



## Machine Learning - Google Translate: A Study of the Use of Machines in Translating Arabic Texts

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### Abstract

*The internalization of technology in Arabic language learning provides many conveniences for teachers and students in completing their assignments and achieving maximum results. However, you must remain alert to errors that appear in machine searches for Arabic vocabulary. Today, Google Translate (GT) machine learning (ML) can be used to search for Arabic vocabulary and at the same time, be alert to errors. This research used a qualitative approach with a case study method for 100 students at the As-Syifa Subang Al-Qur'an Science College, semester 3. The results of this research explain students' perceptions of ML, where they expect ML to be an interactive medium in learning Arabic. Other results show that in using ML-GT there are several linguistic errors such as grammar, word order, phonetics, morphology, syntax, and semantics. Therefore, Arabic teachers and students can utilize ML in various ways in learning as an adaptive response to current developments. At the same time, teachers must improve their skills in applying learning technology.*

**Keywords:** *Arabic Learning, Educational Technology, Google Translate, Machine Learning, Society 5.0 Era*

### Abstrak

Internalisasi teknologi dalam pembelajaran bahasa Arab memberikan banyak kemudahan bagi guru dan siswa dalam menyelesaikan tugasnya dan mencapai hasil yang maksimal. Namun, harus tetap waspada terhadap kesalahan yang muncul dalam pencarian kosakata bahasa Arab melalui mesin. Hari ini, pembelajaran mesin (ML) Google Translate (GT) dapat digunakan untuk mencari kosakata bahasa Arab dan pada saat yang sama, harus waspada terhadap kesalahan. Penelitian ini menggunakan pendekatan kualitatif dengan metode studi kasus bagi mahasiswa Sekolah Tinggi Ilmu Al-Qur'an As-Syifa Subang semester 3 berjumlah sebanyak 100 orang. Hasil penelitian ini menjelaskan persepsi siswa terhadap ML, dimana mereka mengharapkan ML menjadi media interaktif dalam pembelajaran bahasa Arab. Hasil lain menunjukkan bahwa dalam penggunaan ML-GT terdapat beberapa kesalahan linguistik seperti tata bahasa, susunan kata, fonetik, morfologi, sintaksis, dan semantik. Oleh karena itu, guru dan siswa bahasa Arab dapat memanfaatkan ML dengan berbagai macamnya dalam pembelajaran sebagai respon adaptif terhadap perkembangan zaman. Pada saat yang sama, guru harus meningkatkan keterampilannya dalam menerapkan teknologi pembelajaran.

**Kata Kunci** *Era Society 5.0, Google Translate, Pembelajaran Bahasa Arab, Teknologi Pendidikan, Machine Learning*

## INTRODUCTION

The presence of machine learning threatens human thinking and creativity. One doesn't have to look for an expert in a particular field to answer the question he's facing; he just asks the machine and gets a comprehensive and detailed answer (Wang et al., 2022). Back in the '90s, when internet access was still very limited, students had to come to school just to ask about lessons. However, today they're just turning the machines on to get the lessons they need (Ibarz et al., 2021). A machine with its artificial intelligence is then programmed to think and answer questions like a human. In fact, machines are capable of replicating human actions (Verma et al., 2020). How this is becoming a serious threat to human existence in the future. There will be many kinds of human jobs that will be lost as they are replaced by machines (Wang & Siau, 2019). Like the industrial world today, which uses machines rather than humans, it's proof that machines are superior to humans.

In the case of Arabic word translation, a student often uses the machine learning (ML) and Google Translate (GT) to find the answers he is looking for. This activity weakens one's intellect because he receives answers without undertaking a deep thought process (Alsalem, 2019). It can also slowly remove the function of the Arabic dictionary (Omar, 2021). In fact, the Arabic dictionary has been filled with complete vocabulary and sentences for the needs of public communication in everyday life (Ameur et al., 2020). Arabic vocabulary plays a vital role in improving students' language skills. A student has not been called a good speaker of Arabic if he does not know the origin of a word and its variations (Maryamah et al., 2021). The change in the form of the Arabic word affects the change in meaning. The complexity of this Arabic language is one of the reasons someone uses ML as a learning medium. In fact, many translation errors arise as a result of the use of ML, and even that error can change the meaning of the desired word (Alkhatib et al., 2020).

