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Jolanta Mizera-Pietraszko
Pit Pichappan *Editors*

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Lecture Notes in Real-Time Intelligent Systems

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Preface

Real-time intelligence is concerned with the real-life data processing in digitized form which reflects "varied data-inclusive." Real-time intelligence speaks the real-life environment as well as perceptions and understanding derived from analytical processing. It draws data from the empirical settings and real life which enables the processing for real-life situations. Real-time processing depends on real-life data from internal and external environment and characterized by online data.

Realizing the value and significance of real-time intelligence, this current volume on "Lecture Notes in Real-Time Intelligent Systems" is planned and the issue is being published with 56 papers.

Based on the 2016 Beijing Conference on Real-Time Intelligent Systems, this special issue on *"Lecture Notes in the Real-Time Intelligent Systems"* is focused on a broad range of methodological concerns. It features 56 original papers addressing the topics ranging from fundamental questions related to theory and method to questions of applications. Together, these articles reflect the rich variety of intelligent data processing addressed by artificial intelligence researchers and the breadth and depth of theoretical, methodological, and practical approaches to be considered in real-time intelligence research.

These papers in this volume represent a significant contribution to the field. They make a strong connection between philosophical theories of truth and the practice of artificial intelligence researchers. They make a convincing case for the utility of the coherent distinction across the domain of artificial intelligence.

A total of 142 submissions was received, 56 of which were finally accepted for this volume. Each accepted paper has gone through two to three rounds of reviewing, each round with three to four referees.

We do hope that this special issue paves the way and sets the directions for the future research in the real-time intelligence domain.

Jolanta Mizera-Pietraszko
Pit Pichappan

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Applications of Artificial Intelligence

A Research on Classroom Teaching Ability System Construction of English Teachers Combined with Artificial Intelligence

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Abstract. With the rapid development of the computer technology, thousands of households have access to the Internet, which plays an increasingly important role in people's daily life. In the meantime, scientific and technological development has brought us many innovations, which produces new development opportunities to many traditional industries. English teaching has always been an important part of the teaching system. With the increase of international exchanges, English as an international language is frequently used, which poses higher requirements for the English teachers. It has become a hot subject of research currently to design an appropriate English teaching system and accomplish the English teaching tasks in an efficient way. In light of that, this paper first analyzes the research status of the English teaching system both at home and abroad, researches the features of English teaching and the construction principle of the teaching system, and explores the principle and application method of the artificial intelligence technology. Based on the research of relevant concepts and theoretical basis, this paper constructs a classroom teaching ability system of English teachers combined with artificial intelligence, explores the application effect of this system through specific teaching case design, conducts contrast experiment and proves the validity and advancement of this system through the analysis of experimental results, and demonstrates that the new teaching system is conducive to improve the teaching ability of the teachers and the English teaching quality.

Keywords: Multiple intelligence theory · Intelligent teaching · Teaching system

1 Introduction

An important feature of the contemporary society is the emphasis on the application and innovation of knowledge. In this era, the education industry is undergoing transformation to the basic, all-round and advanced knowledge industry. Relevant important infrastructure is being improved. Our country has also regarded education as one of her top priorities and attaches great importance to the development of the cause of education. Our institutions and the curricula play an important role in order to achieve educational reform. Under the circumstances of international integration and common development,

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foreign languages, English in particular, are widely used and it has also posed higher requirements on our level of English fluency. Therefore, English teaching has become an important part in the current teaching system, which has received more attention from the institutions, teachers and parents.

With the development of the Ethernet, informationization and the computer technology and the deepening of the concept of intelligence, a new type of technology, namely artificial intelligence, is being explored and utilized by people. The abbreviation of artificial intelligence is AI, which means to simulate human thinking by way of the computer and then to handle problems with similar human thinking and method. In other words, artificial intelligence is the frontier indicator of modern technology and is one of the hottest research topics in the current technological field. In light of this, this paper explores the theoretical basis and application method of the construction of English teaching system combined with the artificial technology and also blazes new trails to reform the English teaching system.

