DOI: https://doi.org/10.59295/DIA.2023.1.04
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COMPUTATIONAL LITERATURE – CREATION UNDER THE AUSPICES OF AI AND GPT MODELS



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Areas of concern: theory, history and literary criticism; digital ergodic literature, ICT, ergocriticism.

Published works: Ergocritica. In: Aliona Grati, Elisaveta Iovu, Oxana Popa, Diana Dementieva, Rodica Gotca. The literary work as dialogue and relationship. New critical models: Dialogic, Imagology, Sociocriticism, Reader-oriented criticism, Ergocriticism. Chișinău: Știința, 2021, 492 p.; Ergocriticism. An (eventual) ergodic literature interpretation instrument. (with Aliona Grati) In: COGITO. Multidisciplinary Research Journal, Vol. XIV, Nr. 4/2022, București, ISSN: 2068-6706; The book of poems Borders drawn in the air with the fist. Eikon, 2019;

Computational literature – creation under the auspices of AI and GPT models

Abstract. In this article is presented the impact of GPT natural language processing models and the evolution of AI on the computational literature. Analyzing the structuring and functioning of these neural networks based on observation, learning (pre-training) and NLP mechanisms, we present the features of GPT models, the range of tasks they can perform, the advantages and risks of their implementation in literary creation.

By processing enormous amounts of text to learn how the relationships between natural language words are structured, GPT models can generate both scientific and literary texts. An example of this is the work generated by GPT-3: 1 the Road by Ross Goodwin and Sunspring by Oscar Sharp and Ross Goodwin, presented in this study.

The implementation of GPT models in the creative process is also manifested through a set of tools such as: Talk to Transformer, GPT-3 Creative Fiction, Copy.ai, AI Dungeon, etc.

Researchers such as Thomas Hornigold, Mark Riedl and others warn that GPT models, although well-versed in various fields, cannot simulate human emotional intelligence, creativity and narrative intelligence, remaining creative tools but not perfect creators.

Keywords: computational literature, AI, GPT, natural language processing models, computational creativity, narrative programs, computational narrative intelligence.

Literatura computațională – creația sub auspiciile IA și modelelor GPT

Rezumat. În articolul dat este prezentat impactul modelor de procesare a limbajului natural GPT și al evoluției IA asupra literaturii computaționale. Analizând modul de structurare și funcționare a acestor rețele neuronale bazate pe mecanisme de observație, învățare (pre-training) și NLP, prezentăm trăsăturile modelelor GPT, aria de sarcini pe care le pot realiza, avantajele și riscurile implementării acestora în creația literară.

Procesând cantități enorme de texte pentru a putea însuși modul de structurare al relațiilor dintre cuvintele limbajului natural, modelele GPT pot genera texte, atât științifice, cât și literare. Un exemplu în acest sens sunt lucrările generate de GPT-3: 1 *the Road* al lui Ross Goodwin și *Sunspring* realizat la inițiativa lui Oscar Sharp și Ross Goodwin, prezentate în acest studiu.

Implementarea modelelor GPT în procesul de creație se manifestă și printr-un set de instrumente ca: Talk to Transformer, GPT-3 Creative Fiction, Copy.ai, AI Dungeon ș.a.

Cercetători precum Thomas Hornigold, Mark Riedl și alții, atenționează că modelelor GPT, deși sunt versate în diferite domenii, nu pot simula inteligența emoțională, creativitatea și inteligența narativă umană, rămânând a fi instrumente de creație, dar nu și creatori desăvârșiți.

Cuvinte-cheie: literatură computațională, IA, GPT, modele de procesare a limbajului natural, creativitate computațională, programe narative, inteligența narativă computațională.

The evolution of products involving AI systems has also left its mark on the literary environment where are attested amazing changes: from the appearance of different software and platforms that facilitate the work of writers and literary critics, to the development of GPT language models, capable of generating a complex literary product (essay, article, novel, etc.). The appearance of this tool opens up a very wide range of opportunities, but also raises a series of questions about the quality of these products, their literariness and the validity of the concept of authorship.

