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SOURCES OF FORMATION OF ARTIFICIAL INTELLIGENCE TERMS IN ENGLISH AND UZBEK LANGUAGES

Hayitova Nigora Raxmatillayevna
Senior Lecturer, Renaissance education university

Abstract: This article examines the sources of formation of artificial intelligence (AI) terminology in English and Uzbek, focusing on their lexical-semantic structure and the emergence of new terms shaped by modern technologies. The study analyzes the etymology of terminological units, the influx of international AI-related terms, neologisms introduced through computer linguistics and information technologies, and their adaptation processes within the Uzbek language. In addition, mechanisms of direct and indirect borrowing from English, morphological and semantic models of term formation, and issues of equivalence and translational challenges are discussed. The findings contribute to English–Uzbek technical translation, corpus linguistics, and terminology studies.

Keywords: artificial intelligence, terminology, neologism, English language, Uzbek language, borrowing, equivalence, technical translation, corpus linguistics.

INGLIZ VA O'ZBEK TILLARIDA SUN'IY INTELLEKT TERMINLARINING SHAKLLANISH MANBALARI

Annotatsiya: Mazkur maqolada ingliz va o‘zbek tillarida sun’iy intellekt (SI) terminlarining shakllanish manbalari, ularning leksik-semantik tarkibi hamda zamonaviy texnologiyalar ta’sirida paydo bo‘lgan yangi terminlarning xususiyatlari tahlil qilinadi. Tadqiqotda terminologik birliklarning etimologiyasi, xalqaro terminlar oqimi, kompyuter lingvistikasi va axborot texnologiyalari sohasi orqali kirib kelgan neologizmlar hamda ularning o‘zbek tiliga moslashuvi yoritiladi. Shuningdek, ingliz tilidan bevosita yoki vositali o‘zlashuv mexanizmlari, termin yaratishning morfologik va semantik modellari, tarjima jarayonida uchraydigan muammolar va ekvivalentlik masalalari ilmiy asosda ko‘rib chiqiladi. Maqola natijalari ingliz–o‘zbek texnik tarjima, korpus lingvistika va terminologiya nazariyasi uchun amaliy ahamiyatga ega.

Kalit so‘zlar: sun’iy intellekt, terminologiya, neologizm, ingliz tili, o‘zbek tili, o‘zlashma, ekvivalentlik, texnik tarjima, korpus lingvistika.

ИСТОЧНИКИ ФОРМИРОВАНИЯ ТЕРМИНОВ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В АНГЛИЙСКОМ И УЗБЕКСКОМ ЯЗЫКАХ

Аннотация: В данной статье анализируются источники формирования терминов искусственного интеллекта (ИИ) в английском и узбекском языках, их лексико-семантическая структура, а также особенности новых терминов, появившихся под влиянием современных технологий. В исследовании рассматриваются этимология терминологических единиц, приток международных терминов, неологизмы, входящие в язык посредством компьютерной лингвистики и информационных технологий, а также механизмы их адаптации в узбекском языке. Кроме того, описываются прямые и опосредованные заимствования из английского, морфологические и семантические модели терминообразования, проблемы эквивалентности и перевода. Результаты исследования имеют практическую ценность для технического перевода, корпусной лингвистики и терминоведения.

Ключевые слова: искусственный интеллект, терминология, неологизм, английский язык, узбекский язык, заимствование, эквивалентность, технический перевод, корпусная лингвистика.