As for the issue put forward in this paper, researchers have done profound exploration and have received rewarding results. As for the cause of education, lifelong learning is an objective that we will strive for a whole life. We should be good at putting forward and resolving problems. In the face of complicated issues, we should be bold enough to query, to explore, to break professional barriers, and to cooperate share with other people so as to make common progress. More importantly, we should reflect on ourselves three times a day, to combine real situations with virtual reality, to make full use of all kinds of multimedia instruments like communications, the Internet and the computer, and to dig our own learning potential [1]. It is imperative that we conduct the reform in the English teaching. According to the deployment of the education department, English teaching should pay more attention to cultivate students' comprehensive capability to utilize languages and help students form an active learning attitude and good learning habits. The traditional teaching method focused on vocabulary and grammar is no longer applicable [2]. Howard Gardner, an American psychologist, holds that different students have different intellectual capabilities. Therefore, language teaching should not be the same for all students. Rather, it should start with the different features of different students and to teach students in accordance with their aptitude [3]. The sustainable development of our society and the arrival of the learning society pose an objective requirement on the elementary education to pay more attention to the need of lifelong learning of each student, to inspire the wishes of lifelong learning of every student, to guide the middle school students to think independently and plan their own lives, and to equip our students with basic professional consciousness, career consciousness and critical thinking capability [4]. Machine learning is based on statistics and information theory, which is the result of the analysis of the large amount of data and the conclusion and learning of human experience. When similar issues occur, the machine can resolve them based on experiential knowledge [5].

The second part of this paper introduces and analyzes the English teaching model and teaching system and researches into the relevant concepts and theories of artificial intelligence. The third part explores the possibility and construction method of the classroom teaching ability system of English teachers based on the previous theories. The fourth part conducts a practical experiment of the teaching system

designed in the third part. Through the contrastive comparison of the experimental results, it proves the feasibility and efficiency of this teaching method by applying the statistical method and it also demonstrates it is meaningful to research into this system. The fifth part is the conclusion of the whole paper and it also points out the deficiencies of this paper and points out the direction of further research.

2 Language Teaching Design

2.1 Foreign English Teaching Model

We have much to learn from the language teaching models in countries where English is their mother tongue. Based on different learning attitudes, there are several models of foreign English teaching which are shown as follows [6].

S. D. Krashen Model: this model mainly describes the learning process. Under circumstances where affective filter conditions are quite low, it can provide enough understandable input information and promote learning through a predictable sequential process.

E. Bialystok Model: this model mainly describes the forming process of the English language capability. Through the learning of general language knowledge, implied language knowledge and explicit language knowledge and numerous exercises, we can form the English language capability.

H. H. Stern Model: this model determines the inner relations between the five factors. The social background and learning conditions of the learner jointly determine the learning process. Different learning processes directly determine different learning results.

C. N. Candlin Model: this model combines three knowledge systems of language form, conceptual meaning and interpersonal relations. These three aspects are interwoven and inseparable and they altogether determine the process and results of English learning.

C. R. Hubbard Model: this model describes an interactive model of English learning. In an environment where objective matters exist, learners can conduct communications more freely and they can learn and speak in English in communication.

2.2 Domestic English Teaching Model

As English is our second language, the English teaching in domestic language teaching system is still at an exploratory stage. Different teaching systems keep emerging and their teaching effects and quality are different. The following are the major models [7].

Grammar translation model: this is a widely used teaching method and is the most fundamental one. Many schools and teachers have attempted to reform this model. However, its fundamentals remain unchanged with a major teaching process focused on teachers to introduce vocabulary, texts, the translation of the texts, the explanation of typical sentences with grammatical significance, and the conclusion of words and grammar and then the students' job is to practice.

Cognition model: this is a reformed version of the grammar translation model whose focus is the understanding of knowledge. Students should focus on understanding and form the language capability and learn to use this language based on their understanding of the text structure and contents.

Aural-oral model: this is a teaching model based on behavioral psychology and linguistic structural studies. After the explanation of the teachers, students can learn to imitate the teachers, and repeat, replace, and expand what they have learnt so as to communicate in this language.

Communicative model: this is a teaching model based on the theory of social linguistics. Its teaching process is that the teachers will teach and students will learn from them and practice and then they can deepen their understanding and application of the language through communication with others.

2.3 Artificial Intelligence Theory

Artificial intelligence is one of the hottest research directions at present. It is a branch of the computer science, which is deemed as one of the three cutting-edge technologies in the world. Artificial intelligence explores the nature of human intelligence and then apply the computer to imitate this human intelligence so that machine can have some features of human, can conduct human thinking and action, and can handle problems in ways similar to human [8].

At present, artificial neural network is one of the most widely used theories in the field of artificial intelligence. The theoretical basis of the research on artificial neural network is the theory of cerebral neuron. According to this theory, there are more than 10,000,000,000 neurons in human's cerebral cortex. They are interconnected to form a neural network, which can receive all kinds of information from the sensory ending and then transmit to the central nervous system. It can also analyze and process the information and then transmit the information to the motor ending to coordinate various functional activities of the body [9]. The research of the artificial neural network is to reflect some basic features of the functions of human brain and then to imitate, simplify and abstract it, rather than to get a vivid description of the whole biological system. Compared with general computer, the artificial neural network is much more similar to human brain in terms of the constitutional principle and functional features. It does not calculate step by step according to the given procedure. However, it can adapt to the environment, conclude the rules, complete certain calculations, recognize or control the whole process [10]. A typical artificial neuron is shown in Fig. 1 as follows.

