frequency of translators' vocabulary and syntactic errors. The results are shown in Table 7.

As can be seen from Figure 10, lexical parts of speech, lexical omission, and lexical redundancy are also common

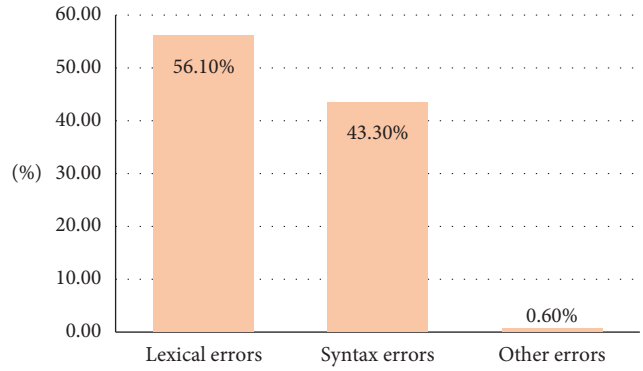

Figure 9: Incidence of three types of errors in machine translation.

Table 5: Independent sample T test for lexical and syntactic errors.

	Levene's test for equality of variances		t-test for equality of means			
	F	sig.	−12.393	df	Sig.	MD
Equal variances assumed	1.024	0.322	−11.357	0.28	.000	−32.187
	1.521	0.465		27.158	.000	−36.248

Table 6: One-way variance analysis of machine translation errors.

	DF	Mean square	F	Sig.
Group A	18	665.173		
Group b	306	14.258	77.481	0.000
Total	324	—		

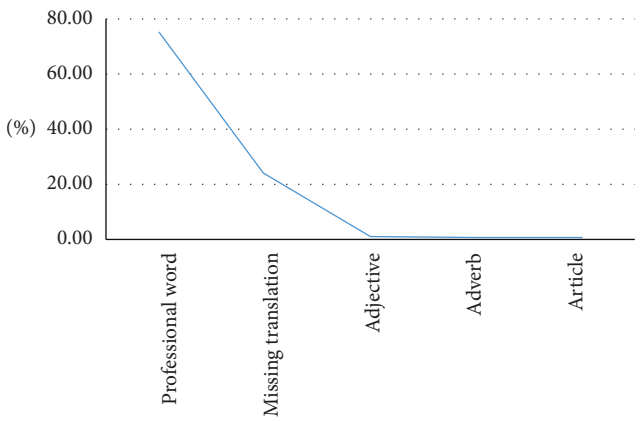

Figure 10: Incidence of lexical mistranslation.

errors. Because each language has its own logic and rules in the transformation of the two natural languages, manual translation can take these into account, so words will be added or deleted appropriately, but the basic principle of machine translation is to turn word by word, which is easy to cause these errors. Taking part of speech as an example, the phenomenon of multicategory and polysemy is common in both English and Chinese. The word "present" refers to a word that can not only belong to two or more parts of speech but also has several different meanings. For example, the word "present" as a noun is "gift," as a verb is "attendance, participation, and statement" and other meanings. It can also be used as an adjective "attendance and presence." Polysemy means that the same word has two or more meanings in the same part of speech. Different meanings also have extended meanings in different contexts. In the process of English-Chinese translation, professionals can find different usages of a word by comparing the contexts. They can use dictionaries and query relevant materials to solve the problem of polysemy. However, machine translation is often difficult to deal with this phenomenon because there is no polysemy storage in corpus and terminology database, or the problem of word disambiguation technology in translation system.

Example 1. We developed the following regression model to test our hypotheses.

Machine translation: we develop the following regression model to test our hypothesis.

The common meaning of the word "develop" in Example 1 is development, research, and formation. In this sentence, the object of development is the regression model; at this time, its meaning is no longer the ordinary meaning of the word itself. The machine translation system translates the word "develop" and "make up," respectively, which is obviously mismatched with the mathematical regression model. The regression model is a kind of data model, which quantitatively describes the statistical relationship. Regression analysis is a computational method and theory. It studies the specific dependence of one variable on another variable and designs different data models according to the different objects of each analysis. Therefore, the word "develop" in this sentence should be translated into "design."

Example 2. Granted, you might not be able to count all of your pages accurately using this method, but it helps you make a more accurate estimate than taking a stab in the dark.

Table 7: Independent sample test for vocabulary translation errors.

