

# Language evolution and GPT-revolution

Volodymyr Shyrokov<sup>1,\*†</sup> and Vasyl Lytvyn<sup>2,†</sup>

<sup>1</sup> Ukrainian Lingua-Information Fund NAS of Ukraine, Holosiivskyi av. 3, 03039 Kyiv, Ukraine

<sup>2</sup> Lviv Polytechnic National University, Stepan Bandera Street, 12, Lviv, 79013, Ukraine

## Abstract

Artificial intelligence (AI) has emerged as a fundamental component of the Web's most valuable information processes: semantic, conceptual, and intellectual. It is based on the use of natural language mechanisms, which set the bar for the most advanced IT technologies. Artificial intelligence is a branch of artificial intelligence, which has emerged from the "machineization" of human physical prowess and the ability to manipulate physical, chemical, biological, substance, energy, and information. In this paper, we review the current state of affairs in the information technology industry, with a clear emphasis on the development and application of AI techniques, with an emphasis on natural human language mechanisms. Moreover, the pinnacle of technotronic evolution can be seen in artificial intelligence systems, which emerge from the emergence of artificial neural network techniques (machine and deep learning methods, backward error propagation, etc.) on the foundation of Large Linguistic Models. Furthermore, there exist entire scientific domains wherein the globalized and interconnected world, complete with globalization and a plethora of problems, as well as the revolutionary circumstances surrounding Chat-GPT, are a direct outcome of the related evolutionary mechanism.

## Keywords

artificial intelligence, GPT, chatbots, evolution, GPT-revolution

## 1. Introduction

The world has grown more communicative and cognitive over the years of Ukrainian independence, and as a result, the Web has come to be as one of the primary forces behind the formation of contemporary society. Simultaneously, natural human language has proven to be the fundamental component of the Web's most valuable information processes: semantic, conceptual, and intellectual. These technical implementations are so efficient that they even outperform previous technological advancements. The way of language functioning has changed considerably in the last two or three decades, moving from a strictly humanitarian to technological status. The current state of affairs in the information technology industry persuasively shows that the primary focus of the major players in this field is now on the development and application of artificial intelligence

---

*CLW-2024: Computational Linguistics Workshop at 8th International Conference on Computational Linguistics and Intelligent Systems (CoLInS-2024), April 12–13, 2024, Lviv, Ukraine*

\* Corresponding author.

† These authors contributed equally.

✉ vshirokov48@gmail.com (V. Shyrokov); Vasyl.V.Lytvyn@lpnu.ua (V. Lytvyn)

ORCID 0000-0001-5563-8907 (V. Shyrokov); 0000-0002-9676-0180 (V. Lytvyn)



© 2024 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

techniques, with a clear emphasis on natural language mechanisms, which set the bar for the most advanced IT technologies. The IT giants have been engaged in a fierce struggle for domination recently, with the potential to impact a trillion-dollar market and, more importantly, dominate global society, as demonstrated by the so-called GPT revolution.

This problem has become kind of an unprecedented amount of popularity recently. In October 2022, the number of queries for Artificial Intelligence (AI) and World Order reached approximately 7.5 billion links for each of these queries. But in April 2023, Google released almost 9 billion connections related to artificial intelligence (AI) and the same 7.5 billion links related to the World Order. Thus, AI has made a dramatic breakthrough in a few months. An even more impressive growth is demonstrated by the relevant data obtained on July 16, 2023: "World Order" – 12,820,000,000 and Artificial Intelligence (AI) – 19,810,000,000 (!).

## **2. Understanding the Impact of AI on World Order**

The data mentioned above definitely show how extraordinarily important the issues they raise are. Furthermore, given the close proximity of these huge numbers, it is highly suggestive that "Artificial Intelligence" and "World Order" are now not only extremely relevant but also interdependent; at this point in history, "Artificial Intelligence" is working in tandem with "World Order" and is already starting to shape it.

Here are a few facts and considerations regarding the turbulent events associated with the release of the first massive artificial intelligence systems, namely the so-called Generative Pre-trained Transformers (GPT) - chatbots, whose intelligent substrate is formed by Large Language Models, created on the basis of artificial neural networks.

November 2022 saw the start of this boom, which was quickly dubbed the GPT revolution. On ChatGPT, the growth rate of registered users, or subscribers, shattered all previous records. The chatbot attracted over a million users in its first five days of operation, and by March 2023, it had surpassed the 100 million mark. The query "chatgpt" currently returns results greater than  $1,66 \cdot 10^9$ .

Due to this circumstance, the phenomena have been compared to the Great Industrial Revolution of the 18th century, which was marked by the development and widespread usage of steam engines and marked the beginning of a new era in the advancement of human civilization. Following this analogy, we may note that much as water vapor was utilized as the working fluid in steam engines, natural human language is currently serving as the equivalent function in artificial intelligence systems.

The evolution of technology and engineering theorists and philosophers have not yet fully understood and evaluated this phenomenon. Nonetheless, it is obviously clear that a deeper and more fundamental understanding of the essence of a phenomenon like language is required. Furthermore, in order to achieve this, the linguistic research methodology will need to be modified in some way – or, to use J. Derrida's language, deconstructed – in order to take into account contemporary general epistemological paradigms and cognitive practices. In our opinion, the main starting points for the implementation of this process are as follows.

The most recent phase of scientific knowledge is defined by a considerable increase in the conceptual space of study, a blurring of the boundaries between various fields of knowledge, and the penetration of varied scientific paradigms, epistemologies, and methodologies. Scientific fields pertaining to novel perspectives on the interplay between matter and consciousness are especially intellectually stimulating in this stream. This seemingly eternal philosophical topic is now gaining new life and receiving new, increasingly "practical" interpretations and embodiments because of the tremendous advancements in the fields of quantum information, neuroscience, artificial intelligence, high-energy physics, astrophysics, genetic engineering, DNA informatics, etc. At a new epistemological level, panpsychism is being resurrected, and there is lively discussion about the isomorphism between the neural structure of the brain and the structure of the universe's galactic and metagalactic systems, as well as the biological and physical foundations and even the substrate of consciousness itself. We are witnessing a turn from the original metaphysical truths to the real physical and other natural mechanisms of the relationship between the ideal and the material. Intellectuality and its manifestations are being more and more linked to the processes of the universe's evolution, the beginning of life, and even the emergence of life itself.

At the same time, the information and network problem are the primary cause of the fast intellectualization of engineering and technology. After all, the functioning of human civilization in the contemporary cognitive and communicative world is accompanied by an ever-increasing rate of information production. Reputable sources claim that the quantity of information on the Internet has recently increased every two years. This rate is probably going to keep rising.

There are two important aspects to this process. The first has to do with the sheer amount of information generated and viewed that humans can no longer physically process and effectively grasp. Concerning the second, estimations suggest that the majority of information in circulation is "parasitic" in nature and does not advance human evolution. Any type of system's broad evolutionary patterns can be seen in these elements. In order to create these patterns, the evolution of the system must become more complex. As this complexity increases in volume and rate, an uncontrolled expansion of its "parasitic" component occurs, which does not aid in the system's evolution but causes an intolerable burden on its functional subsystems.

Therefore, the human race's global information system has now reached a crisis of an almost catastrophic magnitude, along with other contemporary global systems (political, economical, environmental, etc.). In fact, because modern civilization is networked and inflationary, these essential phenomena are ubiquitous, permeating all significant facets of its operations and generally posing a danger to the preexisting World Order.

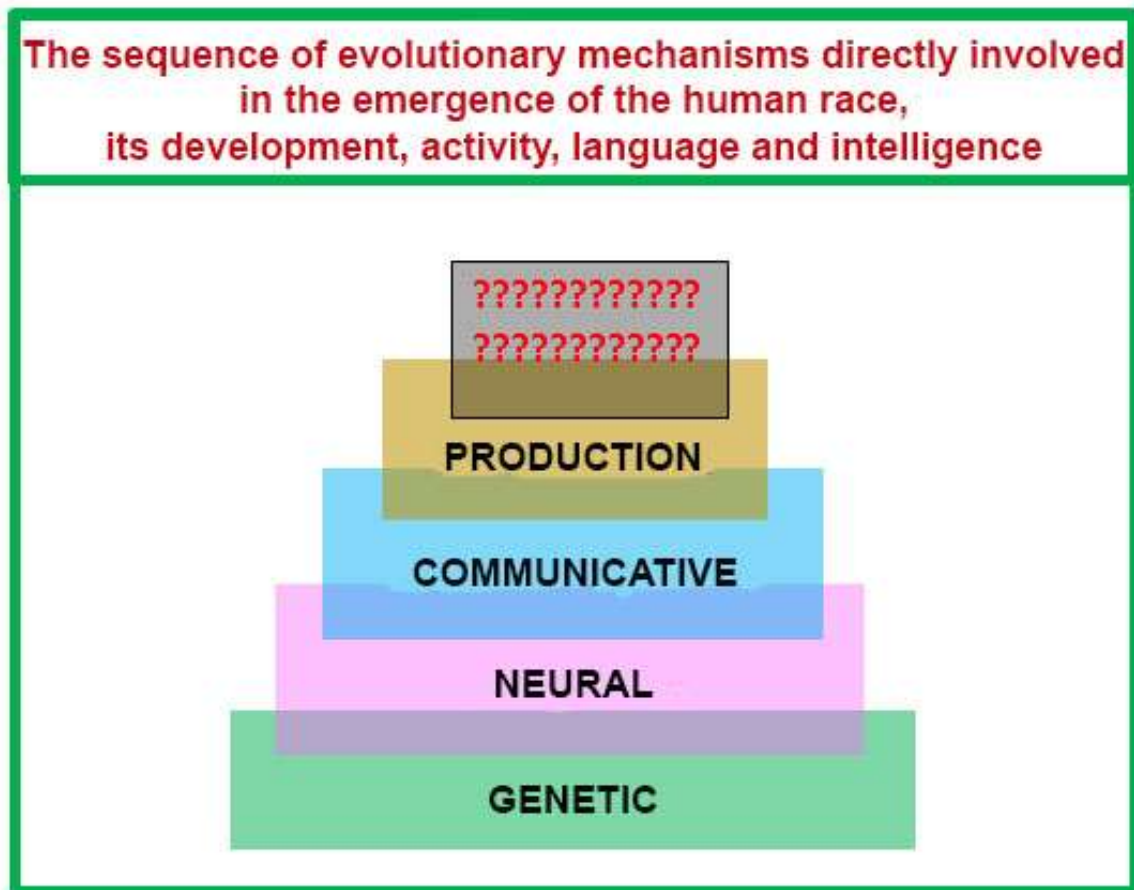
### **3. Evolutionary Significance of Language in Nature and Society**

The uncontrollably (exponentially) growing complexity of the contemporary, highly globalized inflationary world is the root source of these processes. Such a system becomes inherently uncontrollable, and crises in it are unavoidable, according to the general theory

of evolution. The well-known law of required diversity by W. Ashby leads to similar conclusions.

Realizing the urgent need to build intellectual artifacts that may overcome this information, and in reality, global crisis, is one method to transcend, or at least minimize, these crisis occurrences. This has already led to the rapid development of powerful artificial intelligence systems. Meanwhile, there has been a recent shift in the professional community's belief that intelligence is a natural product of linguistic status and a type of system individualization. Thus, individualization of things with a linguistic status is what artificial intelligence is. Whatever the advancements, language remains the fundamental cognitive and communicative element of humanity; in its current form, it was developed during the course of the evolution of the human race and species and, if we adopt a consistent perspective, is both a result and a product of the general and biological evolution of nature and society.

Figure 1 shows the sequence of mechanisms of biosocial evolution that have occurred and are occurring on our planet to highlight the evolutionary context of language.



**Figure 1:** Evolutionary mechanisms

After examining this evolutionary sequence, we can draw the conclusion that each of them has unique information tools, instruments, aspects, tasks, etc. that at each stage acquire characteristics that we now associate with language and become more expressive, universal, and diverse.

This can be stated of brain systems, various signaling systems of the communication mechanism, the language of the genetic code (now that this phrase has begun to take on a literal meaning, it is used without quotation marks), and, lastly, the natural language of humans.

Our functional breakdown of the human language and mental equipment, which we named the Main Cognitive Tract, was developed after a thorough analysis of an extensive array of literary material. The following blocks make up this structure:

*<Perception → Feeling → Experiencing (Emotion) → Awareness →  
Understanding → → Reflection → Reaction (Action)>*

It is evident that the aforementioned scheme only includes the bare minimum of required functions and is unable to meet the demand for additional in-depth information, or what are known as schematic diagrams or microtheories.

The question then becomes, how could the brain, which eventually became the home of language and the mental machinery that makes up intellect and language, have formed in the first place and through what fundamental mechanisms?

Unfortunately, there are no clear answers from the examination of a substantial amount of scientific literature and other data on these topics. Furthermore, a lot of neuroscientists assert that they do not discover a unique “organ” in the brain that is in charge of “thinking” or “reasoning” when they investigate the brain.

It appears that the concepts of “thinking”, “reasoning”, and “intelligence” originate in other places. Where? In which place? Maybe we should approach these topics in a slightly different way in order to give answers? Is it possible to think of the entire human population as a single system, a single thinking organism that is open in terms of the triad consisting of structure, substance, and subject?

We can come to the conclusion that verbal communication's volume and intensity – which are primarily influenced by the number of people who make up a community – are becoming increasingly important evolutionary factors. Thus, intense language communication confers an advantage onto multi-person civilizations in the form of “collective intelligence”. By the latter, we mean the system's non-local, distributed, socialized, integral intelligence, which is made up of everyone's mental capacity for coexisting and actively interacting.

Only a portion of the knowledge required by each user in the system can be stored there; the rest is kept in the collective memory of the community.

Humanity, as a communicative society, can therefore be seen as a single evolving organism with its own memory and intelligence, combining some of each member's memory and intelligence into a single cognitive-communicative system. As Ukrainians say: “A community is a big man!”.

From this perspective, it is important to consider the memory occupied by specific knowledge about specific professions of all members of society who have different professions when assessing the volume of the general memory of mankind, which serves as a correlate of the intellectual potential of a communication system. In other words, we must determine the total number of professions that have existed at various phases of civilization and account for each one's cognitive resource.

After all, it makes sense to suppose that as society advances, new information and technologies would also inevitably arise, leading to the emergence of new professions. Additionally, every new piece of knowledge expands the vocabulary of a language by generating new ideas that can be communicated through words. As a result, the increase of knowledge about science and technology and, by extension, the general language of society, are directly correlated with the number of new occupations.

#### **4. Evolutionary Significance of Artificial Intelligence**

It is arguable that research of this nature is more of an academic than a practical concern. But it's important to understand that the emergence and evolution of natural facts and phenomena have an effect, relationship, and reflection on comparable man-made, human-made facts and objects, or artifacts. If a person wants to replicate a certain path in nature's evolution, or just a portion of it, in their manufactured creations, they should bear some analogies and similarities to their natural counterparts.

Furthermore, there exist entire scientific domains wherein the globalized and interconnected world, complete with globalization and a plethora of problems, as well as the revolutionary circumstances surrounding Chat-GPT, are a direct outcome of the related evolutionary mechanism.

Therefore, the need to produce intellectual products is also evolutionary. So the author believes that attempts to outlaw artificial intelligence today are futile despite the wide range of opinions on the subject. Similar to the Luddite movements of the late 18th and early 19th centuries, the Great Industrial Revolution ultimately proved to be the source of ineffective movements against machines and machine tools.

However, our situation is unique. The pinnacle of technotronic evolution can be seen in artificial intelligence, which emerged from the “machineization” of human physical prowess and the ability to manipulate physical, chemical, biological, substance, energy, and information. Ultimately, intelligence itself—which we had previously thought to be the unique characteristic of the human race and what set humans apart from other natural beings – became possible through these mechanisms.

It has now been shown that the linguistic and mental substrate can and ought to separate from its carrier, which appears to be exclusive, and take up residence on its own. The employment of theoretical and evolutionary methods of analysis is encouraged by this unusual and evolutionary condition, which takes into consideration a certain correlation (similarity) between natural and technotronic evolutionary sequences, as illustrated in Figure 2.

| <b>Evolutionary mechanism</b> | <b>Factor of natural mechanism</b>                      | <b>Tecnotronic mechanism analog</b>          |
|-------------------------------|---|--|
| ??????????????                | ????????????????  | ????????????????????                         |
| <b>PRODUCTION</b>             | Technologies, finances, social institutes               | ????????????????????                         |
| <b>COMMUNICATIVE</b>          | natural languages and information communication systems | ? ????????????????                           |
| <b>NEURAL</b>                 | Neural networks   | Artificial neural networks                   |
| <b>GENETIC</b>                | Genetic code language                                   | Algorithmic languages, programming languages |

**Figure 2:** Mechanisms and factors of evolution of nature and intellectual artifacts: the phenomenon of parallelism

The evolutionary mechanisms (a particular path in the evolutionary tree of biological beings on Earth) that led to the creation and subsequent development of the species Homo sapiens are depicted in this diagram's left column, which runs from bottom to top. For every evolutionary mechanism, the central column displays the substance elements of the evolution of living organisms. Therefore, we consider the genetic code's language as a component of the genetic machinery. Neural systems are, of course, the components of the neural mechanism. The languages of the many social groups – the "languages" of ants and bees, dolphins and monkeys, etc. – as well as human languages, are the components of the communication mechanism. Artifacts are the items of technology, finance, social structures, etc. that comprise the components of the production mechanism, which is the sole privilege of the genus Homo.

There are certain evolutionary similarities between human-made intellectual products and their natural counterparts, as the right column illustrates. For instance, we regard programming languages (algorithmic languages) to be a factor for the first intellectual objects, which include electronic computers. These intellectual artifacts function as an analogue of the genetic mechanism in this evolutionary scheme. The neural mechanism in nature is comparable to the modern mechanism of intellectual artifact evolution. We believe that artificial neural networks have a role in this. Generative pre-trained transformers, or GPT chatbots, have emerged and proliferated due to the use of artificial neural network techniques (machine and deep learning methods, backward error propagation, etc.) on the foundation of Large Linguistic Models. It is important to remember that the fundamental

component of contemporary generative AI systems is genuine human language, which plays a role in the communication mechanism, the next evolutionary mechanism. And this is happening at a time when artificial intelligence objects do not yet have their own communication environment and immanent means of mutual communication, although, as far as we know, work is underway in this direction. Theoretically, the development of an analog of the communication mechanism for intellectual artifacts should be completed by the establishment of a sufficient (full-fledged, sovereign) communication environment. We believe that only then will it be possible to create an analog of this community's production mechanism and for artificial intelligence to emerge as a historical entity on its own. This, in turn, provokes a strong response from human communities (see, for example [2]), who view these possibilities as grave threats to humankind.

However, it is not possible to totally rule out a fundamentally different path. In the book [2] it is stated that "A certain futurological forecast can be made: If ways are invented to combine the information and technological evolution of human society and the biological evolution of matter – that is, if these two lines of evolution intersect at some point (and the current development of genetic engineering, microelectronics, nanotechnology, neurophysiology and cognitive science provides more and more grounds for such a scenario) – then it seems quite likely that a new form of intelligent life will emerge that integrates biological and technotronic substrate into a single cognitive organism". The same idea is a common thread in a number of publications on the so-called transhumanism and technological singularity.

It's obvious that we're about to venture onto the fragile and unpredictable territory of predictions and theories [1]. Thus, let us exercise caution and remember the wise words of the great Isaac Newton: "I invent no hypotheses!"

## References

- [1] The Bletchley Declaration by Countries Attending the AI Safety Summit, 1-2 November 2023. URL: <https://www.gov.uk/government/publications/ai-safety-summit-2023-the-bletchley-declaration/the-bletchley-declaration-by-countries-attending-the-ai-safety-summit-1-2-november-2023#contents>
- [2] V. A. Shyrovkov, Computer lexicography, Naukova Dumka, Kyiv, 2011.
- [3] Q. Robin, GPT revolutionizing AI applications: empowering future digital transformation. Digital Transformation and Society, 2.2(2023) 101–103.