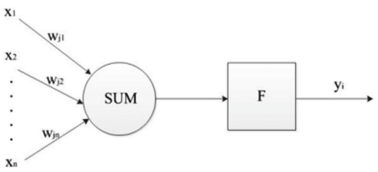

Fig. 1. Artificial neural

In general, when the i^{th} neuron has multiple input values $X_j (j = 1, 2, \ldots, m)$ and single output value Y_i, the formula is as follows:

$$I_i = \sum_{j=1}^{n} w_{ji} x_j - \theta_i \tag{1}$$

$$y_i = f(I_i) \tag{2}$$

In the above formula, θ_i is the threshold value, which can be preinstalled by people. W_{ji} is the weight coefficient from the j^{th} to the i^{th} neurons and f(I) is the transition function.

The neuron transition function: the transition function of the neuron determines its mathematical model and the information processing feature. Therefore, it is of great significance. Common neural network models include input-output model, effect function model, error calculation model and self-learning model [11].

Non-linear transition function is non-diminishing continuous function with a range of [0, 1]. The most typical one is the unipolar Sigmoid function curve or the S Function. This function is much easier to handle, because this function itself and its reciprocal are continuous [12]. The definition of the unipolar S Function is as follows:

$$f(x) = \frac{1}{1 + e^{-x}} \tag{3}$$

2.4 Gardiner Multiple Intelligence Theory

There are fundamental differences between traditional intelligence theory and multiple intelligence theory, which are demonstrated as follows:

Firstly, the traditional intelligence theory holds that the amount of IQ or intelligence of human is determined ever since his birth. However, the multiple intelligence theory holds that human have nine kinds of intelligence and the differences between different people lie in the degree and combining form of these nine kinds of intelligence [13].

Secondly, the traditional intelligence theory asserts that the intelligence of human is composed of linguistic capability and logic thinking. However, the multiple intelligence theory holds that the intelligence of human is multiple and it will generate different capabilities to resolve problems or produce products under different social and cultural background, which is the manifestation of intelligence. The multiple intelligence theory affirms the potential in the development of human beings.

Finally, the traditional intelligence theory holds that human's intelligence remains unchanged ever since his birth. However, the multiple intelligence theory holds that the evaluation of intelligence should be based on the different combining forms of intelligence in order to classify them because human intelligence is diversified. With proper guidance and encouragement, everyone can improve his intelligence to a relatively high level.

Based on the previous comparison, we can conclude that multiple intelligence theory places more emphasis on individual differences and is more customized in comparison with the traditional one. Therefore, it can truly reflect the nature of human intelligence.

3 Methodology

To get a better understanding of the English teaching system status currently, we conduct a field investigation of all the middle schools in this city to put forward a well-targeted teaching system reform plan. The statistics is made of the current English teaching system as follows (Table 1):

Table 1. The middle school English teaching system

Teaching mode	The classroom teaching	Computer teaching	The multimedia network teaching	Autonomous learning network platform
The implementation of school number	8	17	23	6

From the above investigation, we can see that most schools have started to change their teaching models rather than focus on the traditional classroom teaching. Teaching models with the assistance of computer and multimedia are widely acknowledged. Figure 2 demonstrates the teaching scenario with the aid of computer and multimedia in colleges and universities. From this, we can see that it is of great importance to optimize the English classroom teaching system based on informationization, combined with artificial intelligence technology, and guided by the multiple intelligence theory.

Fig. 2. Computer multimedia teaching scenario

3.1 Principle of the English Teaching Ability System

Based on the research into the English teaching models both at home and abroad and the multiple intelligence theory, we conclude the basic principles of the new type of English classroom teaching ability system to be constructed as follows:

1. Openness: the teaching purpose is not only to impart knowledge, but also to cultivate students' emotions. The grades are not the single standard of the evaluation of the teaching results and we should combine the teaching process and self-evaluation and the evaluation of others. The teaching methods are more open and take different forms for different students according to their aptitude.

2. Differentiation: the methods for different students should be different. As different students have different types of intelligence and different capabilities, teaching should not be all the same for every student. However, teaching plan should be more customized to different student so as to guide every student to give full play to their potential.
3. Independence: students should be the subject of learning and teachers should only guide and inspire them to learn. More time and opportunities should be given to students to learn independently, to communication and to make full use of their enthusiasm.

