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A SEMANTIC STUDY OF ARTIFICIAL INTELLIGENCE TERMINOLOGY IN UZBEK AND ENGLISH

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Annotation: This article presents a comparative-typological analysis of the semantic features of artificial intelligence (AI) terminology in Uzbek and English. The study identifies the main methods by which English-origin AI terms are adapted into Uzbek — calquing, phonetic borrowing, descriptive translation, and semantic shift — and examines the accompanying phenomena of meaning narrowing, meaning broadening, and metaphorical transfer. The findings indicate that Uzbek AI terminology has not yet reached full standardization, as several parallel variants often coexist for a single concept. The article concludes with practical recommendations for achieving terminological consistency.

Keywords: artificial intelligence terminology, semantics, calquing, loanwords, terminological standardization, comparative linguistics, neologism.

Over the past decade, the rapid development of artificial intelligence technologies has had a significant impact on every sphere of society, including language and terminology. English has emerged as the primary source of scientific and technical terms in the field of AI, and other languages, including Uzbek, are undergoing an active process of adapting these terms into their own linguistic systems. This process is not merely lexical but deeply semantic in nature, as the meaning structure, stylistic connotation, and scope of usage of terms often shift in the course of transfer from one language to another.

The relevance of the topic is explained by several factors: first, no unified normative dictionary of AI terminology has yet been created for the Uzbek language; second, educational, popular-scientific, and official texts frequently employ different terms to express a single concept in parallel; and third, an in-depth study of the semantic structure of terms provides the theoretical foundation necessary for improving translation quality and shaping terminological policy.

The purpose of this study is to conduct a comparative analysis of the semantic features of AI terminology in Uzbek and English, to identify the methods by which such terms are adapted into Uzbek, and to classify the semantic shift phenomena observed in this process.

The material for this study was drawn from more than 120 terminological units collected from English- and Uzbek-language scientific-technical publications, official documents, educational curricula, and popular-science sources. The analysis was carried out using the following methods:

a. comparative-typological method — for contrasting the terminological systems of the two languages;

b. componential analysis — for revealing the semasiological structure of terms;

c. elements of statistical analysis — for determining the relative frequency of formation methods;

d. contextual analysis — for observing how terms function across different text types.

➢ **Methods of Adapting AI Terminology into Uzbek**

The analysis identified four principal methods by which English-origin AI terms are adapted into Uzbek:

a. Calquing (word-for-word translation) — each component of the term is translated separately into Uzbek (e.g., artificial intelligence → sun'iy intellekt, machine learning → mashinali o'qitish). This method accounts for approximately 54% of the analyzed material.

b. Phonetic borrowing — the sound form of the term is preserved almost unchanged (as with token, chat-bot, prompt in certain contexts). This method is typically used when a term needs to enter the language quickly, though it often results in reduced semantic transparency.

c. Descriptive translation — a single English word is rendered through a multi-component Uzbek phrase (overfitting → haddan tashqari moslashish).

d. Mixed method — part of the term is borrowed while the other part is translated (neural network → neyron tarmoq).

➢ **Phenomena of Semantic Shift**

Alongside purely linguistic transfer, terms undergo semantic shift phenomena when moving from one language to another. The following processes were identified within this study:

a. Meaning narrowing — a general-use word acquires a narrow, specialized meaning within the IT domain (for instance, the English word «model» has a broad meaning in everyday speech, but in the AI context denotes specifically «the output of a computational algorithm»).

b. Meaning broadening — a term originally confined to a narrow field enters general usage (for example, «algorithm» is now used not only mathematically but also in everyday speech).

c. Metaphorical transfer — a word borrowed from another field (such as medicine or psychology) acquires a new metaphorical meaning (hallucination → «gallyutsinatsiya», denoting the generation of information that does not correspond to reality in AI texts).

d. Semantic variability — conceptual confusion arising from the coexistence of several parallel terms for a single concept (e.g., «mashinali o'qitish» and «mashina o'qishi» for machine learning).

