

# Exploring the Application of Artificial Intelligence in Foreign Language Teaching: Challenges and Future Development

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**Abstract.** With the rapid development of artificial intelligence (AI) technology, it is increasingly being utilized in the field of education, particularly in foreign language teaching. The concept of education meta-universe is also gaining popularity, and the emergence of ChatGPT has revolutionized traditional foreign language teaching methods. AI technologies such as speech recognition, machine translation, and natural language processing have proven to be effective tools to help students improve their foreign language learning outcomes. However, the application of these technologies also brings some challenges and problems. This paper aims to discuss the impact of AI on foreign language teaching, analyze its advantages and disadvantages, explore its future development trend, and provide suggestions for educators to make better use of AI technologies to assist foreign language teaching.

## 1 INTRODUCTION

With the rapid development of AI technology, it has been widely applied in various fields around the world, including education<sup>[1]</sup>. In China, the government has emphasized the importance of integrating AI technology into education, particularly in the context of foreign language learning. In 2018, the Ministry of Education released a plan to promote the integration of AI and education, calling for the development of AI-based education resources and applications.

Meanwhile, in the United States, major tech companies like Google and Microsoft have been investing heavily in AI education technology. Google's "AI for Social Good" initiative aims to use AI to solve some of the world's biggest problems, including education. Microsoft has launched several AI-powered education tools, such as Learning Tools for OneNote, which uses machine learning to improve reading and writing skills.

The concept of an "education meta-universe" has also gained popularity worldwide. The idea is to create a virtual world where students can learn and interact with each other and with AI-based virtual teachers<sup>[1]</sup>. In this way, AI technologies have the potential to transform traditional foreign language teaching methods and offer new possibilities for language learning.

In particular, AI has played an increasingly significant role in foreign language teaching. Speech recognition technology enables students to practice speaking and listening skills with accurate feedback. Machine translation technology provides immediate access to foreign language materials and facilitates communication between students of different languages. Natural language processing technology helps to identify and correct errors in written work.

However, the application of these technologies also brings challenges and potential disadvantages. For example, AI may not be able to fully replace human teachers, especially in areas such as language expression and interpersonal communication<sup>[2]</sup>. The mechanized and standardized teaching style of AI may also lack the human touch and personalized teaching styles that some students require. Moreover, the reliability and accuracy of AI technology can be compromised, leading to incorrect feedback and misleading information.

In conclusion, the application of AI technology in foreign language teaching has its advantages and potential drawbacks. Educators should be aware of both aspects and make use of AI technology to enhance language learning outcomes while ensuring the proper balance between AI and human teaching methods<sup>[3]</sup>. The future development trends of AI in language learning are promising, and continued research and innovation will help educators to make better use of these technologies.

## 2 APPLICATION OF ARTIFICIAL INTELLIGENCE IN FOREIGN LANGUAGE TEACHING

The application of artificial intelligence technology in foreign language teaching has started to become more and more common. The following are some typical application scenarios:

### 2.1 Speech recognition technology

Speech recognition technology has proven to be a valuable tool in foreign language learning as it can significantly improve students' communication skills.

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This technology enables learners to receive immediate feedback on their pronunciation and intonation, which is essential in developing their oral expression skills. As a result, students can become more confident in their ability to communicate in a foreign language, and they are more likely to engage in conversations with native speakers.

Moreover, speech recognition technology can help learners improve their listening and comprehension skills. Students can use speech recognition software to listen to recordings of native speakers, and the software can identify any mistakes in their pronunciation. This enables students to hear the correct pronunciation and intonation of words and phrases, thereby improving their understanding of the language.

Speech recognition technology also provides learners with the opportunity to practice their oral expression skills using training materials and oral practice<sup>[4,5]</sup>. Students can use the software to record themselves speaking, and then compare their recordings to the original recordings of native speakers. This helps students to identify areas that need improvement, and they can work on them to enhance their oral expression skills.

In addition to these benefits, speech recognition technology also enables learners to interact with the language in a more natural way. Students can engage in conversation with the software, which can respond to their questions and comments. This creates a more interactive and engaging learning experience, which can help students develop their language skills more effectively. Overall, speech recognition technology is a valuable tool in foreign language learning, and its continued development will likely lead to even greater benefits for students.

## 2.2 Machine translation technology

Understanding foreign language text and translating it into your own language are two important challenges when learning a foreign language. Machine translation technology can help students better overcome these challenges and improve the efficiency of foreign language learning.

First, machine translation technology can help students better understand foreign language texts. Especially for those difficult to understand language difficulties or rare words, students can use machine translation tools to get better explanation and understanding. When students encounter difficulties in reading foreign language articles or listening to foreign language recordings, they can use machine translation tools to quickly obtain accurate translation results, so as to better understand foreign language texts. This helps students improve their language understanding abilities in the process of foreign language learning, gradually adapt to the foreign language environment, and lay a solid foundation for higher level foreign language learning.

Secondly, machine translation technology can help students improve the efficiency and quality of translation. In foreign language learning, translation is an indispensable link, but translation usually requires a lot of time and effort<sup>[4]</sup>. Through machine translation

technology, students can complete translation tasks more quickly, thus having more time and energy to learn and consolidate foreign language knowledge. In addition, machine translation technology can also improve the accuracy and quality of translation, avoid errors in translation, and improve students' translation level. These can help students master foreign language knowledge faster, improve their language skills, and better communicate and cooperate with the foreign language community.

## 2.3 Natural Language Processing Technology

Natural language processing (NLP) technology is a field of artificial intelligence that focuses on the interaction between computers and human language. It is widely used in foreign language teaching to help students better understand the language they are learning<sup>[1,8]</sup>.

One of the main advantages of NLP technology is that it can provide students with personalized learning materials. By analyzing a student's performance in various language areas, NLP software can generate customized learning materials that meet the student's specific needs. For example, if a student is struggling with vocabulary, the software can provide them with a list of words to practice.

Furthermore, NLP technology can help students learn a foreign language in a more natural way. By analyzing authentic language data such as news articles, social media posts, and conversation transcripts, NLP software can help students learn how to use the language in real-world situations. This can make language learning more engaging and relevant for students.

Overall, NLP technology has great potential to revolutionize foreign language teaching and learning. As the technology continues to develop, we can expect to see even more innovative applications that will help students learn a foreign language more effectively and efficiently.

## 2.4 Chatbot Technology

Chatbot technology is an innovative and effective way to enhance students' foreign language skills. Unlike traditional language learning methods, which may lack the interactivity and flexibility that students need, chatbots provide a personalized and interactive learning experience. By interacting with chatbots, students can practice speaking and listening in a natural and conversational way, just like they would with a real person<sup>[9]</sup>.

Chatbots can provide instant feedback and correction, which is particularly important for language learners. Students can receive feedback on their pronunciation, grammar, and vocabulary usage, and they can make adjustments on the spot. This can help them to improve their language skills more efficiently and effectively.

In addition to providing practice opportunities, chatbots can also serve as a source of language learning materials. For example, ChatGPT can provide learners with real-time translations, definitions, and explanations of complex grammar structures. Learners can also access

a wealth of conversational phrases and expressions that can help them to communicate more effectively in their target language.

Chatbots can be a valuable tool for learners who may not have access to native speakers or language tutors. By engaging with a chatbot, learners can still receive conversational practice and feedback, even if they are unable to practice with a human tutor.

Chatbot technology offers a promising and exciting way to improve foreign language learning outcomes. As technology continues to evolve and improve, we can expect chatbots to become even more sophisticated and effective in helping learners achieve their language learning goals.

## 2.5 Face recognition

Capturing facial expressions, such as changes in the mouth, through face recognition technology can help students better learn a foreign language. When learning a language, students need to constantly practice speaking and listening, and face recognition technology can help students better grasp changes in speech and intonation. For example, when learning English, students need to master the pronunciation rules and phonetic features of English. Through face recognition technology, students can observe the teacher's mouth shape change and pronunciation style in real time, so that they can imitate and learn better. In addition, face recognition technology can help students better understand the facial features of a foreign language when pronouncing and intoning different words and find the key points, thus improving their oral expression and listening comprehension.

## 3 Advantages and Disadvantages of Artificial Intelligence in Foreign Language Teaching

In foreign language teaching, the application of artificial intelligence (AI) technology has achieved some preliminary results, but it also faces some challenges.

Advantages of AI technology in foreign language teaching can mainly be classified into three aspects:

- (1) It can provide students with a large amount of language materials and exercise opportunities. AI technology can provide students with abundant language materials and exercise opportunities through means such as speech recognition and machine translation, thus helping them better master foreign language knowledge and skills.
- (2) It can realize personalized education. AI technology can automatically adjust teaching content and methods based on students' learning situations and characteristics, achieving personalized education and improving learning efficiency.
- (3) It can improve learning efficiency. AI technology can provide students with fast and accurate language materials and exercise opportunities, helping them to master foreign language knowledge and skills more quickly.

However, AI technology also has some disadvantages in foreign language teaching:

- (1) It cannot completely replace the role of human teachers. Although AI technology can provide students with a large amount of language materials and exercise opportunities, it cannot completely replace the role of human teachers, especially in aspects related to language expression and interpersonal communication.
- (2) It lacks a humanized teaching approach. The teaching approach of AI technology is relatively mechanized and monotonous, lacking a humanized teaching approach and failing to provide students with more rich and diversified learning experiences.
- (3) It has technical limitations and security risks. The application of AI technology has technical limitations and security risks, such as speech recognition technology may not accurately recognize students with heavy accents, machine translation technology may have inaccurate translations, and chatbot technology may lead to personal information leakage for students.

## 4 Future development trend of artificial intelligence in foreign language teaching

The future development trend of artificial intelligence (AI) in foreign language teaching is expected to be extensive and innovative. With the rapid development of AI technology, it is believed that the application of AI in foreign language teaching will become more intelligent, interactive, personalized, and efficient<sup>[9]</sup>.

**Personalized education:** AI technology will play a crucial role in better realizing personalized education. AI will be able to analyze data related to individual students' learning situation, strengths, and weaknesses, and adjust teaching content and methods accordingly. This will improve students' learning effectiveness and help them achieve better results in foreign language learning.

**Contextualized teaching:** AI technology will be better applied to contextualized teaching. By simulating various scenarios and situations, AI will help students better understand and apply foreign language knowledge and skills in real-life contexts. This will make foreign language learning more relevant and practical for students.

**Interactive and interesting learning process:** AI technology will make foreign language learning more interactive and interesting for students. By means of game-based teaching, virtual reality, and conversational agents, AI will help students learn foreign languages more easily and enjoyably.

**Automation of language learning:** AI technology will better realize the automation of language learning. AI-powered language learning platforms and robots will enable students to master foreign language knowledge and skills quickly and accurately through voice recognition technology and personalized feedback.

Overall, the future development trend of AI in foreign language teaching will bring more opportunities and challenges that need to be actively explored and applied.

The application of AI technology in foreign language teaching will continue to evolve and improve, making foreign language learning more efficient, engaging, and accessible to all learners.

## 5 Conclusion

The application of artificial intelligence (AI) technology in foreign language teaching has shown promising initial results. AI has enabled the provision of a vast amount of language materials and practice opportunities, resulting in personalized education and improved learning efficiency<sup>[7]</sup>. However, AI in foreign language teaching also faces several problems and challenges, such as the inability to replace human teachers completely, a lack of humanized teaching methods, and technical limitations and safety risks.

In the future, AI technology will be better applied and developed in foreign language teaching to achieve personalized education, contextualized teaching, interactive and interesting learning, and automation of language learning<sup>[10]</sup>. This can be achieved by actively exploring and applying AI technologies to promote the development of foreign language teaching and improve students' learning outcomes.

To ensure the successful implementation of AI technology in foreign language teaching, several suggestions are proposed:

- (4) Teachers need to be trained on the basic knowledge of AI technologies and understand how to use these technologies effectively to improve teaching effectiveness and meet students' needs.
- (5) The application of AI technology in teaching needs to ensure data security and privacy protection to prevent any malicious use of technology.
- (6) AI technology should be applied to personalize education, automatically adjusting teaching content and methods based on students' learning situation and characteristics.
- (7) The application of AI technology should be strengthened in contextualized teaching to help students better understand and apply foreign language knowledge and skills by simulating various scenarios and situations.
- (8) Humanized teaching methods should be developed by leveraging AI technology's advantages in interactivity and fun to enhance students' interest and motivation in learning.
- (9) Continuous exploration and innovation of AI technology's application methods and approaches in foreign language teaching is necessary to improve the teaching effect continuously.

In conclusion, the application of AI technology in foreign language teaching offers both challenges and opportunities. We need to keep exploring and innovating to fully harness the technology's potential to improve students' learning outcomes.

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