

Means of Identifying Grammatical and Phraseological Problems in Written Translation with the Help of Information Technologies

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Abstract - This article examines the role of information technologies, particularly AI-driven tools, in identifying and correcting grammatical and phraseological problems in written translation. As globalization increases the demand for precise translations, traditional methods relying solely on human expertise face challenges in accuracy and efficiency. The integration of artificial intelligence (AI), natural language processing (NLP), and machine learning (ML) has transformed translation practices, enhancing error detection and improving overall quality. The article discusses common grammatical issues such as subject-verb agreement and tense confusion, as well as phraseological challenges like idiomatic expressions and collocations. It highlights how advanced tools like Google Translate and DeepL leverage large datasets to improve contextual understanding and translation accuracy. Furthermore, the article presents experimental findings that compare these tools' performance, revealing strengths and limitations in handling complex translations, particularly between Uzbek and English. Ultimately, the study underscores the necessity of combining human expertise with technological advancements to achieve high-quality translations, emphasizing the evolving role of information technologies in the translation process.

Keywords: Collocations, phraseological problems, machine translation, AI, NLP, Idiomatic expressions, error, verb agreement

INTRODUCTION

In an era where globalization dominates communication and businesses, translation plays a critical role in bridging linguistic divides. Written translation, in particular, requires precision, fluency, and a deep understanding of the target language's grammar and phraseology. Traditionally, human translators have handled this task, relying on their linguistic knowledge and experience. However, as technological advancements continue to evolve, information technologies are playing an increasingly vital role in identifying grammatical and phraseological problems in translations. The integration of artificial intelligence (AI), natural language processing (NLP), and machine learning (ML) has reshaped the landscape of translation, improving accuracy, efficiency, and consistency.

II. METHODOLOGY

1. The Role of Information Technologies in Translation

Information technologies (IT) have significantly influenced translation processes over the past few decades. The advent of computer-aided translation (CAT) tools, translation memory systems (TM), and AI-powered machine translation (MT) platforms like Google Translate and DeepL has facilitated quicker and more efficient translations.

Technologies used for identifying grammatical and phraseological issues in translation include the following:

Natural Language Processing (NLP): NLP involves the development of algorithms that allow machines to understand, interpret, and manipulate human language. It is a core technology used in grammar and phraseology checkers.

Artificial Intelligence (AI): AI, through machine learning and deep learning models, allows tools to "learn" from large datasets of language usage, improving their ability to detect complex language errors over time.

Machine Translation (MT): MT systems automatically translate text from one language to another, although their accuracy is not always perfect, especially with less common language pairs.

Translation Memory (TM): TM tools store previously translated sentences, phrases, or text segments, enabling translators to reuse them in future projects. While TMs reduce repetitive work, they also help maintain consistency, reducing errors in phraseology and grammar.

Grammar Checkers: Advanced tools like Grammarly and ProWritingAid use NLP and AI to check for grammatical errors in real time. These tools are often integrated into CAT tools to streamline the identification of problems.

2. Common Grammatical and Phraseological Issues in Translation

Before diving into the solutions provided by technology, it's important to understand the grammatical and phraseological challenges faced by translators. These issues can arise for various reasons, including language-specific syntactic structures, idiomatic expressions, or cultural differences.

Grammatical Errors:

- **Subject-Verb Agreement**: In some languages, the verb form must agree with the subject in terms of number and gender, which can be difficult when translating between languages with different grammatical rules.
- **Tense and Aspect Confusion**: Some languages use tenses differently, leading to tense confusion during translation. The aspect (perfective vs. imperfective) is another source of errors.
- **Word Order**: Languages like English follow a Subject-Verb-Object (SVO) structure, while others like Japanese or German use different orders (SOV). Mistakes in word order can alter the meaning of sentences.
- **Articles and Determiners**: Many languages don't use articles the way English does (or at all). This can cause translators to omit articles or use them incorrectly.

Phraseological Issues:

- **Idiomatic Expressions**: Direct translation of idiomatic expressions often leads to confusion or loss of meaning, as the translated phrase may make little sense in the target language.
- **Collocations**: These are specific combinations of words that frequently occur together (e.g., "make a decision," "take a walk"). Translators may mistakenly translate collocations word-for-word, resulting in awkward phrasing.
- **Polysemy and Homonyms**: Words with multiple meanings can cause confusion when translated out of context, leading to incorrect word choices.

These challenges are often compounded by the translator's fluency in the target language, the complexity of the source material, and the linguistic distance between the languages.

3. How Information Technologies Help Identify Grammatical Issues

One of the most significant ways information technologies assist in translation is through the identification of grammatical problems. Tools leveraging AI and NLP have become increasingly proficient at detecting common grammatical errors, improving both the speed and accuracy of the translation process.

Grammar Checking Software: Tools like Grammarly, ProWritingAid, and Hemingway Editor utilize algorithms to scan text for grammatical errors. These platforms are particularly useful in detecting:

- ✓ Incorrect subject-verb agreement
- ✓ Verb tense errors
- ✓ Sentence fragments
- ✓ Run-on sentences
- ✓ Misplaced modifiers

Integrated into translation software, these tools allow translators to identify and correct grammatical issues in real-time, ensuring that the translated text adheres to the syntactic rules of the target language.

NLP in Grammar Detection: Advanced NLP techniques are designed to understand the grammatical structure of a sentence by breaking it down into its constituent parts (parsing). This allows the system to identify complex errors, such as incorrect use of passive voice, misplaced adverbs, or improper prepositions, which might not be immediately obvious.