Machine learning (ML) is part of artificial intelligence (AI). ML adopts the concept of machine formation as a system that is as intelligent as humans in general (Helm et al., 2020). But in this case, intelligence is created by learning and training first, before the system does it in the real world. In this way, all ML activities will be easily recognized, understood, and done effectively and efficiently (Sejnowski, 2020). ML is the science of algorithms and statistical models that use computer systems to perform tasks without explicit instructions, relying instead on patterns and inferences (Helm et al., 2020). Over the last few decades, ML has given rise to advances in sophisticated learning algorithms and efficient pre-processing techniques. One of them is the evolution of artificial neural networks (ANNs) towards deepening neural network architectures through in-depth learning (DL) (Janiesch et al., 2021). DL has demonstrated the best performance that surpasses human abilities. However, such sophistication has consequences for the weakness of human creativity. For pupils, this sophistication lowers their curiosity for something.

However, ML's sophistication did not make it a phenomenal tool for some Arabic

learners in Indonesia. In fact, there are still many teachers and students in Indonesia who do not know ML for its function in the search for Arabic vocabulary. This incident originates from their doubts about the quality of the search results for Arabic words or sentences that come from ML. More surprisingly, many Arabic language grammatical errors occur through the use of ML because the ML algorithm is unable to detect the grammar validity of the language and the meaning of the word automatically (Omar, 2021). According to Horn, vocabulary is a set of words that form a language. Arabic vocabulary has a vital role to play in mastering four language skills, such as listening, speaking, reading, and writing (M. Ritonga et al., 2023). Without a good mastery of vocabulary, one will have difficulty understanding Arabic comprehensively. Teachers need to pay attention to the elements of word formation when teaching vocabulary to students because word formation always has substitutes contained in it, such as beginnings, inserts, and endings (Alkhatib et al., 2020). Imbuhan as a morphem could have influenced the meaning, so the production of Arabic vocabulary from ML needs to be analyzed to the level of truth.

Until now, the most widely used ML for searching Arabic words or sentences has been Google Translate (GT) (Alsalem, 2019). GT as a machine to translate text from the source language (SL) to the target language (TL) is often mistaken (Van Lieshout & Cardoso, 2022). Semantic and grammatical layouts are vulnerable to errors. What is meant by the semantic error is related to the error in the meaning of the word (Vanjani & Aiken, 2020; Ritonga et al., 2021). Misunderstandings of the meaning of words always lead to misinformation and even quarrels. While grammatical errors are related to morphology and syntax.

Souad's findings in his research suggest that the ML algorithm in Arabic language learning has a very high degree of word order accuracy due to the validity of the data used and its ease of use. ML users are provided with easy access and accurate service done anytime and anywhere (Larabi Marie-Sainte et al., 2019). Kanan's research results describe the position of Arabic as an international foreign language with complex characteristics making it difficult for computers to detect Arabic, ML helps to understand Arabic text data. Nevertheless, he sees opportunities to evaluate the use of ML in Arabic vocabulary discovery (Kanan et al., 2019). Ritonga conducted a study on the use of SIAKAD ML in the detection of student Arabic errors that include phonetic, morphological, syntax, and semantic errors. Technological developments provide many conveniences for teachers and students carrying out learning to get maximum results (M. Ritonga et al., 2022). However, teachers have the task of finding out students' language skills through error detection using machine learning (Kuleto et al., 2021). Van Lieshout's findings show that GT users are able to acquire Dutch vocabulary and pronunciation in the short term. According to him, GT is a multi-purpose tool that can be used easily according to needs, interests and learning styles (Van Lieshout & Cardoso, 2022).

Based on the results of the above research, the researchers consider it important to conduct a study on the use of machine learning in the learning of Arabic vocabulary for Arabic language learners in Indonesia. This research is trying to fill the shortcomings of

previous research. The aim of the study was to identify Arabic translation errors using ML-GT as an alternative medium for Arabic language students to translate words or sentences, so that there are frequent semantic errors in the translation results.

