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MACHINE TRANSLATION AND ITS LIMITATIONS

Jasmina Yusufovna Masejonova

Student at Samarkand State Institute of Foreign Languages

Abstract: This article examines why machine translation can fail to convey the intended meaning, particularly when translating between English and Uzbek. It focuses on common problems involving ambiguous words, idioms, grammatical differences, cultural references, and specialized terminology. The article compares rule-based, statistical, and hybrid approaches to machine translation and uses examples to illustrate how literal translations can produce unnatural or misleading results. It also explores how human post-editing, translation memory, and terminology management can help correct errors and improve consistency.

Keywords: machine translation (MT), rule-based machine translation (RMT), statistical machine translation (SMT), hybrid translation (HT), post-editing, translation errors, cultural context, translation quality.

1. Introduction

Translation plays a significant role in international communication, education, science, business, diplomacy, and cultural exchange. As the volume of multilingual information continues to increase, technological tools have become important for making translation faster and more accessible. One of these tools is machine translation, which automatically generates a translation from a source language into a target language. Machine translation has developed considerably since the early twentieth century. Early systems relied on dictionaries and grammatical rules, while later approaches used statistical models and large bilingual corpora. Modern translation technologies can produce useful translations of everyday texts within seconds. Nevertheless, speed does not necessarily guarantee accuracy. Natural languages contain ambiguity, idioms, cultural references, differences in word order, and expressions whose meanings depend on the situation in which they are used. A machine may translate individual words correctly while failing to communicate the intended message. This problem is especially relevant when translating between English and Uzbek, because the languages differ in grammatical structure, word formation, and the use of context.

2. Literature Review

The idea of using machines to translate languages emerged before the development of modern computers. Early proposals explored the possibility of using bilingual dictionaries and formal systems to represent linguistic information. In 1949, Warren Weaver circulated a memorandum discussing the possibility of applying computational methods to translation. His ideas contributed to growing interest in machine translation. In 1952, researchers gathered at a conference at the Massachusetts Institute of Technology to discuss the problems and possibilities of automated translation.[1] A widely recognized early demonstration took place in 1954 through the Georgetown–IBM experiment, which translated a limited number of Russian sentences into

[1] Weaver, W. (1949). *Translation*. Memorandum on machine translation.

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English[2]. Although the experiment used a small vocabulary and restricted grammatical patterns, it attracted considerable attention. However, expectations about fully automatic translation proved difficult to meet. The 1966 report of the Automatic Language Processing Advisory Committee (ALPAC) in the United States questioned the practical efficiency and quality of the machine translation systems available at that time.[3] The report contributed to reduced investment in some machine translation projects and encouraged further investigation into translation quality and alternative approaches. Subsequent developments included systems designed for specific purposes. For example, Météo was developed for translating weather forecasts, demonstrating that machine translation could be effective when vocabulary and subject matter were relatively restricted. Later approaches included rule-based machine translation, statistical machine translation, and hybrid systems. These developments gradually improved the ability of computers to process multilingual texts.

Rule-based machine translation (RBMT) relies on dictionaries, grammatical rules, and linguistic descriptions. The system analyzes the source sentence, applies predefined rules, and generates a target-language sentence. For example:

English: I read a book. **Uzbek:** Men kitob o‘qiyman.

A rule-based system may use grammatical information to identify the subject, object, and verb and then apply the appropriate Uzbek sentence structure. One advantage of RBMT is that its rules can be inspected and adjusted. However, developing extensive dictionaries and grammatical rules requires considerable linguistic expertise. Such systems may also struggle with idioms, exceptions, ambiguous words, and expressions that do not follow predictable patterns.

Statistical machine translation (SMT) uses statistical models learned from bilingual texts, known as parallel corpora. The system estimates which target-language expressions are likely to correspond to a source-language expression. For example, if a system encounters many English–Uzbek sentence pairs in which “good morning” corresponds to “xayrli tong,” it may learn to select that equivalent in similar situations. SMT can identify useful translation patterns from large collections of texts. Nevertheless, its output depends heavily on the quality, size, and relevance of its training data. If a particular expression or specialized term is poorly represented in the corpus, the system may produce an unsuitable translation.