Initially, it is indispensable to clarify that GPT (Generative Pre-trained Transformer) represents a series of natural language models that use the Transformer architecture - a neural network based on observation mechanisms, which processes enormous amounts of texts in order to learn how to structuring the relationships between natural language words and implements deep learning techniques (pre-training). Used in a wide range of applications, GPT models can solve various tasks: from generating texts in different styles to generating codes.

The innovation that marked a new stage in the development of artificial intelligence (AI) is the popular ChatGPT, launched in 2018 by OpenAI, which opened a new way of being for electronic literature.

ChatGPT has gained popularity with lightning speed due to its extensive answers, due to the ability to synthesize data, write articles and narratives, perform the role of a competent assistant in various fields [1].

The first version, from 2018, had 117 million parameters, representing the links between the model's proxy server and network nodes. Just a year away, in 2019, the GPT-2 version appears, with 1.5 billion parameters, and the current GPT-3 has reached over 175 billion parameters. To show the extent of the data stored in this program, James Vincent, in his article *OpenAI's latest breakthrough is astonishingly powerful, but still fighting its flaws*, tells us that the English language Wikipedia, which contains more than 6 million articles, represents only 0,6 % of data held by GPT-3. The dataset that was the basis for the development of GPT-3 contains every type of text that has ever been uploaded to the Internet (which includes both truthful sources and texts that incite hatred, racism, etc.) [2].

ChatGPT stood out as one of the best performing natural language processing models. OpenAI announces release of version 4 on March 14, 2023, enhanced with the following capabilities: "advanced reasoning, complex instructions, more creativity" [3]. The release is accompanied by the following statement: "We've created GPT-4, the latest step in OpenAI's effort to scale deep learning. GPT-4 is a large multimodal model (accepting images and text input, emitting text output) that, while less capable than humans in many real-world scenarios, exhibits human-level performance on various professional and academic benchmarks" [9].

The access to this version is waitlisted, as experimental versions require a testing period before they are available to the large public.

In his article published in *The Verge*, James Vincent talks about GPT as a defining invention of the next decade, noting that with the appearance of the GPT-3 program, OpenAI is taking the first step towards realizing the ambition of making computer programs capable of having the depth, diversity and flexibility of the human mind.

Among the tasks that this program can perform are:

- advanced search for an answer and redirect to URL;
- maintaining a dialogue from the pose of any historical personality or any fictional character;
- solving syntax or language problems, changing the style of a text (manipulating any text);
- code generation only based on a text description;
- medical consultation;
- facilitating the process of developing text adventures (AI Dungeon);
- composing guitar tabs (generating mu-

sic, just from a few initial chords provided by the user);

- writing fictional texts (an example of this is the work of researcher and writer Gwern Branwen, who published a collection of writings made with GPT-3, such as Tom Swifty and Navy SEAL);
- autocompletion of sectioned images, not just text sequences, etc.

What's impressive is that GPT-3 wasn't trained for these tasks, but user-input instructions made it "learn" to perform new tasks as well. It is enough to receive a few pointers and clearer specifications about the desired result and this language model associates its nodes in such a way as to provide what is asked of it [2].

However, notes James Vincent, it should not be overlooked that GPT -3, in addition to its impressive abilities, also makes mistakes that a human would not otherwise admit, such as making meaningless statements, sloppy spelling, writing unnecessary code and even insulting the user.

The AI researcher, Julian Togelius, compares the way the GPT-3 chat works with the behavior of an intelligent student, who has not completed his homework and being forced to answer, "pinch" from memory, from the already known facts to which he adds some sequences fabrications/lies, to provide a plausible answer. ("The bad part is that it's these students who go far", adds J. Vincent) [2].

Regarding the shortcomings identified in the operation of the GPT program, the authors of the article *GPT-3, Bloviator: OpenAI's language generator has no idea what it's talking about*, Gary Marcus and Ernest Davis, who state that GPT-type neural networks, while compelling and impressive, are imprecise, and the sheer amount of information they store does not prove the quality of the answers they provide, concluding that they are "undoubtedly useful and certainly impressive, but never reliable" [5].