The urgency of this research lies in two aspects: first, the learning of Arabic language needs to adapt to the sophistication of technology through artificial intelligence so that Arabic does not leave behind other lessons; second, the limitations of the results of previous research on the use of machine learning in Arabic learning carried out by Indonesian researchers in learning Arabic in Indonesia mean that the literature about using machine learning to learn Arabic is still minimal. Specifically, this research aims to: 1) Explain the perception of Arabic students of the use of ML-GT in the translation of words or sentences. 2) Describe the Arabic translation errors that arise due to the use of ML-GT.

## **METHODS**

### **Research design**

The researchers used a qualitative approach in the study to explain students' perceptions of machine learning and describe errors occurring in the translation of words or sentences using the machine learning Google Translate without revealing a percentage in any aspect. The study was conducted on a student of As-Syifa College of Qur'anic Science Subang, Indonesia, who studied Arabic as a compulsory course.

### **Data collection**

Data collection occurs through documentation and interviews using Google Forms (GF), where each participant answers every question asked in the GF. The duration of the study for 1 semester (full semester) is 14 meetings since March-June 2023. Documentation was obtained directly from participants when they searched for Arabic words or sentences using ML. This documentation varies widely, from one word to two words to a complete sentence. The documentation process is useful to see if the ML-GT gives the desired information accurately or if there are errors in the information. While interviews are used to find out students' perceptions of ML. This perception includes some things like the use and utilization of ML, ML's position at the moment, and also the impact of ML itself in learning Arabic vocabulary.

### **Participant**

There were 100 participants in this study. They were composed of Arabic students in the third (3) semester. The samples were selected using purposive sampling techniques. Meaning, the participants learn Arabic intensively every week in the classroom, and often they use ML-GT as a medium to translate Arabic words or sentences.

### **Data analysis**

In the process of data analysis, the researchers explained the impact of ML-GT translation errors semantically and revealed what the students should do based on the basic theories of Arabic learning as well as efforts to use AI ML as a translation medium for Arabic words or sentences. The researchers used data from Publish or Perish and

VOSViewer to help map research topics related to the use of ML in Arabic language studies.

## **RESULT AND DISCUSSION**

### **Arabic Language Students' Perception of ML**

In the Society 5.0 era, with massive advances in science and technology, learning Arabic is required to adapt to the needs of an increasingly complex and dynamic society. The society 5.0 era is marked by a situation where man and machine can collaborate harmoniously using artificial intelligence (AI) as a tool (Magni et al., 2023). AI can help improve the quality and effectiveness of Arabic learning by providing interactive, varied, and interesting media, as well as providing quick and accurate feedback to students. In addition, learning Arabic in the era of society 5.0 that utilizes the Internet of Things (IoT) allows students to learn Arabic anytime and anywhere using electronic devices connected to the Internet (Munirathinam, 2020; Arifin et al., 2023).

Since the advent of AI with machine learning (ML) systems, students have had a diverse perception of ML in Arabic language learning. ML is an AI technique related to learning data and its use to predict information in the world (Sarker, 2021). Some students may see ML as a mathematical algorithm used to solve a variety of problems, while others may see it as an innovative and effective learning method. Studies also show that students' perceptions of ML applications can be influenced by factors such as interest, motivation, and response to learning (Lim et al., 2021). Therefore, students' understanding of ML functions can help improve the quality of learning Arabic.

The next student's perception of ML is that it is a very interesting but also uncertain learning tool. They're enthusiastic because this technology can provide a more personal learning experience (Ilmiani et al., 2022; Wang et al., 2022). They realize that ML can adapt the learning material to suit the needs and learning styles of each individual. In Arabic, one can determine what he will learn according to his skills and needs (Alkhatib et al., 2020). However, there are also very careful students. They're worried that ML will replace the teacher's overall role or make them lose control of the learning process (Van Lieshout & Cardoso, 2022). Some are worried that their privacy may be compromised by the data collection carried out by ML. A lot of students are skeptical of ML's ability to fully understand the complexity of human learning. Besides, they asked the ML to give an answer regarding the Arabic text.

Students have diverse views on the role of ML in Arabic language learning. Some see ML as a tool that expands their Arabic learning potential, helps them understand the material better, and provides useful recommendations. However, there are also those who believe that the human role in the learning process should not be neglected and that machines should only be supporters, not substitutes (Wang & Siau, 2019). For example, during a research interview session with a student, Arkan questioned whether ML could understand complex nuances in class discussion or whether they could only give answers

based on the data they received from a machine algorithm (interview, 20/03/2023). Meanwhile, Daniel felt that machine learning could be a very useful tool for expanding his understanding and knowledge, but only if used wisely by the teacher (interview, 20/03/2023).