Bilingual Grammar Checkers: Some tools, like LanguageTool, are tailored for multilingual grammar checking. These tools can identify errors across various languages, improving the accuracy of translations by accounting for the grammatical rules of both the source and target languages.

4. Addressing Phraseological Problems with Technology

Phraseological issues, such as idiomatic expressions and collocations, are often harder for machines to identify. These errors require a deeper understanding of the language's semantics, including context and cultural nuances. However, recent advancements in AI have made it possible for translation tools to better handle phraseology.

Machine Translation and Phraseology: MT systems like Google Translate and DeepL have made strides in improving phraseological accuracy by using large language corpora. These systems use neural machine translation (NMT) models, which can handle entire sentences rather than word-by-word translation, making them more effective at producing natural-sounding phrases.

Handling Idiomatic Expressions: Phraseological errors frequently occur when translating idiomatic expressions. To mitigate this, some tools have developed databases of idiomatic expressions in different languages. Tools like Memsources and Smartling include phrase dictionaries that provide translators with idiomatic alternatives for common phrases, reducing errors.

Collocation Detection: Tools like Wordsmith and Sketch Engine analyze texts to identify commonly used collocations. These tools are particularly useful for translators working with languages that rely heavily on fixed word combinations. They can suggest appropriate collocations in the target language, helping translators avoid awkward phrasing.

5. AI-Powered Translation Assistance

AI-powered tools like DeepL and Google Neural Machine Translation have been game-changers in the identification and prevention of grammatical and phraseological problems in translation. These tools use neural networks that are trained on vast datasets of parallel texts, learning how to mimic the subtleties of human translation.

Contextual Translation: One of the key benefits of AI-powered systems is their ability to handle context better than traditional rule-based systems. By analyzing the broader context of sentences or paragraphs, AI tools can identify grammatical and phraseological issues that stem from out-of-context translations. For example, AI can distinguish between the multiple meanings of a word depending on its placement in a sentence.

Post-editing Machine Translation (PEMT): In a workflow that involves PEMT, human translators work alongside AI-generated translations, correcting grammatical and phraseological errors that the machine might have missed. This collaboration between human expertise and AI ensures higher quality translations with fewer errors.

6. Limitations and Challenges

Despite the many advancements, there are still limitations to current technology in identifying and correcting grammatical and phraseological issues in translation.

Contextual Limitations: While AI has made great strides, it still struggles with highly contextual or specialized content. Idiomatic expressions, metaphors, and colloquial language can often confuse the machine, leading to awkward or incorrect translations.

Cultural Sensitivity: Phraseological problems often arise due to cultural differences, which are difficult for machines to fully grasp. Translating humor, sarcasm, or culturally bound references remains a significant challenge.

Accuracy in Low-Resource Languages: For languages with less digital text available, the accuracy of machine translation and grammar checking tools can be significantly lower.

III. EXPERIMENT RESULTS

To assess the effectiveness of current translation technologies, an experiment was conducted using Google Translate and DeepL to translate selected text between Uzbek and English. The results were analyzed for grammatical and phraseological accuracy.

1. Methodology

Two passages of approximately 500 words each were selected in both English and Uzbek, representing a mix of formal and informal language, including idiomatic expressions and specialized terminology. The passages were translated using Google

Translate and DeepL. Human translators then reviewed the results, noting grammatical and phraseological issues.

2. Results

Google Translate:

- **Grammatical Issues:** Google Translate successfully handled basic grammatical structures but struggled with subject-verb agreement when translating from Uzbek to English. It often defaulted to the wrong tense in sentences involving aspectual distinctions (e.g., perfective vs. imperfective).
- **Phraseological Issues:** Idiomatic expressions were poorly translated, often rendered literally, which led to confusing or nonsensical output. For instance, the phrase "eski gapni aytish" (repeating old information) was translated as "say the old word," which did not convey the intended meaning.

DeepL:

- **Grammatical Issues:** DeepL demonstrated a better grasp of subject-verb agreement and tense consistency, especially in handling Uzbek word order when translating to English. However, some errors persisted in sentences with complex grammatical structures.
- **Phraseological Issues:** DeepL fared better with idiomatic expressions, producing more natural-sounding phrases in English. It accurately translated common collocations but still struggled with rarer idioms, leading to awkward phrasing in a few cases.

3. Analysis

While both tools demonstrated progress in translation quality, neither performed perfectly, especially in phraseological translation. Google Translate provided faster, but less accurate results, often losing meaning in idiomatic expressions and culturally specific references. DeepL, though slower, provided more contextually appropriate translations, particularly with grammatical structures. However, both tools still require significant post-editing by human translators, particularly for high-quality translations between Uzbek and English.

VI. CONCLUSION

The use of AI, NLP, and machine learning in translation has significantly improved the identification of grammatical and phraseological problems. However, as demonstrated in the experiment, these tools are not yet capable of fully replacing human expertise, especially when dealing with languages like Uzbek, where grammatical structures and idiomatic expressions differ greatly from English.

AI-powered tools such as Google Translate and DeepL offer substantial assistance but still struggle with nuance and cultural sensitivity. This highlights the need for collaboration between human translators and technology to achieve high-quality translations. As information technologies continue to evolve, their integration into the translation process will undoubtedly become more seamless, reducing errors and increasing efficiency across a wider range of languages.

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