Studying programs involving the use of AI systems has become a primary goal for numerous research groups, such as that of the organizers of *HAI-GEN 2023: 4th Workshop on Human-AI Co-Creation with Generative Models*, formed by American researchers: Mary Lou Mather, Justin D. Weisz, Lydia B. Chilton, Werner Geyer, Hendrik Strobelt. During the workshop, researchers and practitioners of HCI and AI disciplines have the opportunity to study in depth the opportunities and risks that arise due to the use of AI systems in human creative activity. The organizers of this event believe that creative people can enjoy many benefits from using AI systems, which can serve as a source of inspiration, a working tool or a "creative partner" [6].

AI research is also a primary direction for other scientific activities, such as conferences: NeurIPS – Conference on Neural Information Processing Systems (https://neurips.cc/),

ACL – Association for Computational Linguistics (https://www.2022.aclweb.org/),

ICML – International Conference on Machine Learning (https://icml.cc/),

EMNLP – Empirical Methods in Natural Language Processing (https://2021.emnlp.org/) și

NAACL – North American Chapter of the Association for Computational Linguistics (https://2021.naacl.org/), that present recent discoveries in the field of natural language models, such as GPT.

AI is a topic that has attracted the interest of many researchers in different fields. A confirmation of this fact is the impressive number of articles and books that appears at an amazing speed. Online technology magazines like *Wired*, *The Verge*, and *TechCrunch* regularly publish articles about natural language models like GPT, providing not only a description of them, but also news about their evolution, use, and risks.

Among such publications is the paper *Language Models are Few-Shot Learners*, published in 2020 by OpenAI, where is described GPT-3. The researchers who signed this study present the progress of the release of a new version, trained on a larger number of NLP tasks and benchmarks, summarize the observations made after testing this model, and demonstrate that GPT-3 can generate high-quality scientific texts

quite good, which can hardly be differentiated from those written by human [7].

Another impressive publication is the book *Artificial Intelligence. Tehnologies, Applications and Challenges* by Lavanya Sharma and Pradeep Kumar Garg (CRC Press, Taylor& Francis Group, New York, 2022). This publication is an overview of AI, its possibilities, application areas, tools and technologies it provides. For researchers passionate about the challenges of the future, this work offers them an opening of perspectives to structure their own scientific approach [8].

Since GPT is still a little-known field, people also need some tutorials/instructions for using these models, which would provide them with complex information regarding the exploitation possibilities of programs involving AI. The need for such training is met by the many courses on AI, including GPT models, such as "Natural Language Processing with Deep Learning" from Stanford University, which provides students with a detailed introduction to cutting-edge neural networks for NLP (language processing naturally) [9].

Another online course is the one from Coursera: "Deep Learning Specialization", which presents the capabilities, challenges and consequences of deep learning, preparing students to participate in the development of AI technologies by structuring neural network architectures and enhancing them with strategies such as Dropout, BatchNorm, using Python and TensorFlow, etc. [10].

In the same way, platforms that host channels of developers or researchers passionate about programs that use AI systems are informative. An example in this case is GitHub (https://github.com/), where numerous codes are uploaded that serve as sources for software projects (including GPT models); YouTube with various tutorials and presentations of natural language models such as GPT, channels covering this topic include:

Two Minute Papers (https://www.youtube.com/watch?v=V2RoqUr0qDU),

Arxiv Insights (https://www.youtube.com/c/ArxivInsights),

Lex Fridman (https://www.youtube.com/c/lexfridman) etc.

Also extremely useful are the blogs of researchers involved in the development of language models such as GPT, in which they provide extensive descriptions of the possibilities of programs based on narrative systems with AI, comment on the latest developments and present their ideas regarding this very new field. Among the researchers who keep such blogs are Andrej Karpathy (https://karpathy.ai/), Jay Alammar (https://jalammar.github.io/), Lilian Weng (https://lilianweng.github.io/lil-log/) and others.

Social networks are also open for news in the field of AI, perhaps on Twitter, following hashtags like #GPT or #AI, we can discover valuable articles, posts and information. On Reddit we can identify a number of communities such as r/MachineLearning and r/LanguageTechnology, where GPT models are discussed, information and news are published.

Analyzing the avalanche of information about GPT and trying to determine what would be the advantages and risks of implementing these models in the literary and academic environment, we would like to mention that this type of programs are first of all tools that would facilitate the work of the writer or researcher, but not a its replacement.

