Accuracy Analysis of Artificial Intelligence in Arabic Language Translation and Grammatical Rule Mapping

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Abstract: The development of Artificial Intelligence (AI) has been used in various applications that are able to translate Arabic and map its grammatical rules automatically. In the field of linguistics, especially Arabic, AI has the potential to help and speed up the translation process as well as complex grammar analysis. However, some linguistic aspects, such as sentence context, nuances of meaning, and *i'rab* interpretation, are still a challenge for AI systems. This article presents the analysis of AI's ability to punctuate, translate and map Arabic rules, and assess the extent to which it can replace humans. The research method used was a literature study with a content analysis approach. The objects studied were Arabic *mahfudzhot* selected based on the objectives with the book to analyze the AI with *Kitab Nahwu Wadhih.* This study found that the three AIs analyzed have their own advantages and disadvantages. ChatGPT has the largest percentage score in punctuation (*harakat*) and Arabic rule mapping (*i'rab*). As for the translation, Gemini has a superior percentage score compared to ChatGPT and Perplexity. Although AI is able to perform literal translation and structural analysis, the shortcomings were frequently showed as its results, so a human is needed to ensure accuracy and contextualized interpretation. These results showed that AI can serve as an effective tool, but cannot fully replace human expertise in Arabic linguistics.

Introduction

In this era, human interaction with AI is increasingly intense. AI has developed rapidly and touched various lines of life including the field of education.[1] Based on data

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[1] Iqbal H. Sarker, "Machine Learning: Algorithms, Real-World Applications and Research Directions," *SN Computer Science* 2, no. 3 (2021): 160.

from the Horizon Report 2019, AI in the field of education is increased by 43% in 2018.[2] The popularity of AI, especially GPT, is growing rapidly at the end of 2022.[3]

Nowadays, AI has offered features that facilitate academics to be able to complete work faster and more efficiently.[4] AI is an intelligent assistant that can be utilized for a variety of purposes.[5] One of them is to improvise different learning experiences for students.[6] Based on research data, AI has made its browser widespread and accommodates various sectors in the field of education. The following is AI data with various features that have helped students and academics in the field of education:[7]
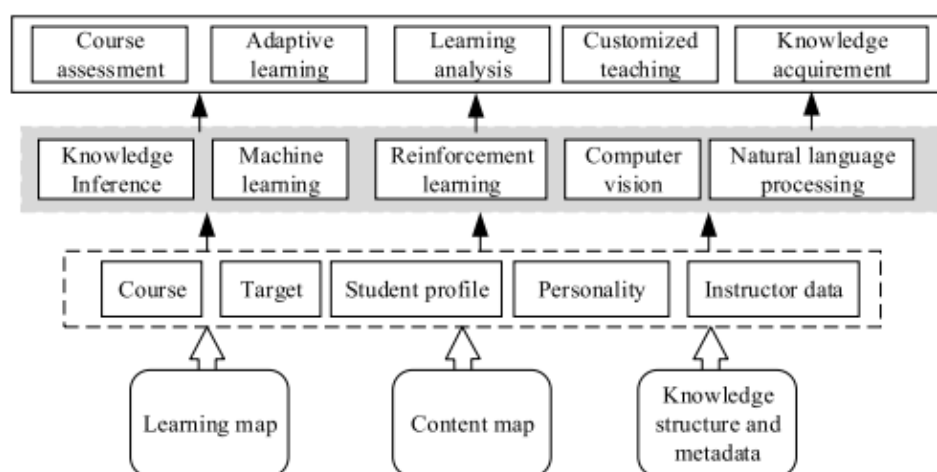

Figure 1. The Utilization of AI in Education

The figure 1 The Utilization of AI in Education shows that AI can be leveraged to create learning maps that include courses and target objects by utilizing machine learning and knowledge inference. This tool is adaptive and can measure assessments in education.[8] The AI used for material maps can be visualized into student profiles and

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[2] Bryan Alexander, et al., "Educause Horizon Report: 2019 Higher Education Edition, 2019." *Retrieved May* 8 (2023).

[3] Jim Samuel, et al., "Adaptive Cognitive Fit: Artificial Intelligence Augmented Management of Information Facets and Representations," *International Journal of Information Management* 65 (2022): 102505.

[4] Maud Chassignol, et al., "Artificial Intelligence Trends in Education: A Narrative Overview," *Procedia Computer Science* 136 (2018): 16–24.

[5] Mohammad Hossein Jarrahi, "Artificial Intelligence and the Future of Work: Human-AI Symbiosis in Organizational Decision Making," *Business Horizons* 61, no. 4 (2018): 577–586.

[6] Michael J Timms, "Letting Artificial Intelligence in Education Out of the Box: Educational Cobots and Smart Classrooms," *International Journal of Artificial Intelligence in Education* 26, no. 2 (2016): 701–712.