➢ **Comparative Analysis Table**

The table below presents the most frequently used AI terms in their English and Uzbek variants, together with their formation method and semantic notes:

English term	Uzbek equivalent	Formation method	Semantic note
artificial intelligence	sun'iy intellekt	calque (word-for-word translation)	both components fully preserve the original semantics
machine learning	mashinali o'qitish / mashina o'qishi	calque	two competing variants coexist, indicating semantic fluctuation
neural network	neyron tarmoq	calque + phonetic adaptation	«neural» is phonetically borrowed, «network» is calqued
deep learning	chuqur o'qitish	calque	the metaphorical sense of «deep» (complexity level) is translated directly
large language model	katta til modeli	calque	modifier order corresponds in both languages
prompt	so'rov / so'z buyruq / prompt	borrowing + descriptive translation	several competing variants exist; standardization is not yet complete
token	token / birlik	direct borrowing	acquires a new meaning in the AI domain, distinct from its linguistic sense
overfitting	haddan tashqari moslashish	descriptive translation	the metaphorical meaning ("excessive fitting") is preserved
hallucination (AI)	gallyutsinatsiya	phonetic borrowing + semantic shift	transferred metaphorically from the medical-psychological domain to AI

➢ **The Problem of Terminological Variability**

The analysis shows that AI terminology in Uzbek has not yet settled into a single normative system. Different terms for the same concept are used across scientific articles, educational literature, and popular publications. On the one hand, this reflects the

language's capacity to rapidly absorb new concepts; on the other, it undermines conceptual consistency in education and official communication. In particular, pairs such as «sun'iy intellekt» and «sun'iy aql», «neyron tarmoq» and «asab tarmog'i», «mashinali o'qitish» and «mashina o'qishi» express the same concept yet are used in parallel across texts.

➢ **Typological Differences Between the Two Terminological Systems**

Because English and Uzbek belong to different typological groups (English being analytic, Uzbek being agglutinative), certain patterns emerge in the morphological adaptation of terms. Many English AI terms are formed as noun-noun compounds (language model, neural network, machine learning), where the modifying noun precedes the head noun. This word order is generally preserved in Uzbek (til modeli, neyron tarmoq), though grammatical adaptation through izofa constructions or suffixes is sometimes required. In addition, English gerundial terms formed with the -ing suffix (learning, training, fine-tuning) are rendered in Uzbek through the action-noun suffix -ish/-ov: training → o'qitish, fine-tuning → nozik sozlash. This allows semantic equivalence to be preserved despite structural differences between the two languages.

Furthermore, a certain competition can be observed between traditional IT terms that entered Uzbek through Russian and new terms being borrowed directly from English: terms inherited from the Soviet period, such as «kompyuter», «dastur», and «algoritm», remain in stable use, while newer terms like «prompt», «token», and «fine-tuning» have not yet been fully absorbed into the language.

➢ **Practical Recommendations**

Based on the analysis presented above, the following practical recommendations were developed for regulating AI terminology in the Uzbek language:

a. Establish a specialized scientific-methodological council on AI and digital technology terminology at the national level, involving linguists and domain experts;

b. Develop an English-Uzbek-Russian explanatory terminological dictionary and update it regularly;

c. When introducing new terms, prioritize calquing and descriptive translation, resorting to phonetic borrowing only when no semantic equivalent can be found;

d. Introduce a foundations-of-terminology course into higher-education IT and philology curricula to build terminological literacy among future specialists;

e. Prepare a methodological guide recommending unified stylistic norms for the use of AI terms in mass media and popular-science publications.

CONCLUSION. The study leads to the following conclusions:

a. The majority of AI terminology in Uzbek (over half) has been formed through calquing, which has allowed a relatively high degree of semantic transparency to be preserved;

b. Terms that entered through phonetic borrowing (such as token and prompt) become part of the Uzbek lexicon more quickly, but their semantics remain less transparent to native speakers;

c. The phenomenon of metaphorical transfer (hallucination → gallyutsinatsiya) demonstrates that terminology is absorbed not only linguistically but also cognitively;

d. There is a need to establish a dedicated terminological commission to standardize AI terminology in Uzbek and to create a unified explanatory-translation dictionary.

Future research would benefit from enriching this study with broader statistical material using corpus-linguistic methods, as well as from a separate examination of the influence of terms borrowed via Russian. In conclusion, the formation of AI terminology is not merely a technological but a profound linguacultural process, and its scientifically grounded management is one of the key conditions for developing the modern scientific-technical style of the Uzbek language.

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