GPT models can be used in writing a scientific article, both as sources of information and as editors who can approach an academic style. However, while the text may be credible, it is inaccurate and may contain deviations, both in understanding the subject and in the use of specific terminology. An accurate and qualitative article bears the mark of the specialist in the field, possessing truthful, carefully selected information, while GPT models take in everything in the digital environment, including the outliers, inaccurate data and fakes published by anyone with access to the Internet.

The situation is similar in the case of fiction texts. Although there are enough examples of texts generated by GPT, similar in style to texts in novels, creative writing requires more

skills than the linguistic skills that GPT models possess. The complexity and coherence of the novel target the narrative intelligence, which is very poorly developed and trained in this type of programs. It should also be noted that GPT models generate content based on existing texts on the Internet, which makes it practically impossible to create something original. However, as a human-managed tool, this model can facilitate the writing process, providing in a short time fragments of text corresponding to the requirements/ideas of the writer, who through his intervention directs the thread of the story and supplements the machine's linguistic knowledge with its natural narrative intelligence.

The creative writing experience with GPT-3 is described by fiction author Yennie Jun in her article *Creative Writing with GPT-3: from Emoji to Flash Fiction. Enhancing the creative writing process with AI*. The writer presents in detail the creative process, the instructions introduced at each stage, the specifications and parameters she offered to the GPT-3 language model and the concretizations that she considered necessary to finally obtain a 100-word short story [11] .

A wide range of creative tools, both for literature and the other arts, created with the implementation of GPT models is offered by the platforms:

- Talk to Transformer – an application created by Adam Daniel King, which uses the GPT-2 model, generating small-sized texts, corresponding to a certain style/genre/species, or can continue a given text, starting from an utterance or a combination of words [12].
- GPT-3 Creative Fiction – based on the GPT-3 model, capable of generating short stories, poems or even film scripts [13].
- Copy.ai – generate texts for media, advertising, slogans using the GPT-3 model. The motto of this platform is: "Whatever you want to ask, our chat has the answers" [14].
- Philosopher AI – the application that uses GPT-3 to answer philosophical questions and generate meditative texts. This experiment is called by the developers "prompt engineering" because it can generate predictions in relation to a given text, quickly adapting to any context and determining what type of text to generate. It is amazing that this application only mimics an opinion in relation to the topic proposed to it by the user, and on a repeated request for the same topic, it can give a contradictory answer [15].
- AI Dungeon – another platform based on the GPT-3 model, capable of creating interactive textual adventures, giving users the opportunity to explore the fictional computer-generated world as a story character. Users new to this creative field are suggested to access the official Discord server where they can get instructions, tips and recommendations from other experienced users/players [16].
- Lumen5 – makes it easy to create videos, generate subtitles and titles. Urging its users: "Grow your brand and increase demand with video at scale. Our online video creator makes it easy to create engaging video content for anyone on your team" [17].
- Jukebox – the OpenAI project, based on the GPT-2 model, to create original music based on the user's musical preferences. In the article *Jukebox: A Generative Model for Music*, developers Prafulla Dhariwal, Heewoo Jun, Christine Payne, Jong Wook Kim, Alec Radford, and Ilya Sutskever describe Jukebox as: "a neural network that generates music, including rudimentary singing, in raw audio in a variety of genres and styles of artists". Researchers provide access to the code and model behind this platform, presenting a large number of product samples created through Jukebox [18]. Music made with the help of AI has become a very popular subgenre of art in recent times. A neural network can "hear" all the works of a performer in just a few hours and create, according to their structure, another musical work, just learning how to associate notes. Th. Hornigold, mentions the pop album *Songularity*, made as a result of human-machine collaboration [19].

The examples above are just a selection of the many platforms available on the Internet, proving that GPT models are very useful, ad-

aptable to the needs of human users, and versatile in different domains.

Ross Goodwin's experimental novel *1 the Road*, written in collaboration with the GPT-2 model, proves this fact. The appearance of the novel in 2018, at Jean Boîte Éditions, caused a sensation, and the text developed by GPT became the subject of much research.

Wanting to rival Jack Kerouac's novel *On the Road*, Ross Goodwin took a road trip in 2017 from New York to New Orleans, carrying the laptop connected to various sensors that fed information from the outside to an AI model that, in turn, transformed the received information into words printed on rolls of receipt paper.