3.2 Basic Framework of the English Teaching Ability System

As is shown in the above picture, the new English teaching ability system is based on the multiple intelligence theory. The major carriers of teaching are music, visual spaces, interpersonal relations and body movement. In light of this, the new English teaching ability system to be constructed can realize the purpose of promoting the development of students and improving students' comprehensive English capability (Fig. 3).

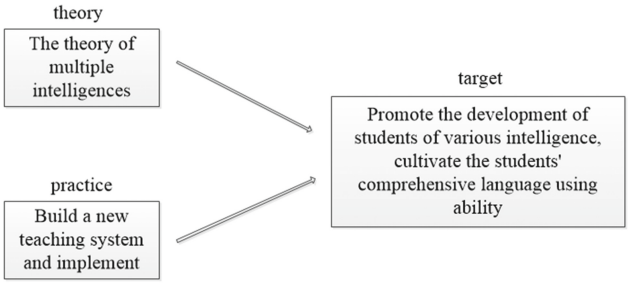

Fig. 3. Computer multimedia teaching scenario

3.3 Running Program of the English Teaching Ability System

First of all, teachers should introduce the classroom teaching in a brand-new and interesting way and create a relaxing linguistic environment to better inspire students' learning interest and initiative. Secondly, teachers should combine the multiple intelligence theory to fully stimulate students' senses of sight, hearing and listening and to motivate students to be completely integrated in the teaching process. Finally, teachers can introduce various teaching carriers like music, sports activities and fine arts to help students practice and strengthen their capability of English application and improve their comprehensive linguistic capability.

4 Data Analysis and Discussion

According to the previous research, we design and construct a new English teaching ability system combined with the multiple intelligence theory and conduct a contrast

experiment between this system and the traditional English teaching system. In this experiment, we randomly choose 100 secondary school students from a certain school and divide them into two groups with each group being 50 students. We apply the new English teaching ability system combined with the multiple intelligence theory to teach the experimental group and the traditional English teaching system to teach the comparison group. After the experiment, we organize a test for the two groups of students and compare their grades. In the meanwhile, we conduct a questionnaire to the students from the experimental group to know the changes brought by the new English teaching ability system combined with the multiple intelligence theory in their English learning. Relevant data are shown as follows:

According to Table 2 and Fig. 4, we can see that the overall grades of the students form the experimental group are higher than those of students from the comparison group. For the experimental group, there are more students having a high grades and less students having a low grades and their teaching quality is much higher. From Table 3 and Fig. 5, we can see that students from the experimental group have improved their interest in learning English after receiving the new English teaching method. Form this we can conclude that the new English teaching ability system combined with multiple intelligence theory is much more effective than the traditional system and is of great importance in improving students' interest and initiative in the learning of English. It also demonstrates the correctness and advancement of this system and that this system deserves to be further promoted.

Table 2. Two groups of student performance statistics

	More than 90	80~89	70~79	60~69	Below 60
The experimental group	10	12	16	11	1
The control group	8	10	14	13	5

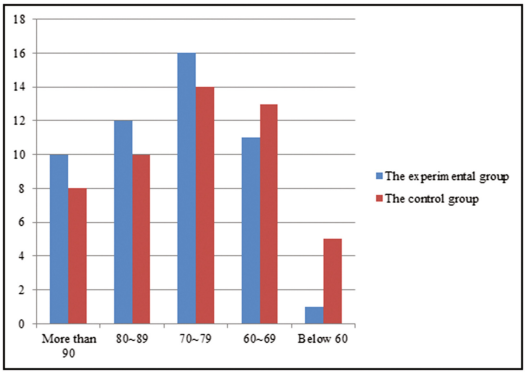

Fig. 4. Two groups of student performance statistics

Table 3. The experimental group students' English learning interest

	Very interested	General	Not interested	A combined
Listen to the teacher before	20	18	12	50
After listening to lectures	26	21	3	50