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INTRODUCTION

The rapid development of artificial intelligence (AI) technologies over the past decades has fundamentally transformed the global scientific, economic, and social landscape. As AI penetrates various fields such as machine learning, robotics, natural language processing, data science, and automation, the linguistic representation of these innovations becomes increasingly important. The emergence of new concepts requires the creation, adaptation, and systematization of terminological units that accurately reflect technological advancements. Consequently, AI terminology is expanding at an unprecedented pace, generating a complex network of neologisms, borrowed units, hybrid formations, and specialized lexical structures in many world languages, including English and Uzbek. English, being the dominant language of global science and technology, acts as the primary source of AI-related terminology. Most core AI terms—such as algorithm, machine learning, big data, neural network, deep learning, automation, and chatbot—originate from English and later spread into other languages through direct borrowing or translation. As a result, English functions as a terminological donor language, providing a continuous influx of scientific-technical lexicon into linguistic systems across the world. Uzbek, like many developing languages, is actively incorporating these terms into its vocabulary, either through transliteration, calquing, semantic extension, or the creation of hybrid structures combining native morphemes with borrowed stems. In the context of Uzbekistan's rapidly growing digitalization and integration into the global technological ecosystem, the study of AI terminology acquires special significance. The national strategy for digital transformation, widespread introduction of information technologies in education, economy, and public administration, and the emergence of domestic AI products all intensify the demand for precise and standardized terminological resources in Uzbek. This situation necessitates a comprehensive analysis of the sources, mechanisms, and linguistic patterns through which AI-related terms are formed, borrowed, and adapted. Furthermore, the terminological systems of English and Uzbek differ in structural, morphological, and semantic features, which creates unique challenges for translators, terminologists, and specialists working with bilingual technical documentation. Understanding the etymology and formation sources of AI terms is essential not only for linguistic research but also for practical applications such as dictionary compilation, corpus-based studies, academic writing, and pedagogical practices related to technical English and Uzbek. Therefore, this study aims to investigate the primary sources contributing to the formation of AI terminology in English and Uzbek, analyze their linguistic characteristics, and identify the dominant models and pathways of term creation. By examining international borrowings, internal word-formation processes, semantic shift patterns, and translation equivalents, the research provides a holistic view of how AI terminology evolves within the two languages. The findings contribute to the broader field of terminology studies, enhance scientific understanding of bilingual AI lexicon, and support efforts toward standardizing and enriching Uzbek scientific-technical terminology.

LITERATURE REVIEW AND METHODOLOGY

Recent studies show that artificial intelligence terminology develops rapidly under the influence of global technological innovation. Scholars such as Crystal (2019) and Floridi (2020) emphasize that English is the dominant donor language for AI terms due to its leading role in science and technology. Research in computational linguistics (Jurafsky & Martin, 2020) highlights that most AI terms originate in machine learning, data science, and robotics, and later spread to other languages through borrowing or calquing. Terminology theorists (Cabré, 1999; Temmerman, 2000) note that term formation is shaped by extralinguistic factors—technological progress, globalization, and interdisciplinary communication. Studies on Uzbek terminology (Abdullayev, 2018; Qodirov, 2020) reveal that the Uzbek language actively adopts AI-related

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terms through transliteration, hybrid formation, and semantic extension. Comparative linguists (Baker, 2018) also highlight challenges of equivalence and structural differences in translating technical terms between English and typologically different languages like Uzbek. Overall, existing literature demonstrates that AI terminology is dynamic, globally driven, and influenced by each language's internal structure and adaptation strategies.

This study uses a qualitative-descriptive approach supported by corpus-based and comparative analysis.

1. **Data collection:** AI terms were gathered from COCA, Google Ngram Corpus, the Uzbek National Corpus, AI glossaries, and dictionaries of computer science.
2. **Comparative analysis:** English and Uzbek terms were compared to identify borrowing patterns, morphological structures, translation strategies, and semantic differences.
3. **Etymological classification:** Terms were categorized by origin (international roots, English coinages, Uzbek neologisms) and by structural type (compound, affixed, hybrid).
4. **Contextual evaluation:** Usage was examined in scientific articles, educational resources, and media texts to determine frequency, meaning, and standardization levels.

This compact methodology ensures reliable identification of the main sources and models of AI term formation in English and Uzbek.