Hybrid machine translation combines different approaches, often integrating linguistic rules with statistical methods. The purpose is to benefit from the strengths of both approaches. For instance, grammatical rules may help determine an appropriate sentence structure, while statistical models help select likely lexical equivalents. Hybrid systems can improve consistency and accuracy in certain contexts. However, combining methods does not automatically solve all translation problems. Ambiguity, cultural meaning, domain-specific terminology, and stylistic choices may still require human judgment.

3. Methodology

[2] Georgetown–IBM. (1954). Early public demonstration of machine translation from Russian into English.

[3] Automatic Language Processing Advisory Committee (ALPAC). (1966). *Language and Machines: Computers in Translation and Linguistics*. National Academy of Sciences, National Research Council.

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The study draws on existing research on machine translation and human post-editing. The theoretical background includes studies on the development of machine translation systems and the linguistic challenges involved in automated translation. Particular attention is given to the differences between machine-generated and human translations, especially in terms of grammatical accuracy, contextual meaning, and cultural appropriateness. Examples of English–Uzbek translation is used to illustrate these issues and discuss the importance of human involvement in the translation process.

4. Discussion and Results

Machine translation can produce useful translations, but several linguistic and contextual factors may reduce their quality.

- *Linguistic ambiguity.* A word may have several meanings depending on the context. A machine must identify the intended meaning before selecting an equivalent in the target language.

Ex: The word “bank”

English: *The bank is closed*.

Uzbek translation in a financial context: *Bank yopiq.*

English: *We sat on the bank of the river.*

Uzbek*: Biz daryo qirg‘og‘ida o‘tirdik.*

- *Idioms and figurative language.* Idioms are expressions whose intended meanings cannot always be understood from their individual words. Literal translation can therefore create confusing or unnatural results.

Ex: “She has a green thumb.”

Literal translation: *Uning bosh barmog‘i yashil.*

Natural equivalent: *U gullar va o‘simliklarni parvarish qilishga usta.*

Ex: “He spilled the beans.”

Literal translation: *U loviyalarni to‘kib yubordi.*

Natural equivalent*: U sirni oshkor qildi.*

- *Grammatical and structural differences.* Languages organize information differently. English commonly uses a subject–verb–object structure, while Uzbek generally follows a subject–object–verb pattern.

Ex: English*: I read the book.*

Uzbek: *Men kitobni o‘qiyman*.

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A word-for-word translation that preserves English word order may sound unnatural in Uzbek. A suitable translation must reorganize the sentence according to Uzbek grammar.Differences in tense, case marking, agreement, suffixes, and sentence structure can also cause problems. Uzbek expresses many grammatical relationships through suffixes, whereas English often uses separate words and a different grammatical structure.

- *Cultural references and context.* Language reflects the traditions, values, and experiences of a community. Some expressions therefore carry cultural meanings that cannot be transferred through literal translation. For example, English expressions associated with holidays, social customs, forms of address, or culturally specific institutions may have no direct Uzbek equivalent. A translator may need to retain the original term, explain its meaning, or replace it with a functional equivalent that produces a similar effect for Uzbek readers. Cultural interpretation is particularly important in literary texts, advertisements, public communication, and informal conversation. A grammatically correct translation may still fail if it does not communicate the intended cultural meaning.
- *Tone, politeness, and pragmatic meaning.* Translation involves more than transferring factual information. It must also communicate the speaker's intention, level of politeness, and relationship with the audience.

Ex: Could you possibly help me?

A direct Uzbek version might be: *Menga yordam bera olasizmi?*

Depending on the situation, a more polite version could be: *Iloji bo'lsa, menga yordam bera olasizmi?*

The second version makes the request more explicitly considerate. The most appropriate choice depends on the relationship between the speakers and the context. Machine translation may preserve the basic request while failing to reproduce its precise tone. Translators must therefore evaluate not only what a sentence says but also how it communicates that message.

- *Specialized terminology.* Technical, legal, medical, economic, and academic texts frequently contain terms with precise meanings. A familiar word may have a specialized equivalent that differs from its everyday meaning.

Ex: The word "consideration"

In ordinary English, "consideration" may mean careful thought. In contract law, however, it refers to a specific legal concept. Translating it simply as *"ko'rib chiqish"* may be unsuitable in a legal context. The correct Uzbek equivalent must be selected according to the legal concept and the terminology used in the relevant jurisdiction.