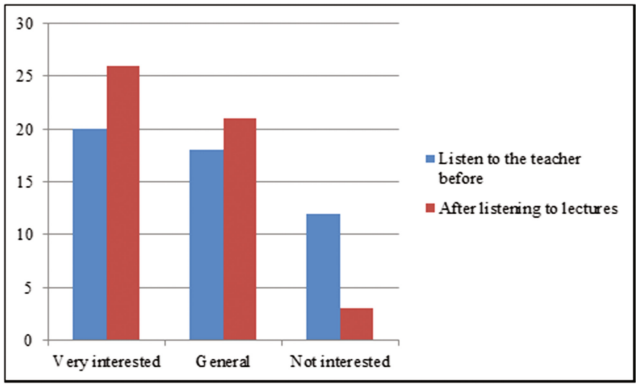

Fig. 5. The experimental group students' English learning interest

5 Conclusion

In recent years, with the rapid development of our economy, people's material life has been significantly improved. Therefore, people are paying more attention to their spiritual and cultural needs. Education is an important guarantee to improve the quality of life and satisfy people's spiritual and cultural demands. As the economic globalization is gaining momentum, our definition of talents is changing and demands for talents are increasing. The traditional teaching model can hardly satisfy the need of our times. For the reform of the cause of education, it is imperative to develop quality education, especially the teaching of English, which is a course our schools, parents and students have attached great importance to. It has become a widely concerned issue to reform the existing English teaching system, improve the teaching quality of English, and cultivate students' comprehensive ability in using English. The rapid development of computer and the Internet technology has brought us infinite possibilities. Many high-grade, precision and advanced technologies such as artificial intelligence technology and virtual reality technology have been introduced into our daily life and work, which has provided an opportunity for the reform of the cause of education. They enable the combination of artificial intelligence technology and English teaching and make it possible to construct a more intelligent and optimized English teaching system.

Through the research in this paper, we can make the following conclusions. Under the environment of reform and development of education, the traditional English teaching model cannot satisfy the teaching demands of our schools and the learning

requirements of our students for knowledge acquisition and capability cultivation. The domestic English teaching models are still at an initial stage with a focus on vocabulary, grammar and translation. Although we have introduced many new media like computer and multimedia, the teaching effect is still not perfect. The multiple intelligence theory emphasizes the differences of teaching and the importance of teaching each student according to their aptitude and inspires the learning interest and initiative of every student. The students should be the subject of learning, while teachers should assist and guide them to improve their comprehensive English application ability [14, 15].

Although some results have been achieved in this paper, there are still some deficiencies. For example, the experimental sample is too small and the experiment duration is not long enough. Therefore, we should continuously deepen our research, expand the scope of research, and optimize the design of the English teaching system so as to make this teaching system to cover multiple disciplines in the upcoming researches.

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Study of the Establishment of a Reliable English-Chinese Machine Translation System Based on Artificial Intelligence

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Abstract. Since twenty-first Century, more and more communication among different countries has made the need for the language translation of the enterprises and individuals more and more. Artificial translation is accurate, but the cost is too high and time-consuming; while the cost of the machine translation is not only low, but the speed is fast. However, the accuracy of machine translation has been criticized by users, therefore, how to build a new generation of machine translation system to improve the accuracy has been imminent. Based on this, a reliable English-Chinese machine translation system based on artificial intelligence is established in this paper, and the principles that should be followed in the process of establishing the system are described in detail, the overall framework, the translation algorithm and the working flow of the system are discussed, and the sentence alignment method based on the translation is proposed. The research results show that the reliable English-Chinese machine translation system based on artificial intelligence designed in this paper can improve the credibility and accuracy of machine translation.

Keywords: Artificial intelligence · Reliability · English-Chinese machine translation · Translation algorithm

1 Introduction

As a cross discipline, machine translation is a high degree of knowledge intensive technology, which needs to be completed by the linguists and computing technology experts [1]. There are still not perfect places in the research and development of the machine translation, but the request of the users is very high, its accuracy needs to be as perfect as the operation [2]. However, even if the computer can help people to complete some intelligent activities, such as computing, but the ability of intelligent translation is different from the operation in essence [3]. The regularity of the operation is strong, the technical staff can sum up the rules to use the computers to simulate the process [4]. The characteristics of the translation work are that the normalization is weak, and its process is difficult to be simulated [5]. So far, the study of the mechanism and the way of the

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brain processing language has been still very little, so machine translation effect has been still not satisfactory, especially the translation of complex sentences and texts [6]. Therefore, it is scientific and practical to build a trusted English-Chinese machine translation system based on artificial intelligence [7].

2 Background

After the advent of the first electronic computer [8], in 1947, engineer Weaver officially proposed the concept of machine translation in his book "Translation", in the decades after that, machine translation has also experienced a tortuous process of development. In 1954, the first machine translation system was proposed, which proved the feasibility of the machine translation system to the world [9]. In 1966, the ALPAC report proposed that it was unnecessary to add more investment to the MT (Transfer System Machine) [10]. The low tide period of machine translation system research was coming [11]. From 1975 to 1989, the second generation of the machine translation systems have been actively developed [12]. This generation of machine translation system has combined many technologies, such as knowledge and separation algorithms, modular design, syntax analysis and semantic analysis of a variety of strategies, and most of them have applied artificial intelligence technology. After 1989, the third generation of machine translation system was born and developed rapidly, this generation of translation system was both based on statistics and based on the actual case, and combined with the advantages of the former two generations of machine translation.