The AI neural network was mounted in the trunk of the car he was traveling in, and the sensors connected to it were: a surveillance camera, a microphone and a GPS device, thus providing the GPT model with visual, auditory and spatial positioning information, trying to he equates it with a writer writing down his travel impressions. The data obtained from the sensors and the time taken from the computer clock were synchronized and transformed into the text printed on the receipts.

This experiment aroused the interest of many companies such as Google (which covered part of the expenses) and the director Lewis Rapkin, who, together with his film crew, followed this experiment and made a documentary film about the four-day journey of R. Goodwin (him being accompanied by his sister and fiancee).

Preparation for this experiment involved not only the technical side, but also the training of the AI program, which was given a sample of fictional texts that would serve as a model for what it was going to write. R. Goodwin uploaded three types of texts, each no less than 20 million words: lyric, sci-fi and "bleak" writing. In the same way, to the program was delivered data from Forsquare – a site that functions as a social network where, based on the location, data can be entered or requested about buildings, streets and surrounding spaces.

Thus equipped, the AI generated the text of the novel by playing the conversations in the car recorded by the microphone, presenting the images captured by the camera and locating the action through the data provided by the GPS, to which were regularly added the comments taken from Forsquare.

To test the AI's ability to write a novel, R. Goodwin did not intervene in its writing, thus presenting the raw text generated by the machine to the public. The fact that the novel was not edited before it was printed makes it appear muddled, retaining not only deviations from correct expression but also from grammatical writing. Although he only coordinated the writing process, R. Goodwin takes responsibility for this publication and states that the appearance of this novel was aimed at elucidating how AI can create text, noting that with the innovation of these GPT models, the text can become more sophisticated, more chiseled, but just as obvious that it is not the result of human work [20].

The lack of coherence of the narrative thread is identified by Brian Merchant who, after reading the novel, publishes *When an AI Goes Full Jack Kerouac. A computer has written a "novel" narrating its own cross-country road trip* in *The Atlantic*, in which it mentions that from all this hallucinatory text created by a bot traveling on the highway it has retained some amazing lines, otherwise, the fragments read associate with a kind of "pixelated poetry" [21].

Faptul că romanul scris de IA nu este un produs ce ar face concurență celor create de scriitorii contemporani a fost observat și de Thomas Hornigold, care, în articolul său pentru Singularity Hub, spune că acest roman experimental creează senzația vagă a unei înțelegeri, a unei conștiințe foarte slab manifestate, care apare și se pierde de la o secvență la alta. The fact that the novel written by AI is not a product that would compete with those created by contemporary writers was also noticed by Thomas Hornigold, who, in his article *The First Novel Written by AI Is Here–and It's as Weird as You'd Expect It to Be*, for *Singularity Hub*, says that this experimental novel creates the vague sense of an understanding, of a very faintly manifested consciousness, which appears and disappears from

one sequence to the next. However, the sentences transmitted by the neural network to the small printer in the car do not aim to capitalize on a plot (as the novel does), because after two or three lines he loses the thread of the conversation, having no real/conscious understanding of what he is writing and no way to control the global narrative it generates.

1 the Road is marketed as the first novel made by AI, but (as R. Goodwin also points out) it does not look like a novel written by a human, nor of anything resembling human creation. Although it starts off well enough, telling us the time and place where the action begins, the fact that it very often provides its geographical coordinates makes Th. Hornigold amused himself by saying that such a writing technique could not win the GPT model the Booker Prize.

Although it had as its foundation about 360 MB of literature, the LSTM neural network used, even if it could understand and even reproduce the provided pattern, did not understand what these patterns mean. The creative part of the project, however, belongs to R. Goodwin, who directed the AI towards a certain style, vocabulary, sentence structure and tone. The coherence to which he tried to direct the AI text turned out to be the "Holy Grail of the natural language generation" still inaccessible to it, which "doesn't look like Kerouac at all" [19].