- *Errors of omission and addition.* Machine-generated translations may omit information, introduce unsupported details, or change relationships between ideas. For example:

Source: *The meeting was postponed because the director was ill.*

Correct translation*: Direktor kasal bo'lgani sababli yig'ilish keyinga qoldirildi.*

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If a translation omits the reason for postponement, the target text becomes incomplete. If it introduces a reason that does not appear in the source, it changes the original message. Comparing the source and target texts is therefore essential, especially when translating official, academic, or professional documents.

- *Non-verbal communication.* Written machine translation systems generally work with linguistic input rather than the full range of information available in face-to-face communication. They may not have access to gestures, facial expressions, posture, eye contact, stress, or intonation.

For example, the sentence "*That's great"* may express genuine enthusiasm, politeness, or sarcasm depending on how it is spoken and the situation in which it occurs. If only the written sentence is provided, the intended attitude may be unclear. A translator or interpreter with access to the surrounding context can make a more informed decision.

5. Conclusion

Machine translation has developed considerably, making translation faster and more accessible. However, translating accurately involves more than replacing words between languages. Ambiguous expressions, idioms, grammatical differences, cultural references, and specialized terminology can lead to errors or unnatural translations. These challenges are particularly relevant when translating between English and Uzbek, as differences in language structure and cultural context may affect the intended meaning. Human post-editing helps address these problems by allowing translators to check meaning, correct errors, and improve the fluency and appropriateness of machine-generated texts. Translation memories and terminology databases can also support consistency when used appropriately. Nevertheless, these tools require careful review to ensure that suggested translations fit the context. Machine translation is therefore best used as a support tool rather than a complete substitute for human judgment. Combining technological assistance with linguistic knowledge, cultural awareness, and careful revision offers a more reliable approach to producing accurate and natural translations.

References:

1. Brown, P. F., Della Pietra, S. A., Della Pietra, V. J., & Mercer, R. L. (1993). The mathematics of statistical machine translation: Parameter estimation. *Computational Linguistics, 19*(2), 263–311.

2. International Organization for Standardization. (2017). *ISO 18587:2017: Translation services—post-editing of machine translation output—Requirements*.

3. National Research Council. (1966). *Language and machines: Computers in translation and linguistics*. National Academy of Sciences.

4. Weaver, W. (1955). Translation. In W. N. Locke & A. D. Booth (Eds.), *Machine translation of languages: Fourteen essays* (pp. 15–23). Technology Press of the Massachusetts Institute of Technology. (Original memorandum written in 1949.)

5. Hutchins, J. (1999). Retrospect and prospect in computer-based translation. In *Proceedings of Machine Translation Summit VII* (pp. 30–36).

ISSN: 2224-6878 | Pakistan Volume 6, No. 10.

IF: 14.91 | 2026 http://waerasia.org/index.php/ijtar

6. Koehn, P. (2010). *Statistical machine translation*. Cambridge University Press.
7. Koehn, P., Och, F. J., & Marcu, D. (2003). Statistical phrase-based translation. In *Proceedings of the 2003 Human Language Technology Conference of the North American Chapter of the Association for Computational Linguistics* (pp. 48–54).
8. Luong, T., Cho, K., & Manning, C. D. (2016). Neural machine translation. In *Proceedings of the 54th Annual Meeting of the Association for Computational Linguistics: Tutorial Abstracts*. Association for Computational Linguistics.
9. O'Brien, S. (2010). Introduction to post-editing: Who, what, how and where to next? In *Proceedings of the 9th Conference of the Association for Machine Translation in the Americas: Tutorials*. Association for Machine Translation in the Americas.
10. Krings, H. P. (2001). *Repairing texts: Empirical investigations of machine translation post-editing processes*. Kent State University Press.
11. Schwartz, L. (2018). The history and promise of machine translation. In *American Translators Association Scholarly Monograph Series* (Vol. 18, pp. 161–190). John Benjamins Publishing Company.
12. Bahdanau, D., Cho, K., & Bengio, Y. (2015). Neural machine translation by jointly learning to align and translate. In *International Conference on Learning Representations*.