

Evolutionary Computing in Translation Studies Under the Transition from the BANI World to the SHIVA World

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Abstract. *The article examines the transformation of innovative translation studies under the conditions of the global transition from the BANI world to the crisis SHIVA world. The author proves that traditional approaches and static neural networks demonstrate cognitive fragility in the face of dynamic information changes and destructive environments. As a solution, the integration of evolutionary computations (genetic algorithms, swarm intelligence) into translation theory is proposed. The concept of hybrid evolutionary intelligence (Hybrid Evolutionary AI) is described, where large language models generate linguistic diversity, and evolutionary algorithms provide its directed selection and adaptation without complete retraining. The author concludes that translation studies is transitioning into a cybernetic discipline capable of creating autonomous and existing translation systems.*

Keywords: *machine linguistics, innovative translation studies, translation theory, evolutionary computing, genetic algorithms, swarm intelligence, hybrid AI, BANI-world, SHIVA-world, translation adaptation.*

Introduction.

The modern scientific paradigm and practical spheres of human activity are undergoing an unprecedented transit - replacing the BANI-world concept, which characterized reality as fragile, disturbing, nonlinear and incomprehensible, the SHIVA-world concept is rapidly developing. This new global metacontext describes reality as split, fragmented, terrible, unthinkable, vicious and at the same time as a reality - reborn (i.e. in the conditions of the current chaos, the destruction of old systems is accompanied by the spontaneous, highly competitive emergence of fundamentally new technological systems [1]).

Innovative translation studies and the general theory of translation today face a double systemic challenge: on the one hand, the volume of cross-lingual information exchange in conditions of permanent crises is growing exponentially, requiring systems to be instantly adaptable, resistant to misinformation and highly autonomous [2]; On the other hand, traditional statistical and even modern neural network translation models based on large language models in an unthinkable and vicious world often demonstrate cognitive fragility, hallucinations and a critical inability to adequately process the discourse of dynamically changing crisis business environments, logistical collapses and hybrid information threats [3].

It is the solution to this fundamental problem that becomes the integration into the theory and practice of translation = evolutionary computing and evolutionary technologies [4], which include genetic algorithms, directed evolution strategies, swarm intelligence algorithms and hybrid artificial intelligence systems. Evolutionary technologies allow for flexible multi-criteria optimization of translation solutions, adapt semantic networks to the context that changes in real time and ensure the survivability of translation systems under severe resource constraints. The purpose of this study is to theoretically substantiate and systematically model the key principles of applying evolutionary computing in innovative translation studies as a tool for ensuring sustainability, adaptability, and synergy in the context of the global transition from the BANI to the SHIVA world.

The Main Part.

The transition to the SHIVA world radically changes the requirements for translation activities. If in the previous concept of the BANI world, the focus of researchers was mainly on overcoming anxiety and incomprehensibility of the source text using flexible approaches, then in the realities of the SHIVA world, the key factors are the fragmentation of the information space, the high toxicity of the environment and the emergence of completely new semantic connections. Fragmentation of the language space leads to the emergence of local, closed discourses and sharp changes in terminology, especially in the field of crisis logistics and military-technical cooperation. The high toxicity of the information environment requires translation systems to filter manipulative distortions and ensure increased cybersecurity of linguistic data. At the same time, the emergence of unthinkable semantic connections cannot be predicted taking into account static training samples. Innovative translation studies in this reality are transformed from a descriptive science into a predictive and cybernetic discipline that studies hybrid human-machine translation systems in critical conditions.

Evolutionary computations model the processes of natural selection, mutation, and crossover to find optimal solutions in multiparametric spaces [5, 6]. In the context of translation theory, they suggest a move away from rigidly deterministic algorithms to stochastic search optimization. The translation process in the SHIVA world is a complex task of finding a compromise between speed, cost, accuracy, pragmatic adaptation, and privacy. Genetic algorithms allow encoding translation options or tuning parameters of neurotranslation models in the form of conditional chromosomes. Quality assessment, which plays the role of a fitness function, is formed dynamically taking into account the requirements of the environment. This assessment takes into account translation accuracy, data processing speed, and risk minimization, with the priority of these components instantly recalculated as external conditions change, for

example, when transitioning from routine translation to work in conditions of technogenic or economic crisis.

In a fragmented world, traditional dictionaries and thesauri become obsolete at the moment of publication. Evolutionary algorithms allow automating the process of mutation and selection of conceptual graphs, cutting off unviable or outdated terminological pairs and fixing the most adaptive neologisms. In addition, swarm intelligence behavioral models, such as algorithms for the behavior of a bee swarm or ant colony, are effectively designed to coordinate distributed agents – human translators and digital subjects – in a chaotic crisis environment. This optimizes task routing and translation verification without the need to create a single, rigid control center.

Within the framework of innovative translation studies, the transition to hybrid evolutionary intelligence systems is justified. Traditional artificial intelligence as large language models plays the role of a generator of primary linguistic diversity, providing a kind of mutation generator. In turn, evolutionary algorithms carry out directional selection and determine the vector of adaptation of the language model to the strict constraints of a specific subject area without the need for complete costly retraining of the neural network. This approach ensures high survival and stability of information flows. If one of the communication channels or linguistic services is destroyed or compromised as a result of a split or destructive environmental influences, the system instantly recombines the available software modules to achieve an acceptable translation result.

Conclusions.

The transition from the conditions of the BANI-world to the SHIVA-world radically transforms the landscape of innovative translation studies, shifting the emphasis from the simple transfer of meanings to ensuring the autonomy, survivability, security and adaptability of translation systems in the conditions of chaos and destruction of global connections. Evolutionary calculations, which include genetic algorithms, evolution strategies and swarm intelligence, are adequate mathematical and methodological tools for solving translation problems in the SHIVA-world, since they are initially focused on optimization in conditions of uncertainty, nonlinearity and aggressive external environment. The integration of evolutionary technologies into translation theory allows us to move from static translation models to dynamic, self-organized systems of hybrid intelligence, capable of instant evolutionary adaptation of the terminological and conceptual apparatus to the challenges of a transforming reality.

Discussion and prospects for further research.

Further development of the proposed concept is seen in the development and simulation testing of specific fitness functions for genetic algorithms that evaluate translation discourse under conditions of severe risks, manipulations and

disinformation, characteristic of the SHIVA-world. An important direction is the creation of applied architectures of hybrid artificial intelligence that combine evolutionary computing with agent systems of large language models for the automatic deployment of local translation platforms in areas of humanitarian and economic crises. Also, a detailed study of the ethical, legal and cognitive aspects of the interaction of a human translator with self-evolving algorithmic systems within the framework of a new paradigm of innovative translation studies is necessary.

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