[7] Lijia Chen, Pingping Chen, and Zhijian Lin, "Artificial Intelligence in Education: A Review," *Ieee Access* 8 (2020): 75264–75278.

[8] Lijia Chen, Pingping Chen, and Zhijian Lin, "Artificial Intelligence in Education: A Review," *Ieee Access* 8 (2020): 75264–75278.

personalities which can later be used to map learning strengths by analyzing learning. Meanwhile, the benefits of AI in general are that it is used to map knowledge structures and metadata. By utilizing prompts, the function can be visualized into accurate knowledge and can create the desired teaching model.[9]

The students also cannot be separated from AI in carrying out their assignments.[10] AI works quickly with data contained in the internet so that the level of validity and validity is quite high.[11] Features in ChatGPT, Gemini, and Perplexity are AI in education can be used such as answering questions, analyzing problems, tidying up paragraphs, and recommending something are daily targets that students use to do assignments.[12] With AI, all tasks become easier and faster to complete.

In the academic world, there is a writing and translation process that mostly involves AI. The need for students to write in foreign languages affects the level of AI interest in translation.[13] With the right prompt, AI can convert languages and is rated better than the Google Translate feature. In Arabic translation, for example, there is already AI that can translate Arabic well.[14]

As for a study, AI is used to detect language errors and paraphrase language. The result is that the validity of ChatGPT can correct text has a percentage of up to 100% and Zero GPT with a percentage of 96%. It was a fantastic result.[15] In addition to ChatGPT and Zero GPT, Perplexity is also used in translation.[16] Meanwhile, in the process of

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[9] Cecep Sobar Rochmat, Riza Riza, and Safitri Anggia Murni, "Artificial Intelligence in Education: Opportunities and Challenges in Improving Learning Efficiency in the Society 5.0 Era," *Progresiva: Jurnal Pemikiran dan Pendidikan Islam* 13, no. 01 (2024): 91–100.

[10] Ahmed Hussein, et al., "Imitation Learning: A Survey of Learning Methods," *ACM Computing Surveys* 50, no. 2 (2017): 1–35.

[11] Khaled Salah, et al., "Blockchain for AI: Review and Open Research Challenges," *Ieee Access* 7 (2019): 10127–10149.

[12] Putri Lintang Utami, et al., "The Comparison of ChatGPT, Perplexity AI, and Scopus Database to Capture Indonesian Higher Education Quality in Achieving SDGs 2030," *E3S Web of Conferences* 513 (2024): 1-10.

[13] Hosnia M. Mohammdi and Doaa M. Elbourhamy, "An Intelligent System to Help Deaf Students Learn Arabic Sign Language," *Interactive Learning Environments* 31, no. 5 (2023): 3195–3210.

[14] Riyad Al-Shalabi, Ghassan Kanaan, Tarek Kanan, Mohammed ElBes, "A Review Study for Arabic Machine Learning and Deep Learning Methods," *2022 ASU International Conference in Emerging Technologies for Sustainability and Intelligent Systems (ICETSIS)* (2022): 225–232.

[15] Jae Q. J. Liu, et al., "The Great Detectives: Humans versus AI Detectors in Catching Large Language Model-Generated Medical Writing," *International Journal for Educational Integrity* 20, no. 1 (2024): 8.

[16] Zhenyu Xu, Ruoyu Xu, and Victor S. Sheng, "ChatGPT-Generated Code Assignment Detection Using Perplexity of Large Language Models (Student Abstract)," *Proceedings of the AAAI Conference on Artificial Intelligence* 38, no. 21 (2024): 23688–23689.

producing writing in the academic world, the use of ChatGPT obtained the highest score and was subsequently followed by Perplexity.[17]

The data shows that the process of writing language translations using AI still encounters various shortcomings. Language has complex grammar so it is not easy to map the correct translation from one language to another.[18] The validity and accuracy of translation is an absolute thing in language translation.[19]

Several researches that discussed Arabic translation with AI includes belonging *are* Khadija's research describes the evaluation of large language models (LLMs) such as ChatGPT-4 and Gemini as translators in the legal context for Arabic to English and French. ChatGPT-4 and Gemini showed poor performance, each producing up to 98-99% errors in translating legal terminology when context is provided.[20] Meanwhile, Hamzahi's research highlighted ChatGPT's ability to translate Arabic to Indonesian, especially from the book "*Arobiyyah Li An-Naasyi'in* Volume 5." The results show that ChatGPT is able to produce fairly accurate translations with a high level of accuracy.[21] Similar to Hamzah, the research conducted by Martiana et al. discussed the role of AI in translating Arabic texts, focusing on the use of ChatGPT. AI is very helpful in speeding up the translation process and producing results that can be understood well. However, the accuracy of the translation still needs to be improved, especially regarding the context and use of appropriate language.[22] On the other hand, Abdulmohsen's research presented the types of ChatGPT in Arabic translation. The results show that GPT-4 outperforms GPT-3.5 and Bard in sentiment classification, on par with the fully-coverage Arabic-based BERT

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[17] Yu-Ching Tseng and Yi-Hsuan Lin, "Enhancing English as a Foreign Language (EFL) Learners' Writing with ChatGPT: A University-Level Course Design," *Electronic Journal of E-Learning* 22, no. 2 (2024): 78–97.