In twenty-first Century, machine translation system also should progress with the times, therefore, this paper presents a reliable English-Chinese machine translation system based on artificial intelligence. In the third section, the established principles, the overall framework, the translation algorithm, the work flow and the automatic alignment method of the bilingual sentences of the machine translation system based on the artificial intelligence are introduced; In the fourth section, the performance of the English-Chinese machine translation system based on artificial intelligence is analyzed, and finally the conclusion is made (as shown in Fig. 1).

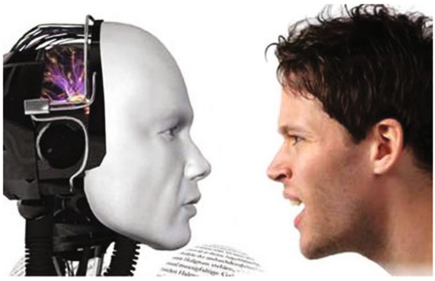

Fig. 1. English-Chinese machine translation system based on artificial intelligence and reliability degree

3 Methods

3.1 Principles of the Establishment of the English-Chinese Machine Translation System Based on Artificial Intelligence

It is a very difficult project to build a reliable English-Chinese machine translation system based on artificial intelligence, which not only needs to guarantee the intelligence of the system, but also maintain the credibility of the system. The following important principles are adopted in the establishment of this system.

Data and procedures are independent of each other: the dictionary used by the machine and the system data of the rules is represented separately in the form of a database file on separate disks, and independent of the translation program, this is not only conducive to data management, maintenance, update, but also conducive to the upgrading and expansion of the translation process. From the point of view of the process control mechanism, "control" and "implementation" are two different mechanisms, the execution mechanism is responsible for the data analysis and operation, and the control mechanism is responsible for the control of the whole system at a higher level. The improvement of the control mechanism will improve the execution mechanism, but will not affect the logical performance of the execution mechanism, and the change of the implementation mechanism will not fundamentally affect the control mechanism, because the control mechanism is only implemented in the underlying implementation mechanism.

Designing a more specialized machine dictionary: in order to improve the quality and efficiency of the English-Chinese machine translation system based on artificial intelligence. The form of "the basic entry professional entry" is used in this system. The literary translation of professional fields is based on dictionary translation and professional entry. Such as the literary translation of the automatic control technology, the dictionary only needs to have basic entry and computer professional entry, when the professional field is changed, it only needs to change a part of the professional items, and maintain the basic items. The dictionary with this structure not only has the inheritance, but also can be removed and replaced, which is conducive to the expansion and improvement of the dictionary.

Paying attention to the order and classification rules of translation: The English-Chinese machine translation system based on the artificial intelligence not only needs to have a suitable machine dictionary, but also needs the appropriate rules, and follows the principles of the first special after the general. The English-Chinese machine translation system based on artificial intelligence should carry on the scientific classification on the basis of the principles of syntax analysis and semantic analysis.

3.2 Overall Framework Design of the English-Chinese Machine Translation System Based on Artificial Intelligence

The framework of an English-Chinese machine translation system based on artificial intelligence can be roughly divided into the following three parts (as shown in Fig. 2).

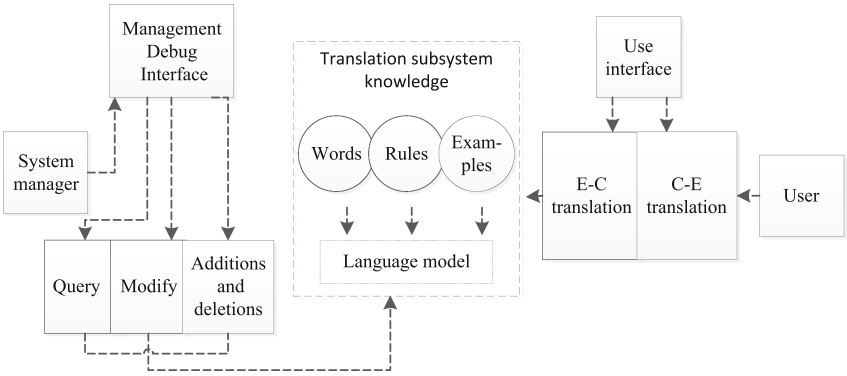

Fig. 2. The framework of the English-Chinese MT System

Translation system knowledge base: the translation process of the English-Chinese machine translation system based on artificial intelligence can be regarded as an application and knowledge of the process of reasoning. Knowledge representation is the basis of this process, and the knowledge representation methods used in the English-Chinese machine translation system based on artificial intelligence is divided into two categories: internal and external knowledge. The external knowledge is stored in the knowledge base, which is managed by the language knowledge, researchers, such as the dictionary and all kinds of rules. The internal knowledge is the sentence to describe the syntax and semantic features of knowledge in the process of translating, such as the tree graph, the structural feature and the semantic network. The knowledge base of the translation system includes a language model, a dictionary, a lot of rule bases and a case base. The dictionary is divided into basic bilingual dictionaries and bilingual dictionaries. Rule base stores the phrase rules, sentence patterns, sentence pattern matching rules, English-Chinese translation rules, and so on; All the rules have the same data structure. Case library stores the English-Chinese bilingual examples and related information.