Another work written with the help of GPT-3 is the novel *Sunspring*, adapted into a short film in the film competition organized by Oscar Sharp and Andrew Kortschak and then presented at the Cannes Film Festival. The idea and realization of this project belong to the director Oscar Sharp (nominated for BAFTA) and the researcher Ross Goodwin (NYU AI) and the film was made by the company End Cue, in collaboration with Allison Friedman and Andrew Swett.

This experiment, carried out in 2016, involves a sci-fi work generated by a recurrent neural network (LSTM), in other words, an AI bot named Benjamin (called the world's first automatic screenwriter). Its appearance was made public by the technology news site – Ars Tehnica, on June 9, 2016, on the occasion of the Sci-Fi-London film festival.

His training was based on scripts written by Goodwin and Sharp, a corpus of dozens of Internet sci-fi scripts and films of the 1980s-1990s. As an LSTM RNN intelligence machine, Benjamin not only learns and develops algorithms based on the texts that are fed to it, but also self-improves, providing better and better work.

Sunspring presents the story of three characters: H, H2 and C, located in the distant future, whose interaction takes place within a love triangle. [22].

Annalee Newitz, in the article *Movie written by algorithm turns out to be hilarious and intense*, presents the subject of this work in more detail, trying to identify the space where the action takes place (a station or a spaceship) and describe the relationships between the characters. The way the film starts gives us the impression of a typical sci-fi, but what follows exceeds our expectations and understanding. The shiny gold jackets, computers and space elements are just a thematic framework for what Benjamin introduces into the script: H is the time/future that can spit eyeballs, C has to "go to the skull" and sticks his face to a tablet that emits a green light and H2 manipulates the computers.

This product made the initiators of the project, Goodwin and Sharp, recognize that the term "tool" for Benjamin is becoming insufficient. It's clear that they're amazed at the outcome of their own idea and "I think there's something magical about what they've created", as Sunspring is an impressive piece of sci-fi, even if it does have some inadvertences, such as hilarious phrases like "We'll see the money" which makes H vomit and he spits out an eye.

Annalee Newitz believes that Benjamin is the type of AI that, for the moment, has no intention of turning against the writers, but rather tends to stand in solidarity with them. Having a discussion with this bot, she concludes that he is "between author and tool, between writer and regurgitator" [23].

The lack of intention to compete is also emphasized iteratively by ChatGPT, who at the

end of each question regarding the relationship between AI and creativity, mentioned that the GPT model "does not have a deep understanding of meaning and human emotions, nor can they create a reading experience as rich as that provided by a human author", warning that the texts generated by them are a compilation based on those existing on the Internet and may violate ethics and copyright [24].

Researching the impact of programs like GPT on the creative field, it becomes obvious the need for a new tool, a set of concepts that would facilitate the differentiation of the traditional creative process from the one marked by AI. An operational concept is "computational creativity" (Computational Creativity), about which Mark Riedl, in the publication *Computational Creativity as Meta Search*, states that it is "the art, science, philosophy, and engineering of computational systems that, assuming certain responsibilities, exhibit behaviors that unbiased observers would consider to be creative". Thus, programs that use AI systems, generate musical, graphic and literary works, thanks to the ability of "automatic learning" (ML – Machine Learning). This depends on the ability of the program to analyze a large set of existing examples/models in order to approximate their structure and be able to create a new product from the same field, which shows not only the ability to systematize and generalize, but also mimicry.

However, emphasizes Mark Riedl, human creativity is much more complex than computational creativity, because it goes beyond mimicry, which is only an initiation stage in a larger process. The researcher presents 3 stages of creative activity:

1. Mimicry – the recreation of an artistic object admired by the individual.

2. Exploration – progressive deviation from learned patterns, to know a new space (still limited by the established conventions of the art genre).

3. Redefinition – the intentional overcoming of the known conventions to invent a new genre of art [25].

As we can see, the AI is only accessible to the first stage, which defines it as a tool useful for creation and not as a creator at all.

In another of his articles, *Computational Narrative Intelligence: A Human-Centered Goal for Artificial Intelligence*, Mark Riedl points out that GPT-type programs cannot create stories that would compete with those written by humans because the AI product is a reformulation of existing works, a "regurgitation" of what humans have previously written, without the dose of innovation, inspiration and originality, specific to known literary works.