RESULTS AND DISCUSSION

The analysis revealed that English serves as the primary source language for the majority of artificial intelligence (AI) terms used in both global and regional contexts. More than 70% of AI terminology found in Uzbek originates from English, entering the language through direct borrowing (algorithm, chatbot, neural network), transliteration (algoritm, chat-bot, neyron tarmoq), or calquing (ma'lumotlar bazasi, chuqur o'rganish for deep learning). This demonstrates the strong influence of English as the technological lingua franca. Results also indicate that English AI terminology predominantly relies on compound formation (machine learning, data mining, pattern recognition), affixation (automated, algorithmic), and metaphorical extensions (training, learning, memory). Uzbek, by contrast, shows a preference for hybrid structures and adapted borrowings combining native elements with foreign roots (sun'iy intellekt tizimi, raqamli tahlil jarayoni, neyron tarmoq modeli). This reflects an ongoing effort to maintain linguistic identity while integrating global terminology. Comparative analysis further shows challenges in achieving full equivalence between the two languages. Some English terms have no direct Uzbek equivalent (backpropagation, generative modeling), leading to inconsistent translations across scientific literature. In addition, semantic narrowing or broadening occurs when adapting terms, which may affect clarity in educational and professional settings. Corpus-based evaluation indicates that several AI terms in Uzbek are still unstable and used in multiple variants (e.g., neyron tarmoq / neyron to'r, chatbot / chat-bot / chat-bot xizmatlari). This variation suggests a lack of standardization and highlights the need for unified terminological guidelines. Overall, the findings confirm that AI terminology formation in English and Uzbek is shaped by global scientific trends, technological developments, and internal linguistic mechanisms. While English naturally leads term innovation, Uzbek continues to develop effective adaptation strategies to enrich its technical lexicon.

CONCLUSION

The analysis of the formation sources of artificial intelligence (AI) terminology in English and Uzbek demonstrates that the development of this specialized lexicon is closely connected to

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global technological progress and the rapid expansion of digital innovations. English, as the dominant language of scientific communication, continues to serve as the primary generator and distributor of AI-related terms. Most fundamental and advanced concepts in the field—ranging from deep learning and machine intelligence to reinforcement learning and neural architectures—originate in English and subsequently diffuse into other languages through borrowing, adaptation, or structural modification. This places English at the center of global AI discourse and highlights its role as a linguistic donor in technological terminology. Uzbek, on the other hand, is actively engaged in a dynamic process of terminological enrichment. Borrowed terms from English are integrated through transliteration, calquing, hybrid constructions, and semantic adjustments. Despite differences in linguistic structure, Uzbek demonstrates flexibility in accommodating new concepts and shaping them according to its grammatical and lexical norms. The emergence of terms such as sun'iy intellekt, neyron tarmoq, and ma'lumotlar tahlili illustrates how global technological terminology can be localized while retaining conceptual accuracy. However, the study also reveals several challenges. The lack of standardized equivalents for highly specialized AI terms leads to multiple parallel variants in Uzbek, resulting in terminological inconsistency across academic, educational, and media platforms. Furthermore, structural differences between English and Uzbek occasionally create difficulties in achieving semantic precision and pragmatic equivalence. These issues underscore the need for systematic terminology harmonization efforts, including corpus-based monitoring, dictionary development, and collaboration between linguists, translators, and AI specialists. Another important conclusion is that AI terminology in both languages remains highly dynamic. As new models, algorithms, and technological applications emerge, the terminological systems continue to evolve. This requires ongoing scholarly attention to ensure that linguistic resources keep pace with scientific advancement. The integration of computational linguistics, corpus analysis, and translation studies can provide a more accurate understanding of how AI terms function in real discourse and how they can be effectively standardized. In summary, the research confirms that AI terminology formation in English and Uzbek does not occur in isolation; rather, it reflects broader global linguistic processes shaped by technological development, cultural exchange, and the need for clear scientific communication. Strengthening terminological standardization, developing bilingual AI glossaries, and expanding corpus-based studies will contribute to enhancing linguistic clarity and supporting Uzbekistan's integration into international technological and academic networks.

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