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ERROR PATTERNS IN NEURAL MACHINE TRANSLATION FROM ENGLISH INTO UKRAINIAN: A CONTRASTIVE LINGUISTIC ANALYSIS

This study investigates neural machine translation (NMT) from English into Ukrainian, focusing on the identification and analysis of recurrent error patterns. Modern NMT systems, such as Google Translate, DeepL, and ChatGPT, have significantly improved in terms of speed, fluency, and general accuracy. However, these systems continue to face challenges in translating complex syntactic structures, idiomatic expressions, and culture-specific elements. Such limitations manifest in lexical inaccuracies, grammatical inconsistencies, semantic misinterpretations, and stylistic deviations, highlighting the importance of detailed linguistic analysis for evaluating machine-generated translations [1, 2].

A diverse corpus was employed for the analysis, including literary texts, news articles, technical documents, and everyday communication. This selection allowed for a systematic examination of how NMT systems process English source texts and produce Ukrainian output. Human translations were used as reference to identify differences in linguistic and stylistic accuracy [3, 4].

The literature review demonstrates that error analysis in NMT is not purely technical but requires a linguistic and translational perspective. Despite their advanced architectures, NMT systems often make recurrent errors such as mistranslation, omission, syntactic misalignment, and terminological inconsistency [1, 5]. Errors are particularly frequent in translating idiomatic expressions, culturally bound references, and ambiguous constructions, reflecting the structural differences between English and Ukrainian [2, 6]. The use of structured error taxonomies, such as the Multidimensional Quality Metrics (MQM), provides a systematic framework for identifying and categorizing these errors [1, 7].

Empirical analysis revealed that lexical errors frequently occur with polysemous words, collocations, and domain-specific terminology [2, 3]. Morphosyntactic errors include incorrect agreement, case marking, and word order deviations [1, 7]. Omissions and under-translations are also common, indicating that NMT sometimes fails to convey all source information [2, 4]. Additionally, style and register often deviate from natural Ukrainian usage, revealing difficulties in stylistic adaptation [5, 6].

Human translators play a critical role in addressing these limitations. They can correct lexical and grammatical errors while ensuring that translations preserve semantic nuances, stylistic features, and cultural relevance [3, 6]. A hybrid approach, where NMT systems provide draft translations and human translators perform post-editing, is highly effective. Humans refine the output, adapt style, resolve ambiguity, and maintain coherence and naturalness [2, 7].

Future improvements in NMT should focus on enhancing linguistic and cultural intelligence, integrating modules for semantic disambiguation, context recognition, and stylistic adaptation [1, 2]. Additionally, translator education should include post-editing skills, critical evaluation of machine-generated content, and strategies for handling

complex linguistic phenomena [3, 5]. The combination of human expertise and machine efficiency allows for translations that are not only accurate but also culturally and stylistically appropriate [4, 6].

In conclusion, while NMT systems are useful tools for fast translation, human intervention remains essential to ensure linguistic precision, cultural adequacy, and stylistic integrity. This contrastive linguistic analysis of English–Ukrainian NMT outputs demonstrates common error patterns and highlights the indispensable role of human translators in optimizing machine-generated translations [1–7].

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