Part of the processing system: English word processing includes English automatic segmentation and fuzzy word processing, this part is the basis of the combination of phrases and sentence matching, which automatically uses the maximum matching word segmentation algorithm, the system uses the rules and statistical methods to eliminate and merge. In the English analysis part, there are two parts in the system, the combination of phrases, and the sentence matching. The task of phrase merging is to use a variety of phrase rules and methods to divide the class words into five basic phrases, the sentence matching is based on the combination of phrases. In the Chinese- English translation and the Chinese generation part, there are three levels of transformation and generation, including words, phrases and sentences, the tasks and algorithms of each layer are different.

Operation interface: interface includes user interface and administrator management debug interface. For an actual machine translation system, debugging language rules and dictionaries are very important. In the debugged good machine translation system management interface, the system administrator can conveniently and intuitively debug the language rules and dictionaries, this can improve the efficiency of debugging,

improve the quality of the language knowledge base. The management and debugging interface of the English-Chinese machine translation system based on the artificial intelligence is responsible for the maintenance of the knowledge base management and translation and debugging. Knowledge base management function helps the system administrator to create and manage each knowledge base and inquire the debugging operation. For example, the system administrator can carry out debugging through the observation of the specific examples of the translation process of the language knowledge base. The system administrator can manage the production process of any syntax component and the characteristics of the corresponding node attributes and values.

3.3 Translation Algorithm and Work Flow of the English-Chinese Machine Translation System Based on the Artificial Intelligence

People often solve the new sentence through the past learning experience of learning a language, based on this idea, the examples from the corpus can be used to translate new sentences, that is to say, the experience of the past can be aroused by imitating human analogical thinking, and the grammatical structure, the semantic choice and the current translation of the target language are obtained. The translation algorithm of the English-Chinese machine translation system based on the artificial intelligence is based on the

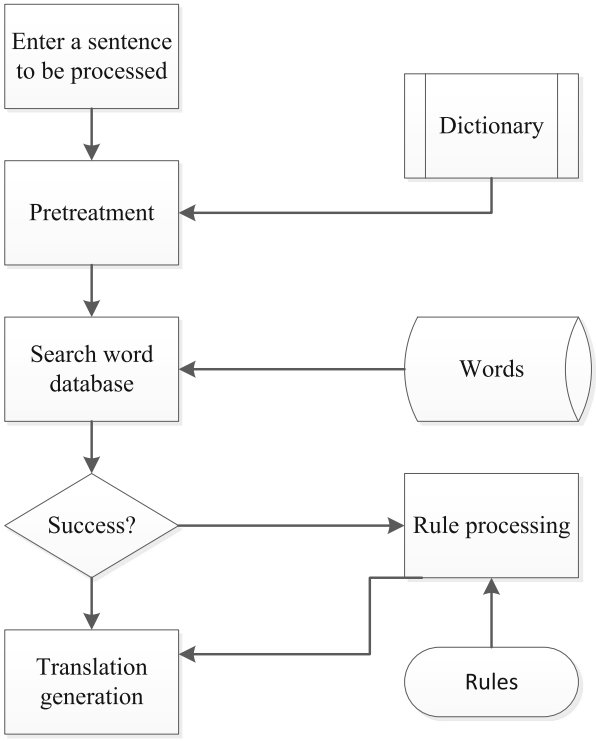

Fig. 3. General procedure of MT System

corpus as a priority, which is the rule of the auxiliary translation throughout. For each sentence, first the pretreatment is carried out, the most similar sentences and phrases in corpus based translation template are found out, if the size of the corpus is not large enough, then the translation is achieved by the rules concluded by the linguists, including the segmentation rules, the rules of the merger, the phrase rules, and the target language rules and so on. The translation process of the trusted English-Chinese machine translation system based on the artificial intelligence is shown in Fig. 3.

Among them, the translation method is based on the principle of conversion, follows the edge analysis, and simultaneously generates the design principles. The specific translation algorithm is shown in Fig. 4.