[18] Nurjannah Pujirahayu, et al., "The Adventure of Naqy (Nahwu Qurany) Nahwu Learning Solutions Based on Online Games," *Proceeding of International Conference on Islamic Education (ICIED)* (2022): 547-554.

[19] Daniel Maier, et al., "Machine Translation Vs. Multilingual Dictionaries Assessing Two Strategies for the Topic Modeling of Multilingual Text Collections," *Communication Methods and Measures* 16, no. 1 (2022): 19–38.

[20] Khadija Ait ElFqih and Johanna Monti, "Large Language Models as Legal Translators of Arabic Legislation: Does ChatGPT and Gemini Care for Context and Terminology?," *Proceedings of The Second Arabic Natural Language Processing Conference* (2024): 111–122.

[21] Hamzah Faris and Maman Abdurrahman, "Analisis Penerjemahan Bahasa Arab ke Bahasa Indonesia Melalui Artificial Intelligence ChatGPT," *Al-Af'idah: Jurnal Pendidikan Bahasa Arab dan Pengajarannya* 7, no. 2 (2023): 222-233.

[22] Martiana Nurullawasepa, et al., "AI (Artificial Intelligence) dalam penerjemahan teks Bahasa Arab", *Senriabdi* (2023): 141-157.

model. However, when it comes to generating data for sentiment in Arabic dialects, these models are often less accurate than the original human-supplied data.[23]

Different from previous studies, this article presented analyzed the accuracy of translation and mapping of sentence rules in Arabic using three types of AI, namely ChatGPT, Gemini, and Perplexity. The results of the content analysis have been corrected using the book of *nahwu*, including the book of *Nahwu Wadhih* and other books of *nahwu*. This study has analyzed how accurate AI, especially ChatGPT, Gemini, and Perplexity are in translating and mapping Arabic sentence rules. The importance of measuring accuracy is to recommend the best type of AI in Arabic translation and mapping the grammatical of Arabic.

Methods

The selection of *mahfudzat* verses as the research observation that AI can perform data analysis effectively and efficiently. In addition, AI has the potential to conduct its statistical and corpus analysis. A qualitative approach was applied in this research to answer three research questions that have been identified. This qualitative approach facilitated an in-depth understanding of the role of AI technology in Arabic learning, especially in the aspects of *harakat*, translation, and *i'rab*. The following chart will explain the methodology used in this study.[24]

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[23] Abdulmohsen Al-Thubaity et al., "Evaluating ChatGPT and Bard AI on Arabic Sentiment Analysis," *Proceedings of ArabicNLP 2023* (2023): 335–349.

[24] Muhammad Firmansyah, Masrun Masrun, and I Dewa Ketut Yudha S, "Esensi Perbedaan Metode Kualitatif dan Kuantitatif," *Elastisitas: Jurnal Ekonomi Pembangunan* 3, no. 2 (2021): 156–159.
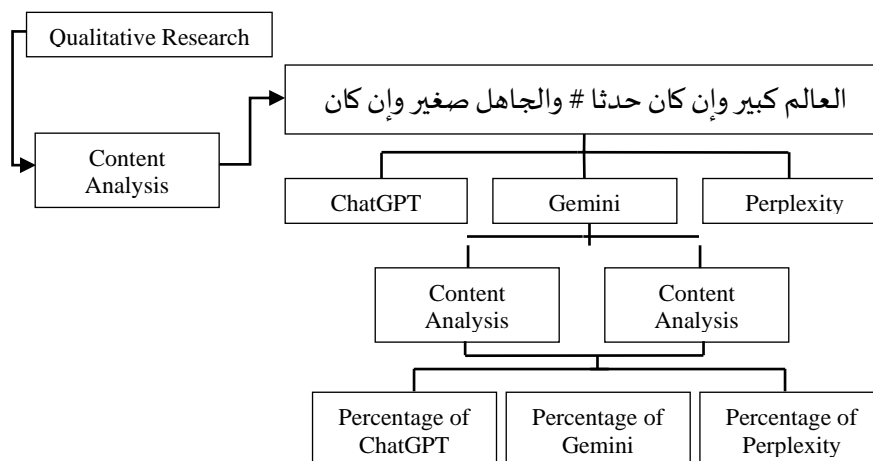
Figure 2. Flow of Research Methods

The main data in this study was a line of *mahfudzat* from the second grade. The reference sources used to analyze this line of *mahfudzat* are the *Nahwu Wadhih* books by Al-Jarimi, from volumes 1 to 5. This data was obtained through direct analysis of AI applications, namely Perplexity, GPT, and Gemini. The data collection technique used was structured and directed data collection. The analysis technique used is content analysis which allows researchers to understand and interpret the correction of the meaning of translation, *i'rab*, and *harakat mahfudzhat* as research objects after the process of translation, *harakat*, and mapping language rules using AI ChatGPT, Gemini, and Perplexity.

Content analysis was carried out on two *mahfudzat* verses. The first is to check the accuracy of the transliteration from Arabic *mahfudzat* to Indonesian using ChatGPT, Gemini, and Perplexity. The truth of transliteration is compared to the translation of the word from *mahfudzat*. Next is to check the accuracy of punctuation (*harakat*) and language rules (*i'rab*) of two *mahfudzat* verses with ChatGPT, Gemini, and Perplexity. As a comparison of the truth of *harakat* and *i'rab*, an analysis was carried out using the Book of *Nahwu Wadhih* as the main source of reference in giving *harakat* and mapping the *i'rab* words of the two *mahfudzat* verses.
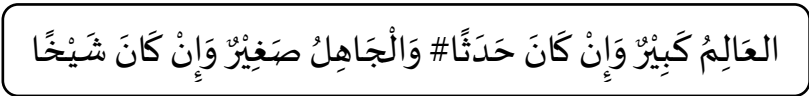
Results and Discussion

Analysis of Arabic Translation and Mapping Rules Using AI: Arabic has characteristics of all world languages, including letter writing, reading (*harakat*), and sentence structure. The sentence structure in Arabic is called the science of *nahwu* or

qawaid.[25] To learn the rules of Arabic, it is necessary to study the book. Therefore, in this study, a book was used to correct the accuracy of AI answers related to translation, the *harakat* system, and Arabic language rules. The book is the book of *Nahwu Wadhih.*

One of the books of nahwu that is popularly used for beginners is the Book of *Nahwu Wadhih fi Qawaid Al-Lughah Al-Arabiyyah Lil Madrasah Ibtidaiyyah* is a book that contains Arabic *qawaid* material, especially in *nahwu* material. The book, compiled by Ali Jarim and Musthafa Amin, was published by the Dar Al-Ma'arif printing house, located in Egypt. As the name *"Nahwu Wadhih"* (Clear example), this book that contains the rules of the Arabic language *(nahwu)* is compiled for the level of beginners. This book consists of three *juz* (chapters) for Madrasah Ibtidaiyyah and three *juz* (chapters) for Madrasah Tsanawiyyah.[26]

The purpose of compiling the book *Nahwu Wadhih* is to bring beginners closer to accurately learning Arabic. This book of *Nahwu Wadhih* makes it easier for beginners to memorize and remember the material of the book, as well as a testament to understanding the art of *nahwu* science which is very important. This book is used in several Islamic boarding schools and other Islamic schools, especially in modern Islamic boarding schools.[27]

The *mahfudzat* verses selected to measure the accuracy of AI: ChatGPT, Gemini, and Perplexity are shown in the following chart:

العَالِمُ كَبِيْرٌ وَإِنْ كَانَ حَدَثًا# وَالْجَاهِلُ صَغِيْرٌ وَإِنْ كَانَ شَيْخًا

Figure 3. *Mahfudzat* in Arabic

Analysis of the *Harakat* System (Punctuation) in Arabic: The note in the analysis is that the total number of *harakat* is 30 so the maximum correct percentage is 30. Therefore, the formula for the percentage of correct answers is obtained as follows:

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[25] Zahrotul Muzdalifah, Moh. Khasairi, and Kholisin Kholisin, "Development of the Arabic Grammar (Nahwu) Textbook Al-Ajurumiyyah Al-Qur'aniyyah Based on the Scaffolding-Structure," *Izdihar: Journal of Arabic Language Teaching, Linguistics, and Literature* 4, no. 2 (2021): 153–164.

[26] Andi Holilulloh, Mujawir Sayyid Mujawir Sakran, and Wail As-Sayyid, "Analisis Materi dan Metode Sintaksis Arab dalam Kitab An-Nahwu Al-Wadhih," *Al-Fathin: Jurnal Bahasa dan Sastra Arab* 3, no. 02 (2020): 125-139.

Table 1. Punctuation Errors in Each AI against *Mahfudzat* Verse

Aspect	Types of AI		
	ChatGPT	Gemini	Perplexity
Punctuation	العَالَمُ كَبِيرٌ وَإِنْ كَانَ حَدَثًا# وَالْجَاهِلُ صَغِيرٌ وَإِنْ كَانَ شَيْخًا	العالِمُ كبيرٌ وإن كان حَدَثًا# والجاهِلُ صغيرٌ وإن كان شيخًا	العَالَمُ كَبِيرٌ وَإِن كَان حَدَثًا#وَالْجَاهِلُ صَغِيرٌ وَإِن كَانَ شَيْخًا
Error Descriptions	العَالَمُ كَبِيرٌ وَإِنْ كَانَ حَدَثًا# وَالْجَاهِلُ صَغِيرٌ وَإِنْ كَانَ شَيْخًا	العالِمُ كبيرٌ وإن كان حَدَثًا# والجاهِلُ صغيرٌ وإن كانَ شيخًا	العَالَمُ كَبِيرٌ وَإِن كَان حَدَثًا#وَالْجَاهِلُ صَغِيرٌ وَإِن كَانَ شَيْخًا
Correct Answer	العَالِمُ كَبِيرٌ وَإِنْ كَانَ حَدَثًا# وَالْجَاهِلُ صَغِيرٌ وَإِنْ كَانَ شَيْخًا	العَالِمُ كَبِيرٌ وَإِنْ كَانَ حَدَثًا# وَالْجَاهِلُ صَغِيرٌ وَإِنْ كَانَ شَيْخًا	العَالِمُ كَبِيرٌ وَإِنْ كَان حَدَثًا#وَالْجَاهِلُ صَغِيرٌ وَإِن كَانَ شَيْخًا
Percentage of correct answers	90%	46,67%	83,34%

Based on Table 1, after conducting an experimental analysis on three AIs, namely ChatGPT, Gemini, and Perplexity, it was found that the largest percentage of accuracy in punctuation was ChatGPT. ChatGPT reached 90% correct in punctuation (*harakat*). Perplexity has a score not much different from ChatGPT. Meanwhile, Gemini has a score far from ChatGPT and Perplexity. Gemini cannot fully punctuate the *mahfudzat* verse.

The three AIs mentioned above are no better than applications specifically designed to provide diacritics. Of course, this can happen, as ChatGPT, Gemini, and Perplexity are general AIs that their features are not specifically designed to correct diacritics in the Arabic language. Therefore, it is recommended that to master the skill of reading, a good AI application that can provide perfect diacritics is the Tashkeel application, as it adheres to the rules of grammar and morphology.[28] Analysis of the Translation System in Arabic:

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[27] Akmal Walad Ahkas and Al Lu'lu' Mahabbah Fillah, "Analisis Buku Nahwu Wadhih Juz 2 Karya Ali Al-Jarimi dan Musthafa Amin," *Ta'lim al-'Arabiyyah: Jurnal Pendidikan Bahasa Arab & Kebahasaaraban* 6, no. 1 (2022): 125–133.

[28] Sovia Fahraini and Muhammad Fikri Almaliki, "Analysis of Arabic Against the Use of Artificial Intelligence (AI) Through Tashkeel (Automatic Harokat) Application to Increase Maharah Qiraah," *International Conference on Education* (2023): 64-77.

Table 2. Translation Errors in Each AI to *Mahfudzat*'s Verses

Aspect	Types of AI		
	ChatGPT	**Gemini**	**Perplexity**
Translation	Orang yang berpengetahuan besar meskipun dia masih muda, sedangkan orang bodoh masih kecil meskipun dia sudah tua. (A knowledgeable person even though he is young, while a stupid person is still even though he is old).	Orang yang berpengetahuan luas itu besar, meskipun dia masih muda. Sementara itu, orang bodoh itu kecil, meskipun usianya sudah tua. (A knowledgeable person is big, even though he is young. Meanwhile, the fool is small, despite his old age).	Dunia ini besar meskipun hanya terjadi sekali, dan orang bodoh itu kecil meskipun dia sudah tua. (The world is big even though it only happens once, and the fool is small even though he is old)
Description of Translation Errors	-His age is still young -Keep small		<u>The world is big even if it only happens once, and</u>
Correct Answer	Orang yang berpengetahuan luas itu besar, meskipun dia masih muda. Sementara itu, orang bodoh itu kecil, meskipun usianya sudah tua. (the knowledgeable person is big, even though he is young. Meanwhile, the fool is small, despite his old age)	Orang yang berpengetahuan luas itu besar, meskipun dia masih muda. Sementara itu, orang bodoh itu kecil, meskipun usianya sudah tua. (A knowledgeable person is big, even though he is young. Meanwhile, the fool is small, despite his old age).	Orang yang berpengetahuan luas itu besar, meskipun dia masih muda. Sementara itu, orang bodoh itu kecil, meskipun usianya sudah tua. (A knowledgeable person is big, even though he is young. Meanwhile, the fool is small, despite his old age).
Correction	87,5%	100%	43,75%

A review of machine translation, especially post-translation in the context of the Arabic language, has garnered more attention due to concerns regarding the consistency and accuracy of chatbot responses affecting learners' trust.[29]

Based on table 2 the implementation of AI in translating Arabic sentences as shown by ChatGPT, Gemini, and Perplexity above still encounters shortcomings in two of the three AIs. At the time of the award, Gemini had the lowest score between ChatGPT and Perplexity, but at the time of translation, Gemini reached the highest score with a perfect score of 100%. ChatGPT is slightly better than Perplexity, which is 87.5%, while Perplexity is wrong in translating the entire first verse in mahfudzhot, so it gets a score of 43.75%.

The results obtained in the above study differ from another study involving the book *'Arobiyyah Li An-Naasyi'in* Volume 5,' which analyzes language translation using ChatGPT. The results indicate that ChatGPT is capable of producing translations that are

fairly accurate with a high level of precision. While ChatGPT does possess high accuracy, it is not significantly higher than Perplexity in terms of translation. Meanwhile, Khadija's research presents a stark contrast, showing that ChatGPT-4 and Gemini demonstrate poor performance, each producing up to 98-99% errors in Arabic translation.[30]

Due to the lack of consistency in the accuracy of the three types of AI mentioned above in translation, collaboration between machines and humans is needed through the post-translation editing process to improve the accuracy and fluency of the translations.[31] Analysis of Gramatical Mapping in Arabic:

Table 3. Table of *I'rab* Errors in *Mahfudzat* Verses for Each AI

Aspect	Types of AI		
	ChatGPT	**Gemini**	**Perplexity**
Error Statement on *I'rab*	1) العَالَمُ: *Mubtada* (مبتدأ) *marfu'* with *dhammah*. 2) كَبِيرٌ: *Khabar* (خبر) from "العَالَمُ" *marfu'* with *dhammah*. 3) "وَ" is the letter *athaf* (حرف عطف) and "إنْ" is the letter *syarth* (حرف شرط). 4) حَدَّئًا: *Isim* "كان" *manshub* with *fathah*. 5) وَالْجَاهِلُ: *Mubtada* the second *marfu'* with *dhammah*. 6) صَغِيرٌ: *Khabar* from "الْجَاهِلُ" *marfu'* with *dhammah*. 7) وَإنْ: The letter *athaf* and the letter *sharth*. 8) كَانَ: *Fi'il madhi naqis mabni fathah*.	1 العالِمُ: فاعل مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 2 كبيرٌ: خبر مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 3 وإن: حرف شرط جامد. 4 كانَ: فعل ماض مبني على الفتح والتاء للتأنيث. 5 حَدَّئًا: اسم كان مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 6 والجاهِلُ: فاعل مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 7 صغيرٌ: خبر مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 8 وإن: حرف شرط جامد.	1. العَالَمُ: مبتدأ مرفوع وعلامة رفعه ضمة ظاهرة على آخره. 2. كَبيرٌ: خبر المبتدأ مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 3. وَ: حرف عطف. 4. إنَّ: حرف مشبه بالفعل. 5. كَانَ: فعل ماضٍ ناقص مبني على الفتحة الظاهرة على آخره. 6. حَدَّئًا: اسم كان منصوب وعلامة نصبه الفتحة الظاهرة على آخره. 7. وَ: حرف عطف. 8. الْجَاهِلُ: مبتدأ مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 9. صَغيرٌ: خبر المبتدأ مرفوع وعلامة رفعه الضمة الظاهرة على آخره.

[29] Nely Rahmawati Zaimah, Eko Budi Hartanto, and Fatchiatu Zahro, "Acceptability and Effectiveness Analysis of Large Language Model-Based Artificial Intelligence Chatbot Among Arabic Learners," *Mantiqu Tayr: Journal of Arabic Language* 4, no. 1 (2023): 1–20.

[30] Khadija Ait ElFqih and Johanna Monti, "Large Language Models as Legal Translators of Arabic Legislation: Does ChatGPT and Gemini Care for Context and Terminology?," *Proceedings of the Second Arabic Natural Language Processing Conference* (2024): 111–122.

[31] Lamis Ismail Omar and Abdelrahman Abdalla Salih, "Systematic Review of English/Arabic Machine Translation Postediting: Implications for AI Application in Translation Research and Pedagogy," *Informatics* 11, no. 2 (2024): 23.

	9) "كان" *Isim manshub* with *fathah*.	9) كَانَ: فعل ماض مبني على الفتح.	على آخره.	
		10) شيخًا: اسم كان مرفوع وعلامة رفعه الضمة الظاهرة على آخره.	10. وَ: حرف عطف.	
			11. إنَّ: حرف مشبه بالفعل.	
			12. كَانَ: فعل ماضٍ ناقص مبني على الفتحة الظاهرة على آخره.	
			13. شَيْخًا: اسم كان منصوب وعلامة نصبه الفتحة الظاهرة على آخره.	
Correct Answer	1) العَالِمُ: *Mubtada* (مبتدأ) *marfu'* with *dhammah*. 2) كَبِيرٌ: *Khabar* (خبر) from "العَالِمُ" *marfu'* with *dhammah*. 3) "وَإِنْ" is the letter *athaf* (حرف عطف) and 4) "إِنْ" is not a *syarth* letter (حرف شرط). 5) حَدَثًا: *khobar* "كان" *manshub* with *fathah*. 6) وَالْجَاهِلُ: The first *mubtada marfu'* with *dhammah*. 7) وَ: Letter *athaf* 8) إِنْ: is not a *syarth* letter. 9) كَانَ: *Fi'il madhi naqis mabni fathah*. 10) شَيْخًا: *khobar* "كان" *manshub* with *fathah*.	1. العَالِمُ: مبتدأ مرفوع وعلامة رفعه ضمة ظاهرة على آخره. 2. كبيرٌ: خبر مرفوع وعلامة رفعه ضمة ظاهرة على آخره. 3. و: حرف عطف 4. إن: ليس حرف شرط جامد. 5. كَانَ: فعل ماض ناقص مبني على الفتح 6. حَدَثًا: خبر كان منصوب وعلامة فتحه فتحة ظاهرة على آخره. 7. والجَاهِلُ: مبتدأ مرفوع وعلامة رفعه ضمة ظاهرة على آخره. 8. صغيرٌ: خبر مرفوع وعلامة رفعه ضمة ظاهرة على آخره. 9. و: حرف عطف 10. إن: ليس حرف شرط جامد. 11. كَانَ: فعل ماض ناقص مبني على الفتح. 12. شيخًا: خبر كان منصوب وعلامة فتحه فتحة ظاهرة على آخره.	1. العَالِمُ: مبتدأ مرفوع وعلامة رفعه ضمة ظاهرة على آخره. 2. كَبِيرٌ: خبر المبتدأ مرفوع وعلامة رفعه ضمة ظاهرة على آخره. 3. وَ: حرف عطف. 4. إنْ:.... 5. كَانَ: فعل ماضٍ ناقص مبني على الفتحة ظاهرة على آخره. 6. حَدَثًا: خبر كان منصوب وعلامة نصبه الفتحة ظاهرة على آخره. 7. وَ: حرف عطف. 8. الْجَاهِلُ: مبتدأ مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 9. صَغِيرٌ: خبر المبتدأ مرفوع وعلامة رفعه الضمة الظاهرة على آخره. 10. وَ: حرف عطف. 11. إنَّ:... 12. كَانَ: فعل ماضٍ ناقص مبني على الفتحة الظاهرة على آخره. 13. شَيْخًا: خبر كان منصوب وعلامة نصبه الفتحة الظاهرة على آخره.	
Percentage	84,61%	53,8%	77%	

Based on table 3 the analysis of *i'rab* or mapping of language rules, ChatGPT has fewer errors than Gemini and Perplexity with a percentage score of 84.61%. Gemini can

only achieve an accuracy score of 53.8% and Perplexity of 77%. Although not perfect, ChatGPT has achieved superior projections in mapping Arabic rules (*i'rab*) compared to the other two AIs. AI models demonstrate insufficient performance in mapping language rules. The rules of the Arabic language possess their own complexities, making them difficult for AI to read, resulting in low accuracy in mapping language rules. However, ChatGPT-4 has performance levels comparable to specialized AI applications used for studying Arabic language rules. Other AIs, such as Gemini and Perplexity, still need to continually improve their performance.[32]

Implications of the Use of AI on Translation and Mapping of Arabic Rules: In nowadays educational environment, it is increasingly important to integrate innovative technologies, especially digital technologies that are free of artificial intelligence.[33] AI is a tool that must be used to keep pace with the massive acceleration of the world.[34] The use of AI needs to be adopted in educational environments to support the quality of education and learning, especially in universities.[35] Avoiding AI is like denying the progress of the times and will slowly be left behind by the world's development.[36]

AI is a robot. Robots work based on the prompts provided by managing the most data on the internet. As a result, the wrong answer is very likely to be recommended because the AI sorts out the top data-based.[37] This mistake needs to be re-examined by the individual who wrote the prompt. This error may be found in a variety of requests where the database is difficult to find.

As for the translation process, the provision of punctuation marks and mapping of Arabic rules using three AIs, namely ChatGPT, Gemini, and Perplexity, it turned out that several errors were found. Translation is a complex process so AI projections are not yet

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[32] Ahmed Abdelali, et al., "Larabench: Benchmarking Arabic AI with Large Language Models," *Proceedings of the 18th Conference of the European Chapter of the Association for Computational Linguistics* 1, (2024): 487-520.

[33] Zhi Zhou, et al., "Edge Intelligence: Paving the Last Mile of Artificial Intelligence With Edge Computing," *Proceedings of the Ieee* 107, no. 8 (2019): 1738–1762.

[34] Oksana Synekop, et al., "Use of ChatGPT in English for Engineering Classes: Are Students' and Teachers' Views on Its Opportunities and Challenges Similar?," *International Journal of Interactive Mobile Technologies (iJIM)* 18, no. 3 (2024): 129–146.

[35] Jurgen Rudolph, Shannon Tan, and Samson Tan, "War of the Chatbots: Bard, Bing Chat, ChatGPT, Ernie and beyond. The New AI Gold Rush and Its Impact on Higher Education," *Journal of Applied Learning & Teaching* 6, no. 1 (2023): 364-389.

[36] Jakub Growiec, "Existential Risk from Transformative AI: An Economic Perspective," *Technological and Economic Development of Economy* 30, no. 6 (2024): 1682–1708.

able to translate accurately.[38] Among the three AIs that have been analyzed have relatively similar error scores. In analyzing the three AIs used, some excel in giving *harakat*, some excel in translation, and some excel in mapping Arabic rules. This advantage makes one AI only good for analyzing one of the translations, *harakat*, and mapping of Arabic rules. This mistake requires humans not to rely too much on AI.

AI projections will continue to be refined to generate the right answers. However, it does not mean that humans can rely entirely on AI, especially in learning Arabic. The importance of mastering Arabic for a Muslim cannot be represented by artificial tools or intelligence. This is because Arabic is part of Islam.[39]

Arabic has a huge role to play in the study of Islam. To explore the study of Islam in depth, a muslim needs to learn Arabic and the knowledge of Arabic tools such as language rules, the *harakat* system, and translation.[40] AI can help speed up the process of deepening Arabic material and become an assistant in translation, but for a Muslim, it still has a great priority if it is able to understand Arabic perfectly without relying on tools.

Arabic has priorities to learn it. Among them is the means to understand the Qur'an or hadith and to study it is worth a reward. So for a Muslim, it is not allowed to rely on AI continuously because it will erode these virtues. As for people who seriously pursue knowledge, they have a high degree. Do not let the excessive use of AI erode interest in learning Islam and Arabic. Limiting the maximum use of AI to complete tasks is included in the ethics of learning.[41]

The use of AI without forgetting the existence of personality as a muslim needs to be maintained. Thus, the rudimentary AI projection as the results of the above research can be corrected by Muslim users with their knowledge. Critical thinking is

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[37] Yanqing Duan, John S. Edwards, and Yogesh K Dwivedi, "Artificial Intelligence for Decision Making in the Era of Big Data–Evolution, Challenges and Research Agenda," *International Journal of Information Management* 48 (2019): 63–71.

[38] Leen Al-Khalafat and Ahmad S. Haider, "A Corpus-Assisted Translation Study of Strategies Used in Rendering Culture-Bound Expressions in the Speeches of King Abdullah II," *Theory and Practice in Language Studies* 12, no. 1 (2022): 130–142.

[39] Mohamed W. Fareed, Ali Bou Nassif, and Eslam Nofal, "Exploring the Potentials of Artificial Intelligence Image Generators for Educating the History of Architecture," *Heritage* 7, no. 3 (2024): 1727–1753.

[40] Mohammed Al-Batineh and Razan Alawneh, "Current Trends in Localizing Video Games into Arabic: Localization Levels and Gamers' Preferences," *Perspectives* 30, no. 2 (2022): 323–342.

[41] Tri Diantami, Siwi Widura Yuwana, and Eni Nurhayati, "Pentingnya Pendidikan Bahasa dalam Membangun Karakter yang Berbudaya di SMP PGRI 9 Sidoarjo," *Jurnal Riset Rumpun Ilmu Bahasa* 2, no. 2 (2023): 132–144.

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indispensable to be able to sort information appropriately.[42] Analysis with critical thinking from AI users can minimize the mistakes made by AI in Arabic translation and mapping.

Conclusion

The application of artificial intelligence (AI) in the translation and mapping of Arabic rules has great potential but still faces some limitations. Based on the analysis of three AIs (ChatGPT, Gemini, and Perplexity), ChatGPT is proven to have the highest accuracy in providing punctuation (90%) and quite good in *i'rab* (84.61%). Gemini excels in translation (100%) but is weak in the giving of *harakat* and *i'rab*. Perplexity has varying accuracy, with an advantage on simple translation but weak in other aspects. The main conclusion suggests that while AI can be used as an effective tool, the role of humans is still important to guarantee accuracy and contextual understanding, especially in Arabic language learning. This study is limited to analyzing only one *mahfudzat* verse, so the next research is recommended to analyze the nuances of more complex Arabic meanings using AI.

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The authors of this scientific article (FF, RH, CS, RD, AA, MB) contributed to every part of this scientific article. Each author participated in every stage of the research process. They conducted a preliminary study, collaborated in processing and analyzing the data, and gathered relevant reference sources for this scientific article. Their contributions were essential to the completion of this scientific article. The involvement of each author demonstrates their commitment and effort in producing a comprehensive research work.

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[42] Khalil A. Fayyoumi, "Analyzing Active Tasks in Jordanian Primary Arabic Textbooks: Teaching Strategies and Skill Development Implications," *International Journal of Instruction* 17, no. 2 (2024): 497–518.

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