Based on the exposure above, students realize the presence of ML has great potential to change the way they learn. However, they also want to ensure that the role of teachers, human experience, and educational values remain the main focus in the use of ML in learning environments. For them, ML is not just about technology as a tool, but how it can help them reach their maximum and deepest learning potential. Eventually, the ML presence is expected to change their view of easy and enjoyable Arabic learning (Almahasees et al., 2021).

### Arabic Translation Errors Using ML-GT

The researchers found a translation error of an Arabic word or sentence using the machine learning (ML) of Google Translate (GT) in Table 1 below:

**Table I:** ML-GT Translation Errors

No	Language Elements	Description Error
1	Phonetics	The result of the translation of the Arabic vocabulary experienced by the student was a linguistic error on phonetic aspects, such as <i>makharrij al-huruf</i> error, line error, reading error, and intonation error.
2	Morphology	Google Translate is wrong in choosing the desired word form as well as the choice of words that should match the <i>ruba'i mazid</i> expressed in the form of <i>tsulatsi mazid</i> .
3	Syntax	The sentence patterns generated by Google Translate in the Arabic-Indonesian and Indonesian-Arabic languages are not in line with Arabic grammar.
4	Semantics	The selection of words that are relevant to the sentence requested sometimes does not relate to the meaning desired, so often listeners misunderstand.

The data in Table 1 above explains ML-GT errors in translating Arabic words or sentences, either Indonesian-Arabic or Arabic-Indonesian, the impact of which is often misunderstood by listeners. Those errors covered all aspects of the Arabic language, such as phonetics, morphology, syntax, and semantics. Lacking machines, he can't detect the meaning desired by humans.

Another mistake in the ML-GT is the *sharf* aspect, or the morphology of the Arabic language. Morphology is an element of the language that must be studied and known by the students. Because with the correct understanding of the morfology of Arabic, you will

be able to produce a lot of vocabulary (Devi & Elmula, 2023; Kurniati et al., 2019). This is not only the case in Arabic but also in various languages around the world, as shown in Figure 1 below:



**Figure 1.** ML-GT translation error

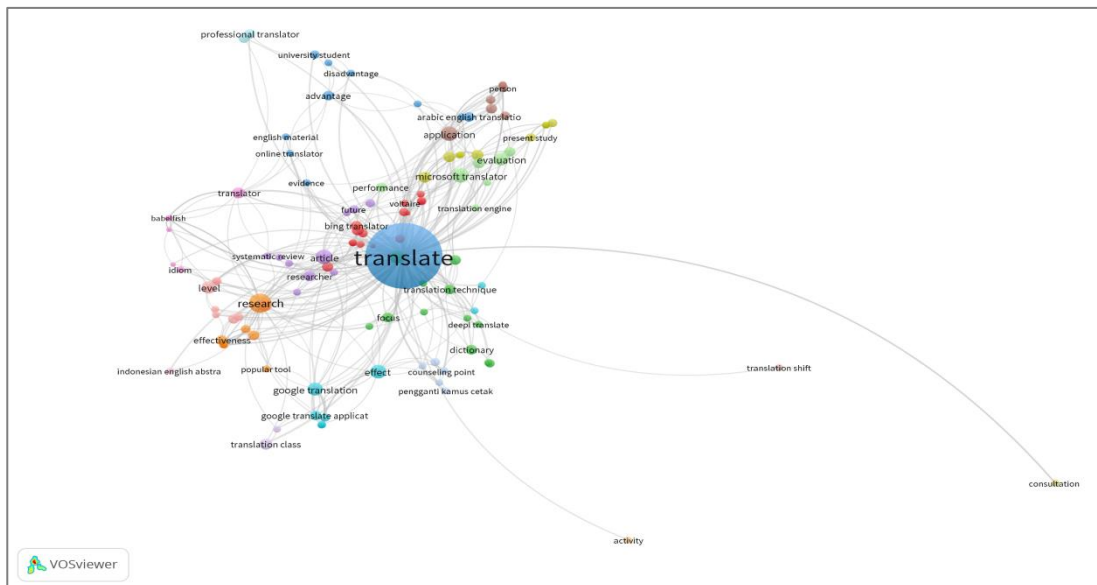
Figure 2 above explains errors in the morphemic and semantic aspects. The Arabic sentence above is an excavation of the Qur’an surah al-Baqarah: 185. ML-GT cannot detect morphemes in a text, as in the word **فيه** should mean “...in the month.” While the semantic error consisting of the word **بينات** should mean “explanations of the guidance”, **الفرقان** “should mean distinguishing (between the *haq* and the *bathil*)”. The above sentence is an example with the foundation of the Qur’an as its original source to compare the validity of the original and machine translations.

Another error obtained from ML-GT is in the translation of the *sharf* aspect or the morphology of the Arabic language. When the word is expressed in the form of passive sentence (*fi’il madhi majhul*), but the result is active sentence (*fi’ill madhi ma’lum*), there is also the result of the translation that should be written as a word (*shigab*) subject (*fa’il*) but written as an object (*maf’ul*). Similar errors are common in dialectal translation, where ML-GT translates words into non-meaning words. As an example of the proverb, “throw a stone behind your hands” is translated as “رمي الحجارة وإخفاء يديك” whereas the desired meaning is “free of responsibility.”

The result of the error analysis of the Arabic ML-GT translation also contains errors in the syntax aspects of the language’s grammatics (*qawa’id*) and word order (*Al-tarkib*). In these two cases, there are cases where there is an error in the word order of the sentence translated by the machine (Vanjani & Aiken, 2020). It affects the meaning of language and the inhibition of the message to be conveyed to others. Another error that also emerged was the inaccuracy of the word selection in the sentence expressed, so the researchers grouped it as a semantic error (*dalalah*).

Errors in translating Arabic words or sentences using ML-GT can be grouped into six categories: phonetic, morphological, syntactical, semantic, word order, and language

grammar. If the use of Google Translate is analyzed using VOSViewer, it can be described in the following figure 2:



**Figure 2.** Usage of Google Translate by VOSViewer

Figure 2 above confirms that the use of GT in massive language learning is done. In fact, there are still various sources of error. Errors are found in phonology (Muslimin et al., 2021), morphology (Devi & Elmula, 2023), syntax (Alkhatib et al., 2020), word order (*Al-tarkib*) (Abdullah Bukhar, 2022), and semantics (Almahasees et al., 2021). The ML translation errors found in Arabic have relevance to the various results of the above research. The fundamental difference lies in the foreign language studied. This finding is important because each language has its own character and characteristics, both in terms of phonological, morfological, syntac, word order (*Al-tarkib*), and semantic aspects.

Another difference that can be highlighted in this study is the tool for measuring language errors. If some existing studies detect language errors through conceptual analysis of linguistic theory, then this study uses ML-GT as a tool to detect errors in students' Arabic translation results. In the context of this research, ML-GT was used to evaluate students' Arabic translation results, providing deeper insight into the types and frequency of errors made by students. This helps in understanding error patterns and developing more effective teaching strategies to improve students' language skills.

## CONCLUSION

Based on the data and analysis described above, the researchers concluded that the machine learning (ML) Google Translate (GT) can be used for searching Arabic vocabulary and sentences, and at the same time, they should beware of existing errors. This can be done by teachers and students, as well as anyone who needs machine performance to make language commands from Arabic to Indonesian through ML-GT.



The results of the translation were then analyzed, looking at various errors occurring in Arabic aspects such as grammar (*qawa'id*), word order (*At-tarkib*), phonetics, morphology, syntax, and semantics. Researchers looked at students' perceptions of ML's presence and expected ML to be an interactive medium for learning language skills. The knowledge that ML-GT is a learning tool has not improved the Arabic language skills of the students. From the data obtained, it is indicated that artificial intelligence (AI) is not in a position to optimally produce the quality of translation of true Arabic words or sentences according to Arabic grammar so that it is easy to understand the interlocutor. Students are not helped in choosing the correct vocabulary and sentences with context; reasoning is not developed; and eventually, the oral language is not aligned with the written language.

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