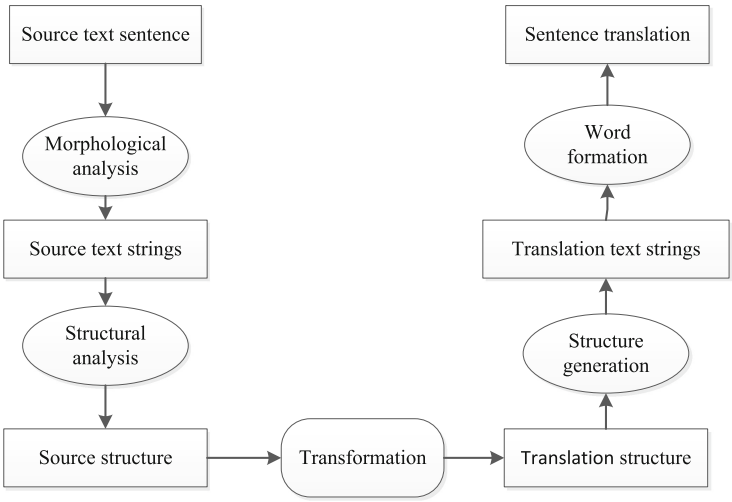

Fig. 4. Procedure on MT System based on rules

Text files, keyboard input and scan input of the three ways can be used to input the original text.

The English morpheme analysis stage is divided into overlapping word processing and segmentation of the two steps, English word segmentation uses the bidirectional maximum matching algorithm. The rule base is used to eliminate ambiguity in the processing of the text word segmentation, when a word segmentation ambiguity occurs, it is unnecessary to make a judgment, it is needed to be maintained to the structural analysis phase to be processed. If there are no disambiguation rules, the Chart Parsing algorithm can be used to transfer the default phase structure, phase analysis adopts a top-down and local sub tree structure generation, phase transformation algorithm uses the method of the combination of partial sub tree transform algorithm and top-down global sub tree displacement algorithm.

3.4 Automatic Alignment Method for Bilingual Sentences in the English-Chinese Machine Translation System Based on the Artificial Intelligence

In the existing machine translation systems, the applications of statistics and case method are more and more extensive, and the bilingual corpus is more and more important. The bilingual corpus has a variety of forms, such as text level, sentence level and lexical level. It is very easy to get to the level of text, but not very useful. Automatic translation of bilingual texts from the textual level is a process of automatic translation and alignment of bilingual sentences, it can further find the relationship between the corresponding vocabulary, and obtain the basis of other translation knowledge.

A large number of studies have been made on the translation by the foreign scholars in India and Europe, and a good result has been achieved. Their approach is summed up in two ways: Based on the length and alignment method, and based on the word alignment method. But there is a big difference between Chinese and India, although these methods can also be used directly, but the effect is not obvious. And due to changes in the language environment, the use of these methods is also a lot of restrictions. On this basis, Wang Bin proposed a sentence alignment method based on comprehensive information, but the accuracy is not high.

Therefore, the establishment of the English-Chinese machine translation system based on the artificial intelligence needs to propose a new alignment method. In this paper, a new method is proposed, which is based on the translation method. The specific contents are as follows:

The formal representation of sentence alignment is: sentence alignment is to regard the translation of a sentence as a sentence with two languages together, and its formal representation is: Setting M and P are the translation the target text of each other, and can be expressed as a combination of sentences, namely, $M = m_1 m_2 \ldots m_n$, $P = p_1 p_2 \ldots p_n$. The Setting U is the minimum alignment of S and T, it consists of x sentences $m_{i1}, \ldots, m_{i+x-1}$ in M and y sentence $p_{i1}, \ldots, p_{i+x-1}$ in P. So the alignment of M and P can be expressed as a sequence of all U: $u_1 u_2 \ldots u_k$, the task of $U_i (i = 1 \sim i)$ is to find a minimum alignment sequence.

Based on the translation of the English-Chinese bilingual sentence alignment. The choice of word evaluation function is based on the choice of the translation of sentence alignment method, which involves not only the English sentences, but also the Chinese sentences. In addition, in order to reduce the influence of the dictionary on alignment accuracy, the part of speech tagging and additional processing are not introduced. As long as there is a translation and Chinese-English sentence in a string matching, it is considered that the English word is the translation in Chinese sentences. This is because in most cases, although the nature of the English words is different, but its meanings in Chinese are similar, but which are not always included in the dictionary.

For the dynamic programming algorithm and overall evaluation function, the dynamic programming algorithm is used in this paper in the process of choosing alignment. The Setting E_1 is the number of sentences in the English segment, and E_2 is the number of sentences in the Chinese segment. The value of each possible sentence in the English and Chinese texts is evaluated, according to the consideration of this article, including: