Analysis of the Application Potential of English Translation Strategy Based on Wireless Widget Technology in 5G Technology Reports

Xinping Zhang, Henan Medical College, China*

ABSTRACT

As technology continues to evolve, the process of English translation has become easier. A technology called widget, which is used in modern research, provides an efficient graphical user interface for the interaction between the user and the application. This paper compares the newly proposed wireless widget system with existing models of English translation strategies for internet of things (IoT), cloud computing (CC), artificial intelligence and edge computing (AI+EC), and pure internet concepts. These models were compared on metrics such as accuracy, search completion rate, and throughput. The results show that the proposed system outperforms the existing models with an accuracy rate of 98%, a search completion rate of 96%, and a maximum throughput of 96%. The model shows high performance advantages and can effectively improve the efficiency of translation work.

KEYWORDS

5G Wireless Technologies, Artificial Intelligence, Cloud Computing (CC), Internet of Things (IoT), Widget Technologies

INTRODUCTION

The popularity and growth of the Internet have significantly changed instructors' teaching strategies. Modern teachers can manage thousands of students via the Internet without much auxiliary help. Web technology allows real-time communication between educators and administrators, rivaling the more intimate interactions in traditional classroom settings (Du, 2021). The availability of online education has also allowed consumers to access high-quality programs without leaving their homes. Anyone with a computer and a willingness to learn has the potential to earn a college degree. This convenience makes education more accessible and inspires innovative approaches by removing barriers such as time and location (Zhang, 2020).

To operate commercially, 5G networks must be licensed. However, 5G technology represents a key driver of information technology innovation, reshaping the nature of the entire information

DOI: 10.4018/IJICTE.339969

*Corresponding Author

economy. In the future, 5G wireless networks are expected to be a key option to fulfill customers' needs for reliable and fast network connectivity, especially in congested urban areas, because of their ultra-high transmission speeds, continuous stability, and low latency index. Only about 20% of 5G usage occurs outdoors since 5G systems are primarily used in indoor cellular frameworks (Sun, 2021). However, the walls of a typical home may interfere with and weaken wireless network signals, reducing the efficiency of the available spectrum and resulting in a decreased data transmission rate. The development and deployment of 5G technology not only improves the user experience but also helps mitigate this problem (Shah et al., 2020).

The continuous development of AI technology has brought us to the cutting edge of the AI era. In this era, humans must aim to achieve peaceful coexistence with machines. To do so, we must pay more attention to AI education to help young people adapt to AI and prepare them to learn and work in today's smart society (Zhang & Zhan, 2020).

Currently, more and more people are participating in online programs. However, in the wake of the epidemic and the widespread adoption of online English education, several issues have emerged. These include the diversity of the student population, the variation in educational platforms, and the difficulty of conducting classroom activities. Moreover, some students may lack the confidence to speak in class because they have never had the opportunity to develop their public speaking skills outside of an online learning environment (Hu & Wu, 2023).

The online classroom limits educators' ability to understand students' emotions. They may have difficulty communicating with students and provide less than optimal lessons. Online English teachers must overcome several challenges and continually reevaluate their educational practices. The purpose of language is communication, yet traditional teaching methods are no longer sufficient to meet the needs of today's and tomorrow's educators and learners (Xu, 2021).

On the other hand, new teaching models based on 5G technology may increase student motivation and help improve English language proficiency. At the same time, teachers can easily and quickly adjust lesson plans and classroom content using the new English language model created by 5G technology (Zhang, 2020). Through various measures, a quantitative analysis model of advanced technologies for teaching English in higher education has been developed.

This study proposes a 5G-based soft computing system for writing and translating university English speeches (Lei, 2020). The proposed technology for studying this new network has the potential to generally improve students' English writing skills and increase resource sharing, teacher–student interaction, and student engagement. The proposed language translation method could disseminate linguistic information much more effectively than it does today. Contrary to popular belief, technological advances in today's classrooms have nothing to do with the traditional presence of textbooks or the basic framework of the current educational system (Islam & Hasan, 2020). Children benefit from smart classrooms because they can better communicate, learn, and write. Moreover, the classroom reflects and meets students' and teachers' expectations. Higher education institutions provide students and teachers access to a variety of fascinating environments, creative resources, and knowledge. The success of both faculty and students depends on a novel approach and method of motivation. Like the world of work, academia adapts quickly to technological change. Examples of state-of-the-art technology include cameras, remote controls, and 5G networks (Sharadgah & Sa'di, 2022).

Proponents of potentially disruptive technologies such as 5G and the Internet of Things may use these as the basis for future debates. To manage the decoding process during translation, we created a 5G network-based wireless widget for English translation and compared it to other English translation platforms. The results of the study show that the 5G network-based wireless widget approach has the potential to significantly improve translation quality and reduce translation time.

RELATED CONCEPTS

English Translation Using 5G

Although the development of online teaching models has improved online education and teacher efficiency, teachers still face difficulties collecting, evaluating, and processing large amounts of data (Hsu et al., 2023). However, AI and 5G technologies can systematically solve these problems. Therefore, research to create new teaching methods can utilize the maturity of emerging technologies as a springboard (Chen et al., 2020).

Personal computers have become an essential tool for managing digital learning in higher education, thanks to the need for continuous competence, the rapid development of research and methodologies, and the widespread use of networked technologies such as the Internet (Hwang et al., 2020). The Internet is not only a convenient resource but also a central node on the information superhighway, a place for social interaction, and a conduit for serious scholarship. Therefore, online education that utilizes advances in instructional technology is critical for students and educators (Cope et al., 2021).

With the advent of blended learning, online courses, mini-classes, and other innovative educational methods, the role of the teacher has shifted from dictator to advisor, and English language teaching (ELT) methods have become more focused on the students themselves. By utilizing big data networks with smart education and artificial intelligence, students can access the ELT environment on virtually any mobile device with internet access. This will provide students with a more positive classroom environment (Hwang et al., 2020).

The English classroom of the future will include cutting-edge technological tools to motivate students (Jung, 2015). Web-based language education and audio pedagogy should also be included in the methods and indicators of 5G innovation. Using artificial intelligence technology to process educational pedagogical data, researchers can focus on a simple and effective platform. In addition, researchers advocate developing a new and adaptable method of recognizing spoken English to overcome the difficulties of learning English in China (Mosalanejad et al., 2013).

The business English translation system should be based on edge computing, and the business English translation method has been proven effective by analyzing the results of simulation tests. Using phrase-based statistical machine translation and deep neural network-based automatic speech recognition techniques, systems that automatically translate English lectures into Japanese can be developed. However, the accuracy of the translation model suffers when false positives occur in speech recognition. To reduce speech recognition errors, a parallel corpus of real-world examples can be used as training data (Hong, 2021).

In conclusion, by utilizing the intelligence of modern educational technology and training, we can better respond to market changes and take advantage of new technologies. Educators who adopt 5G-enabled services may be better adapted to future knowledge dissemination (Qian et al., 2021).

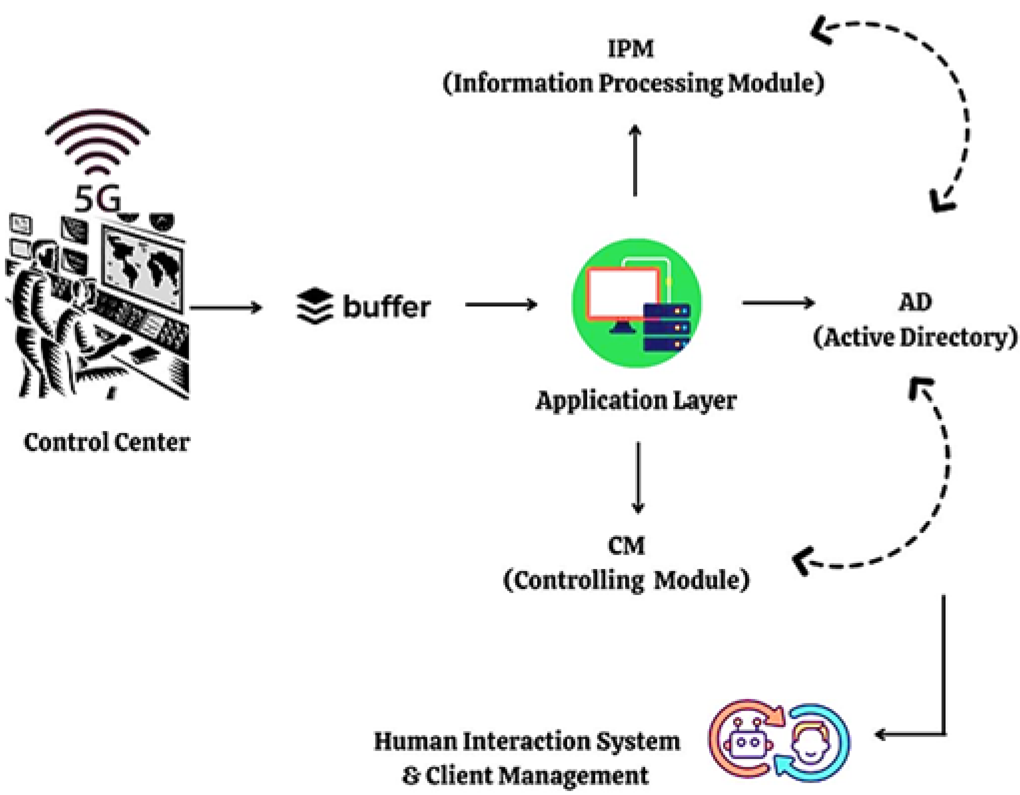
Related Works

Statistical machine translation has been used for translation between many language pairs, contributing to its popularity in recent years. Mohaghegh and Sarrafzadeh (2009) describe the problems in creating a corpus and building a baseline system. 5G subscriptions are expected to be commercial technology from 2020 onwards, ensuring 5G can manage mobile traffic (Mohaghegh & Sarrafzadeh, 2009). Ezhilarasan and Dinakaran (2017) studied 3G, 4G, and 5G network technologies (Ezhilarasan & Dinakaran, 2017). Kim et al. (2018) introduced a 5G K-Simulator consisting of a link-level simulator (5G K-SimLink), a system-level simulator (5G K-SimSys), and a network simulator (5G K-SimNet). Using the 5G K-Simulator, universities, research institutes, and industries can easily develop and verify 5G technology (Kim et al., 2018). The evolving 5G cellular wireless networks are envisioned to provide higher data rates, enhanced end-user quality of experience (QoE), reduced end-to-end latency, and lower energy consumption. Hussein et al. (2020) conducted a detailed survey on the integration of D2D communication into cellular networks, especially 5G networks. The development of wireless communication technology and the widespread application of big data has accelerated globalization (Hussein et al., 2020). Gao (2021) offers solutions to several existing problems. By combining the characteristics of SAR images, learning-based super-high-resolution image reconstruction technology has been added to the field and applied in reality (Liao, 2021). Liao (2021) studied the process of urban English translation, making corresponding analysis and preparation before translation and paying attention to relevant replies and reports after translation. Henceforth, the Internet of Things (IoT) and 5G will play a significant role in mobile applications and networks for health applications, smart watches, smart cities, smart cards, and beacons, for example. Painuly et al. (2021) discussed the concept of IoT along with its implementation, specifications, potential challenges, and parameters related to modern 5G technology. Jian (2022) analyzed the feature extraction methods of IoT terms and studied the application content of IoT technology in English–Chinese translation. Based on terminology characteristics and existing terminology translation methods, the paper proposed various translation methods, such as literal translation, decomposing and combining, and non-translation (Jian, 2022).

MATERIALS AND METHODS

This section describes techniques to improve the delivery of English language educational translations using 5G network virtualization algorithms. The analysis includes a primary data evaluation technique that builds relationships based on content and involves many translation devices. Figure 1 shows a similarity-based clustering technique for organizing an optimization method for adapting the optimized spectrum.

Figure 1. Proposed Approach—5G-Wireless Widget



Today, many people use wireless technology in their smartphones. The 5G generation of technology offers numerous benefits to users, providing fast and efficient networking capabilities. One of the critical advantages involves wireless widget technology, which plays a significant role in enhancing user experience.

The maintained height of an English translation strategy leaf widget *m* such that *n* fits into a rectangle of size *m*h*, as in Equation 1, where *ETS* stands for English translation strategies and *wg* stands for widget:

$$ETS\ wg\left(m,n\right) \tag{1}$$

The variable *n'* is chosen to be less than or equal to *n*. Then, the English translation strategy leaf widget is defined as in Equation 2:

$$ETS\ wg\left(leaf\ \ m,n\right) = \min(t\ for\left(n^{'},t\right) \in m\ /\ if\ \ n^{'}\ \leq n) \tag{2}$$

This equation identifies the pair of elements (*n'*, *t*) in set m that satisfies the condition *n'* ≤ *n* and returns the smallest value of *t* that satisfies the condition. It is used to compute the minimum height of a leaf widget that adapts to the given *n* value.

The internal English translation strategy widget in the vertical orientation is defined as in Equation 3:

$$ETS\ wgVO\left(int\,m,n\right) = sum\,of\ ETS\,wg\left(s,n\right) for\,s \in m \tag{3}$$

This equation computes the value of *ETSwg*(*s*, *n*) separately for all elements *s* in the set *m* and finds the sum of these values. It calculates the total height of multiple leaf widgets that satisfy the given *n* value.

The above equation says that the minimum height *m* of the width constraint *n* as well as *n* in the vertical orientation. The internal English translation strategy widget in the horizontal orientation is defined in Equation 4:

$$ETS\ wgHO\left(m,n\right) = ETSH\left(m,n,1\right) \tag{4}$$

where *ETAwgHO*(*m*, *n*) is the minimum height of a widget *m*, with *m* set to the horizontal orientation. *ETSH*(*m*, *n*, 1) is the minimum height of *m*, with all of its children in the horizontal layout. *ETSH*(*m*, *n*, *j*) is defined as follows: If we fit a rectangle of *n* x *height*, *ETSH*(*m*, *n*, *j*) is the minimum height such that the horizontal layout of m.ch[j] is represented in Equation 5:

$$ETSH\left(m,n,j\right) = min\left\{hl\,m.ch\left[j\right]\right\} \tag{5}$$

where *m.ch[j]* is the j^{th} child of *m* to the last child *m*. Consider that the width of the j^{th} child is at most *n'*. Consider the two components of this segment: first on the j^{th} child and height of the English training strategy widget as in Equation 6:

$$EST\,wg\left(m.ch\left[j\right],n'\right) = X \tag{6}$$

Another component is the group formed after the j^{th} child for $1 \leq n' \leq n$ as in Equation 7:

$$ETSH\left(m, n - n', j + 1\right) = Y \tag{7}$$

Taking the maximum of the above components as in Equation 8:

$$Z = maximum\left\{X, Y\right\} \tag{8}$$

Then, the value of $ETSH(m, n, j)$ takes the minimum of Z, as in Equation 9:

$$ETSH\left(m, n, j\right) = minimum\,Z \tag{9}$$

The internal widget of the ETS is as in Equation 10:

$$ETS\,wg\left(int\,m, n\right) = \min\left\{sum\,ETSH\left(ETS\,wg\left(a, n\right) for\,a \in m.ch\right), ETSH\left(m, n, 1\right)\right\} \tag{10}$$

The root widget of the ETS is denoted by Equation 11:

$$ETS\,wg\left(rt, M\right) \tag{11}$$

Next, we consider Equation (12):

$$ETS\,wg\left(rt, M\right) \leq W \tag{12}$$

When $ETSwg(rt, M) \leq W$ holds, the widget can be considered to conform to the specified constraints regarding dimensions, proportions, or other relevant properties. This may mean that the widget adapts to the given spatial constraints or satisfies the dimensional constraints in the design requirements.

Then, we fit the widget into an M x W rectangle. The widget does not fit a M x W rectangle if the condition in Equation 13 is satisfied:

$$ETS\,wg\left(rt, M\right) > W \tag{13}$$

RESULTS AND DISCUSSION

We compared the wireless translation widget technology with existing technologies in terms of performance metrics. Existing technologies include the IoT (Hou & Zhang, 2022), cloud computing (Liang, 2022), AI + edge computing (Xu, 2021), and Internet Plus (Chen, 2020).

We collected English language texts accessed through publications such as books, magazines, and newspapers, choosing different types of books covering a variety of domains and topics to ensure a wide range of language coverage. We also selected English texts from the wealth of resources available on the Internet, including platforms such as news websites, blogs, forums, and social media, which provide English texts from a variety of fields and contexts.

Table 1 and Figure 2 indicate that the translation platform performs poorly in terms of specific types of errors, with chapter errors having the highest frequency at 120.

The table shows that as the number of Chinese words increases, the frequency of various error types increases. Chapter error is the most common error type, and its frequency increases with the number of Chinese words. The frequency of other error types and ontology errors is relatively low, while the frequency of paragraph errors is in between.

Figure 3 and Table 2 show that ontological errors accounted for a small proportion of all errors. In addition, the number of errors in the original text recognition and sentence segmentation was high, showing a gradual increase with the increase in the number of Chinese words.

Figure 4 and Table 3 show that most types of errors occur with a frequency of less than four times, with the exception of term errors, which occur often. An error of unequal semantic range cannot happen when the number of Chinese words is less than 2,500.

Figure 2. Frequency of Error Types

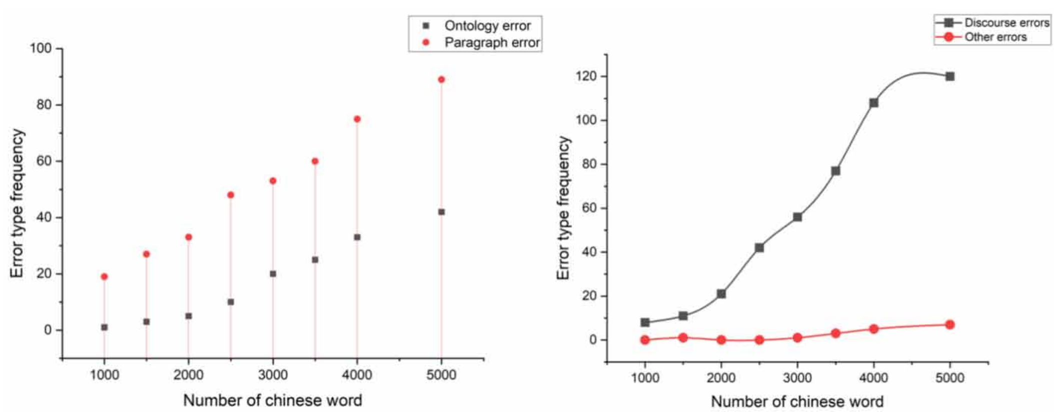


Table 1. Frequency of Error Types

Number of Chinese words	Error type frequency			
	Discourse errors	Other errors	Ontology error	Paragraph error
1,000	8	0	1	19
1,500	11	1	3	27
2,000	21	0	5	33
2,500	42	0	10	48
3,000	56	1	20	53
3,500	77	3	25	60
4,000	108	5	33	75
5,000	120	7	42	89

Figure 3. Ontology Error Among English Translation Errors

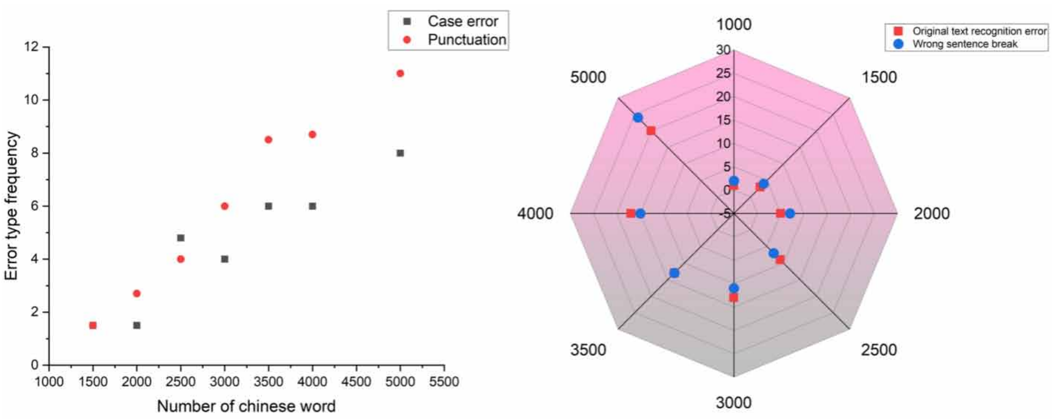


Table 2. Ontology Error Among English Translation Errors

Number of Chinese words	Error type frequency			
	Case error	Punctuation	Original text recognition error	Wrong sentence break
1,000			1	2
1,500	1.5	1.5	3	4
2,000	1.5	2.7	5	7
2,500	4.8	4	9	7
3,000	4	6	13	11
3,500	6	8.5	13	13
4,000	6	8.7	17	15
5,000	8	11	20	24

Figure 4. Frequency Map of Semantic Errors

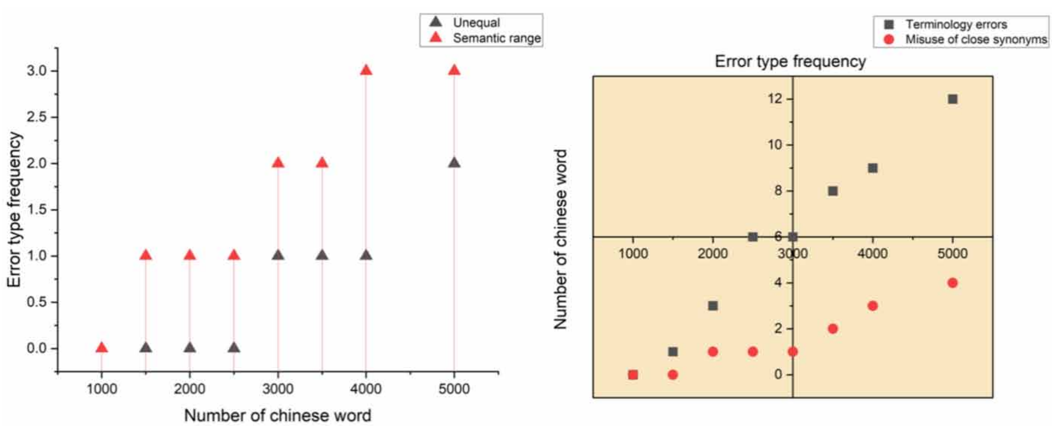


Table 3. Frequency Map of Semantic Errors

Number of Chinese words	Error type frequency			
	Terminology errors	Close synonyms, misuse	Unequal	Semantic range
1,000	0	0	0	0
1,500	1	0	0	1
2,000	3	1	0	1
2,500	6	1	0	1
3,000	6	1	1	2
3,500	8	2	1	2
4,000	9	3	1	3
5,000	12	4	2	3

Figure 5 and Table 4 demonstrate that the suggested approach yields respectable results when translating English into a machine-readable form. Compared to current systems, the accuracy improves by over 20% when the number of repeats is low.

Figure 6 depicts the memory usage results for both the proposed and existing solutions. According to the analysis displayed in Figure 6, the wireless widget technology consumes less memory than the existing technologies.

The throughput statistics for both the suggested and existing solutions are shown in Figure 7. The wireless widget technology transmits the most data compared to other technologies.

CONCLUSION

As technology advances, efforts are being made to refine the process of English translation and reduce the workload involved. One such attempt involves the use of wireless sensor networks and 5G technology to compile reports on various wireless technologies used in English-to-English translation. This wireless widget technology is used in conjunction with 5G wireless technology to create an intuitive graphical user interface for the program.

Figure 5. English Translation Precision and Recall

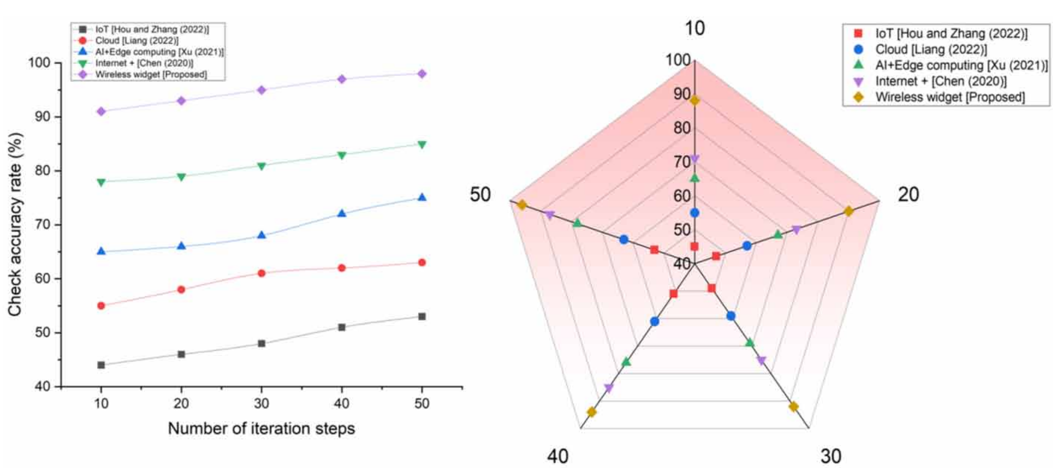
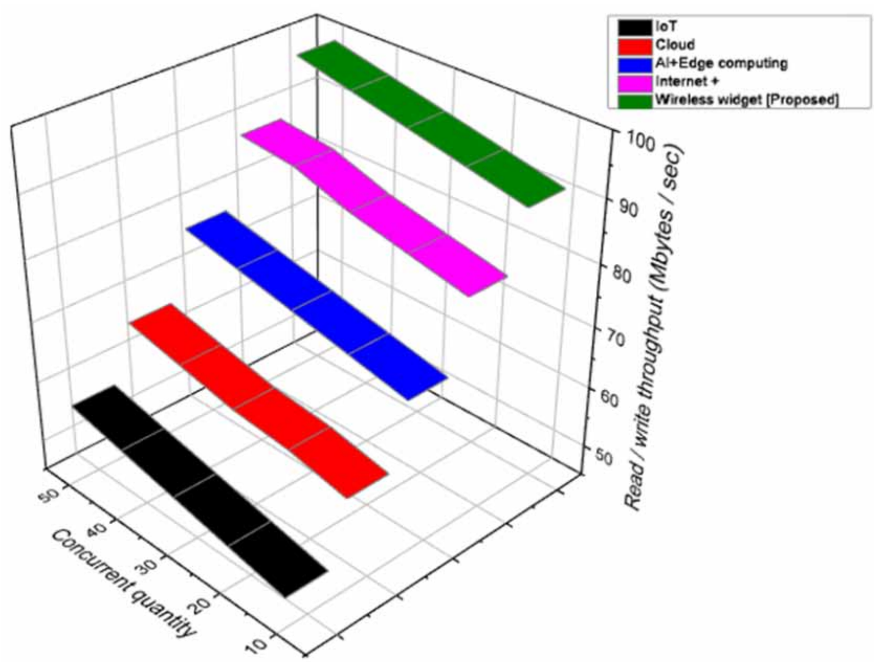


Table 4. English Translation Precision and Recall

Number of iteration steps	Check accuracy rate (%)					Search completion rate (%)				
	IoT	Cloud	AI+Edge computing	Internet +	5G Wireless widget	IoT	Cloud	AI+Edge computing	Internet+	5G Wireless widget
10	44	55	65	78	91	45	55	65	71	88
20	46	58	66	79	93	47	57	67	73	90
30	48	61	68	81	95	49	59	69	75	92
40	51	62	72	83	97	51	61	76	85	94
50	53	63	75	85	98	53	63	78	87	96

Figure 6. Throughput

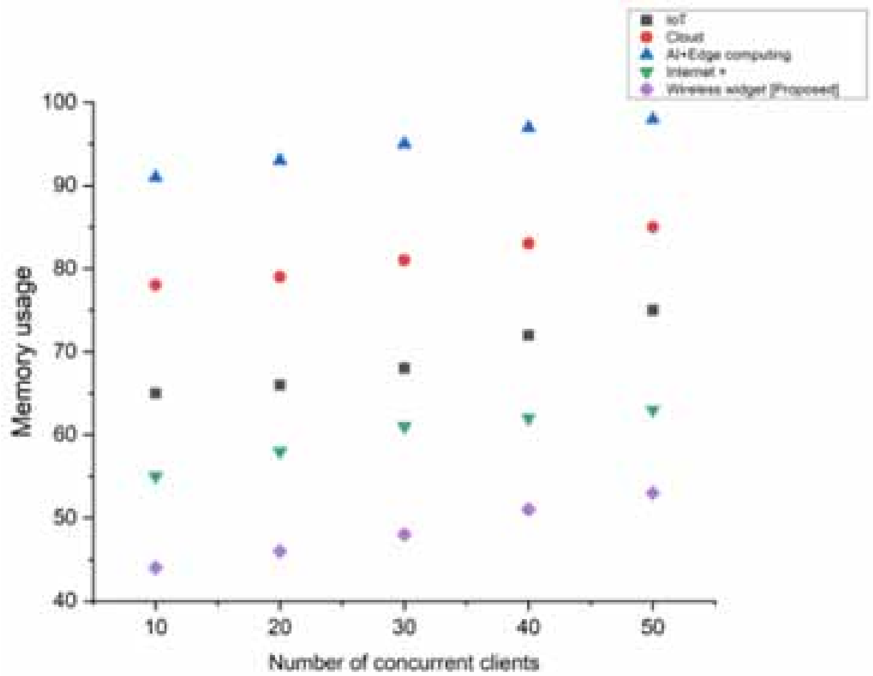


This study compares the suggested wireless widget system with existing models, including IoT, cloud computing, artificial intelligence with edge computing, and Internet-only concepts for English translation methodologies. We used accuracy, search completion rate, and throughput as metrics to evaluate the models. The results indicate that the suggested system outperforms the existing models in terms of accuracy (98%), search completion rate (96%), and maximum throughput (96%).

In summary, the suggested wireless widget system represents a significant advancement in English translation technology, with superior performance metrics compared to existing models.

Cultural and linguistic differences have a significant impact on the use of 5G technologies in English language education and translation. Individual differences and needs of learners, as well as language differences, must be considered for optimization. Further research should focus on the needs of different cultural and linguistic contexts and improving the quality and efficiency of wireless widget technology-based English translation strategies. Innovations such as multimodal translation,

Figure 7. Memory Usage



personalized services, cross-domain translation, and collaborative translation can provide more accurate, comprehensive, and intelligent translation services and advance the development of AI technology in language translation.

REFERENCES

Chen, G. (2020). A study of English–Chinese translation of commercial advertisements under the background of "Internet+.". *Journal of Physics: Conference Series*, *1544*(1), 012041. doi:10.1088/1742-6596/1544/1/012041 PMID:34191934

Chen, X., Xie, H., & Hwang, G. J. (2020). A multi-perspective study on artificial intelligence in education: Grants, conferences, journals, software tools, institutions, and researchers. *Computers and Education: Artificial Intelligence*, *1*, 100005. doi:10.1016/j.caeai.2020.100005

Cope, B., Kalantzis, M., & Searsmith, D. (2021). Artificial intelligence for education: Knowledge and its assessment in AI-enabled learning ecologies. *Educational Philosophy and Theory*, *53*(12), 1229–1245. doi:10.1080/00131857.2020.1728732

Du, Y. (2021). Retracted: Improvement of English teaching model based on computer network. *Journal of Sensors*, *2021*, 1–10.

Ezhilarasan, E., & Dinakaran, M. (2017). A review on mobile technologies: 3G, 4G and 5G. In *Proceedings of the Second International Conference on Recent Trends and Challenges in Computational Models (ICRTCCM)* (pp. 369–373). IEEE. doi:10.1109/ICRTCCM.2017.90

Gao, B. (2021). Analysis of the needs of English–Chinese translation courses and research on teaching strategies under the background of wireless communication and big data. *Wireless Communications and Mobile Computing*, *2021*, 1–5. doi:10.1155/2021/3424658

Hong, H. (2021). Research on campus education information system based on Internet of Things and artificial intelligence decision. *Wireless Communications and Mobile Computing*, *2021*, 1–17. doi:10.1155/2021/2460916

Hsu, M. H., Chen, P. S., & Yu, C. S. (2023). Proposing a task-oriented chatbot system for EFL learners speaking practice. *Interactive Learning Environments*, *31*(7), 4297–4308. doi:10.1080/10494820.2021.1960864

Hu, R., & Wu, K. (2023). Edge computing and 5G based low-delay business English translation framework. *Internet Technology Letters*, *6*(5), e321. doi:10.1002/itl2.321

Hussein, H. H., Elsayed, H. A., & Abd El-kader, S. M. (2020). Enabling device-to-device technology in 5G heterogeneous networks. In *Fundamental and Supportive Technologies for 5G Mobile Networks* (pp. 187–212). IGI Global.

Hwang, G. J., Xie, H., Wah, B. W., & Gašević, D. (2020). Vision, challenges, roles and research issues of artificial intelligence in Education. *Computers and Education: Artificial Intelligence*, *1*, 100001. doi:10.1016/j.caeai.2020.100001

Islam, A. S., & Hasan, M. (2020). The effectiveness of mobile assisted language learning (MALL) on ESL listening skill. *NOBEL: Journal of Literature and Language Teaching*, *11*(2), 188–202. doi:10.15642/NOBEL.2020.11.2.188-202

Jian, L. (2022). The Internet of Things term feature extraction method and its application in English–Chinese translation. *Computational Intelligence and Neuroscience*, *2022*, 2022. doi:10.1155/2022/2134627 PMID:35463248

Jung, H. J. (2015). Fostering an English teaching environment: Factors influencing English as a foreign language teachers' adoption of mobile learning. *Informatics in Education-An International Journal*, *14*(2), 219–241. doi:10.15388/infedu.2015.13

Kim, Y., Bae, J., Lim, J., Park, E., Baek, J., Han, S. I., Chu, C., & Han, Y. (2018). 5G K-simulator: 5G system simulator for performance evaluation. In *Proceedings of the IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)* (pp. 1–2). IEEE. doi:10.1109/DySPAN.2018.8610404

Lei, X. (2020). The research on optimization strategy of college English teaching mode based on 5G technology and artificial intelligence technology. In *Proceedings of the International Conference on Virtual Reality and Intelligent Systems (ICVRIS)* (pp. 869–872). IEEE. doi:10.1109/ICVRIS51417.2020.00212

Liang, C. (2022, August). Distributed computer solution design of tourism English translation strategy based on cloud real-time collaborative system. In *Proceedings of the 3rd International Conference on Electronics and Sustainable Communication Systems (ICESC)* (pp. 1270–1273). IEEE. doi:10.1109/ICESC54411.2022.9885416

Liao, W. (2021). Retracted article: Evolution of dissolved total solids in groundwater based on high resolution image processing and evaluation of urban English translation. *Arabian Journal of Geosciences*, *14*(17), 1683. doi:10.1007/s12517-021-08028-9

Liu, M., Navarrete, C., Maradiegue, E., & Wivagg, J. (2014). Mobile learning and English language learners: A case study of using iPod touch as a teaching and learning tool. *Journal of Interactive Learning Research*, *25*(3), 373–403.

Mohaghegh, M., & Sarrafzadeh, A. (2009). An analysis of the effect of training data variation in English–Persian statistical machine translation. In *Proceedings of the International Conference on Innovations in Information Technology (IIT)* (pp. 105–109). IEEE. doi:10.1109/IIT.2009.5413782

Mosalanejad, L., Najafipour, S., & Dastpak, M. (2013). Is the mobile based learning can be effective in academic learning? A study to check if mobile-based learning is desirable in presenting educational workshops. *Turkish Online Journal of Distance Education*, *14*(4), 155–163.

Painuly, S., Sharma, S., & Matta, P. (2021). Future trends and challenges in next generation smart application of 5G-IoT. In *Proceedings of the 5th International Conference on Computing Methodologies and Communication (ICCMC)* (pp. 354–357). IEEE. doi:10.1109/ICCMC51019.2021.9418471

Qian, K., Schmitt, M., Zheng, H., Koike, T., Han, J., Liu, J., Ji, W., Duan, J., Song, M., Yang, Z., Ren, Z., Liu, S., Zhang, Z., Yamamoto, Y., & Schuller, B. W. (2021). Computer audition for fighting the sars-cov-2 corona crisis—Introducing the multitask speech corpus for Covid-19. *IEEE Internet of Things Journal*, *8*(21), 16035–16046. doi:10.1109/JIOT.2021.3067605 PMID:35782182

Shah, S. T. U., Li, J., Guo, Z., Li, G., & Zhou, Q. (2020). DDFL: A deep dual function learning-based model for recommender systems. In *Proceeding of the International Conference on Database Systems for Advanced Applications* (pp. 590–606). Cham: Springer International Publishing. doi:10.1007/978-3-030-59419-0_36

Sharadgah, T. A., & Sa'di, R. A. (2022). A systematic review of research on the use of artificial intelligence in English language teaching and learning (2015–2021): What are the current effects? *Journal of Information Technology Education*, 21.

Sun, X. (2021). 5G joint artificial intelligence technology in the innovation and reform of university English education. *Wireless Communications and Mobile Computing*, *2021*, 1–10. doi:10.1155/2021/2460916

Xu, Y. (2021). Research on business English translation architecture based on artificial intelligence speech recognition and edge computing. *Wireless Communications and Mobile Computing*, *2021*, 1–10. doi:10.1155/2021/5518868

Zhang, M., & Zhan, Y. (2020). Research on the innovation of college English teaching based on curriculum thinking. *International Journal of Electrical Engineering Education*, 0020720920931445.

Zhang, S. (2020). Evaluation of learners' visual attention in online English guiding system based on large-scale 5G and information mining. In *Proceedings of the Second International Conference on Inventive Research in Computing Applications (ICIRCA)* (pp. 299–302). IEEE. doi:10.1109/ICIRCA48905.2020.9183302

APPENDIX

Data Availability Statement: The data that support the findings of this study are available from the corresponding author.

Competing Interests: The authors of this publication declare there are no competing interests.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. Funding for this research was covered by the authors of the article.

Xinping Zhang was born in Henan, China, in 1983. From 2002 to 2006, she studied in Zhengzhou University of Aeronautics and received her bachelor's degree in 2006. From 2006 to 2009, she studied in Zhengzhou University and received her Master's degree in 2009. She has published a total of 6 papers. Her research interests are College English Teaching and Research, English Language and Literature, British and American Literature and English Translation.