	Levene's test for equality of variances		*t*-test for equality of Means			
	F	Sig.	t	df	Sig.	Mean difference
Equal variances assumed	1.276	0.268	−10.711	282	.000	−34.867
Equal variances not assumed	1.187	0.158	−8.146	196	.000	−34.867

Machine translation: granted, it cannot use this method to accurately calculate all pages, but it can help to make more accurate estimates than jabs in the dark.

Error analysis: polysemy is a common phenomenon in English. In a sentence, how to correctly grasp the meaning of a word needs to be considered in the context. In this sentence, "Granted" is a conjunction, which is supposed to be hypothetical, even if, to say the least. The meaning of the first half of this sentence is "it may not be possible to accurately calculate the total number of pages in this way," and the meaning of the second half of this sentence is "however, this method is much more accurate than you blindly groping." Obviously, there is a turning point in this sentence. Therefore, by analyzing the context, we can conclude that "granted" has the meaning of concession since it is located at the beginning of the sentence. Here, it can be translated into "admittedly" instead of "granted" as a substantive verb, which belongs to part-of-speech mistranslation. In addition, it is obviously incorrect for the machine translation tool to translate the phrase "taking a stab in the dark" at the end of this sentence into "thorn sitting in the dark." In English, "take a stab in the dark" is a saying that people guess without any basis, and the guesser does not know the truth of the matter. In order to make the language more concise and vivid, the author translates it into "blindly search" and " instead of machine translation, which translates words in phrases into "thorn sitting in the dark."

4.6. Sentence Translation Error Analysis. Whether there are significant differences in the total errors, vocabulary errors, syntax errors, and each error subcategory of machine translation, and the relationship between each pair of errors, the results are shown in Table 8.

The comparison among all error subcategories is shown in Table 9.

There were no significant differences in the intersubject effects in terms of lexical errors, syntactic errors, and total errors. Therefore, there is no significant difference in the number of lexical errors, syntactic errors, and overall errors.

Apart from word order and passive voice mistranslation, three types of syntactic mistranslation are found in machine translation, as shown in Figure 11. The rate of mistranslation is $*100\%$ of the total number of machine-translated sentences/machine-translated sentences with some kind of syntactic translation errors. The same type of syntactic translation errors occurring repeatedly in the same sentence are labeled and counted once, and the different types of syntactic errors occurring in the same sentence are labeled and counted separately.

Table 8: Add word and verb phrase effect.

Dependent variable	df	Mean square	F	Sig.
Word pretermission	2	137.222	29.158	0.000
Adding word	2	8.472	6.157	0.003
Verb phrase	2	2.223	3.564	0.025

Table 9: Variance homogeneity test of added words and verb phrases.

	Word pretermission	Adding word	Verb phrase
F	1.005	3.578	4.332
df1	2	2	2
df2	5	5	5
Sig.	0.158	0.249	0.891

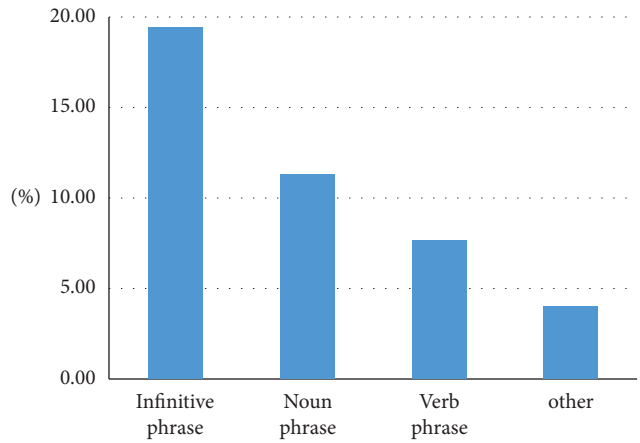

Figure 11: Incidence of three types of syntactic mistranslation in machine translation.

In tagging and statistics of syntactic errors, it is found that word order mistranslation is the most complex, and the rate of mistranslation is the highest among all kinds of syntactic errors, reaching 43.3%. However, due to the Mistranslation of word order, there is a great interlace between the mishandling of noun phrases, verb phrases, prepositional phrases, passive voices, infinitive phrases, and participle phrases. Comparing the two versions, it is found that the machine has achieved high accuracy in the translation of passive voice. Mistranslation of passive voice is mainly manifested in the machine's handling of passive voice in infinitive verbs. The following will discuss the mistranslation of passive voice in infinitive phrases' mistranslation. This study takes word order disorder as an example. There are many cases of inappropriate word order,

and the causes are different. It can be divided into many cases, such as inappropriate attributive position.