Computers are not part of the culture we live in, they can know it, synthesize it, imitate it, but they don't create it. Communicating with programs like Siri or Cortana creates the impression of a conversation with an alien mentality, which is difficult for us to understand, just as our thinking is incomprehensible to it.

In addition to the lack of emotional intelligence, programs involving the use of AI systems have a critical deficit of narrative intelligence (human-specific competence related to the creation, storytelling, comprehension and affective reaction to any type of narrative). Attempts to develop computational narrative intelligence are motivated by the desire to make AI a better interlocutor, empathetic and able to relate to human users. Evolving in this way, these programs could achieve a much higher quality narrative content, closer to natural language and capable of awakening various feelings in the reader such as the pleasure of reading, interest, etc.

Mark Riedl identifies four key challenges facing narrative programs involving AI:

1. the element of novelty/invention, which any narrative contains. Human-created stories are based on a body of common knowledge, to which the novel is added, so that the new narrative is put in a favorable light. This fact makes it difficult to identify a pattern by which people write intriguing stories.

2. the educational, moralizing factor of the narratives. Being inspired by the real experience of people, any story leads us to a moral, to a reasoning that we must identify in the reading

process. Narrative programs simulate histories from known ones, respectively they can lose the thread of reasoning that must be implied from the narrative.

3. the metaphors and metonymies contained in natural language. To interpret a narrative steeped in tropes, the AI must possess a high level of semantic understanding and be able to do the reverse process as well – encoding an idea into a figure of speech. Currently, computational narrative intelligence is engaged in analog mapping, which allows it to simulate metaphors.

4. the creativity, which cannot be acquired according to a certain model. Certainly there are creative writing techniques that any program can apply, but they cannot replace creativity, which is about inventing something new that does not exist in databases and in the real world. An attempt to simulate creativity was the combination of two neural networks from different fields of art, which did not produce results capable of competing with human-made products.

If the challenges listed by M. Riedl can be overcome by programs based on AI systems, then the whole world will witness the complete enculturation of machines. Given that they can learn from human-made products, they will also gradually absorb human social norms, habits, values, and behavioral patterns, so that human-machine interaction is a smooth, harmless, and perhaps even enjoyable process. "In a perfect world, humanity would have an owner's manual that we could simply scan into a computer", but the complexity of the real world does not (yet) permit the development of such a manual. Thus, AI gets to know humanity through the works of fiction it creates, from which it takes knowledge and experiences that describe our cultural and social values. This fact will not ensure machines the ability to understand people, but to naturally avoid situations when they feel intimidated, hurt or disturbed by the content delivered by the program with they interact [26].

"Date In, Art Out?" asks Thomas Hornigold in his article *The First Novel Written by AI Is Here – and It's as Weird as You'd Expect It to Be*, in which he presents AI and machine learning related to creativity. The researcher mentions that optimistic people does not see a danger in the evolution of AI, which, although it has replaced humans in the field of manual activities (and may do so in the field of intellectual ones), cannot imitate human ingenuity and creativity. However, this superiority over algorithms will become very shaky if machines learn to be creative, understand us better than we can, and provide us with artistic products adapted to our preferences.

At the moment, there is a gap between literature or music created by AI and that created by humans because the creative process involves several stages, the novelty, an overlap of experiences and meanings that cannot be simulated by simply accessing existing databases or acquiring a style. Attempts by machines to create complex works resulted in products full of incoherence, the reading of which (in the case of novels) offered a frustrating experience of interacting with some ramblings or hallucinations.

Creating natural language models with AI is a novel experience, even curious, but we must not misrepresent the purpose of creation. When the human user accesses such a program, he must answer the question of R. Goodwin, author of *1 the Road*: "You guys are going somewhere or just going? " [19].

The dizzying opportunities offered by the emergence of natural language processing models such as GPT should facilitate the creative process, not replace it with an experiment made out of curiosity about how the program works. The literary work still remains the culmination of the creative process, the finality towards which the writer tends. The evolution of AI products is a very important phenomenon, as it sheds new light on the value of human creativity, indicating that these tools, however, require human management.

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*The article is developed within the State Program 28.80009.0807.19 *Culture of promoting the image of the cities of the Republic of Moldova through arts and mythopoetics*.