Example 3. It consists of three campuses of Wangjiang, Huaxi, and Jiangan.

Machine translation: it includes three Wangjiang, Huaxi, and Jiangan campuses.

The attributive marker of Chinese is "of." Like "beautiful girl, what you said," the attributive is put in front of the central language. In English, there are preattributive and postattributive. When the attributive is too long, in order to avoid the top priority, the attributive is often postattributive, and even the attributive clause is connected. This makes the relationship between English attributives and the position of the central language not fixed. Chinese attributive is closely related to the central language, and attributive is located in front of the central language, which plays a modifying and restrictive role. Computers can only translate one by one according to the sequence of words, so there are many loopholes. "Three" should be placed in front of "campuses."

4.7. Analysis of Other Translation Errors. Lexical and grammatical errors are internal errors in language. Translation involves all aspects of language. Besides the language system itself, it has its own independent lexical and grammatical systems, as well as the external form of language and the cultural background of language. These differences also lead to mistranslation. For example, the misuse of punctuation marks, punctuation errors in form, and Chinese punctuation symbols are more complex and more detailed differentiation; each punctuation has a profound meaning, according to the meaning of a specific use conditions. English punctuation is much simpler, only commas and punctuation marks. English punctuation marks correspond to Chinese periods, while English clauses do not distinguish hierarchical relations, and they are all commas. The Chinese language uses a stop sign between words and phrases and commas between clauses with other relations such as progressive and transitional. Machines, on the contrary, only use commas and punctuation marks, resulting in the following punctuation errors.

Example 4. Under its administration, there are 14 state key (specialized) laboratories, 1 national engineering laboratory, 2 national engineering research centers, and 3 national engineering technology centers.

Machine translation: under its management, there are 14 national key laboratories, 1 national engineering laboratory, 2 national engineering research centers, and 3 national engineering technology centers.

Punctuation at intervals is natural, and in machine translation, there are often redundancies. Without clause relations or even mood pauses, punctuation will suddenly appear, separating the complete words or sentences, which not only affects the smoothness of sentences and the understanding of users but also is not beautiful in form.

5. Conclusions

Machine translation is an important research direction in the field of natural language processing. In the existing English-Chinese machine translation system, long sentence analysis is also a research difficulty. It is difficult to get the correct results when dealing with these ambiguities by the existing parsing methods. With the development of information technology, patents or long sentences with huge vocabulary and complex structure have been widely used in people's daily work. How to translate these long sentences reasonably and effectively has become an urgent problem for machine translation system. This study analyses the Chinese translation errors of English machine translation based on the wireless sensor network communication algorithm, and the main work and conclusions are summarized as follows:

(1) Comparing machine translation software from various aspects, we can get authoritative translation website, which can help people choose translation software quickly and correctly, and ensure the speed and quality of translation to a certain extent. From the above comparison, it is not difficult to conclude that Google's translation effect is more impressive, but it cannot guarantee that there are no omissions. In contrast, it is not difficult to see that the main errors are manifested in vocabulary, syntax, and form, and mistranslation shows regularity.

(2) Through a comparative study of machine translation and manual translation, it is found that there are various kinds of errors in the first-level error categories, i.e., lexical and syntactic categories, in vivid and machine translation systems. Although improper symbolic translation is rare, mistranslation of "numerals" may lead to very serious consequences because the management of text data is scientific and rigorous.

Machine translation has been going on for decades. From understanding the history of machine translation to the principles and methods of machine translation to learning to use machine translation software, it takes a lot of time and a lot of information. In the process of consulting materials, from ignorance at the beginning to a little knowledge at present, to understand that the current field of translation services is undergoing unprecedented changes, the whole process is hard, but the harvest is not small. The development of science and technology will certainly lead to changes in various fields. As an interpreter, we should actively learn from the achievements of technological changes in this field. At present, there are two extreme phenomena in the market due to the uneven quality of machine translation software: those who do not know a foreign language think they have grasped the straw to save their lives and those who do not know foreign languages think they have grasped the straw to save their lives. Therefore, the machine translation software should be given a correct and rational evaluation. By comparing machine translation with manual translation, we find that machine translation has solved many tedious

tasks of traditional translation to a great extent, and its development prospects are immeasurable.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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