

IMAGE GENERATIVE PROGRAMS OF ARTIFICIAL INTELLIGENCE AND THEIR USE IN EDUCATIONAL DISCIPLINES OF LINGUISTICS, LITERATURE, AND ARTS – THE SEMIOTIC ASPECTS

Prof. Christo Kaftandjiev, Prof. Vesselina Valkanova
Sofia University

Abstract. The authors analyse in the Literature Review some of the world's most important scientific books and articles on the following topics – Artificial Intellect (AI); AI image generative programs (Midjourney and others); semiotics and semantics; intertextuality; metaphors; variants/Invariant and redundancy.

In the main part of the paper, the author examines some of AI characteristics, namely - less routine and tedious work; time saving; much more impressive results compared to older generation computers; easier communication with AI, and degree of AI creativity.

One of the most important topics in the article is AI and its applications in education of linguistics, literature, art, painting, cinema, architecture, advertising, economics, etc. from a semiotic point of view.

The authors also study semantic concepts and AI - intertextuality and AI; relation “diachrony/synchrony” and AI; paradigm and AI; redundancy and AI; and the relation “invariant/variants” and AI.

In “Discussion and Conclusions” the authors evaluate the positive and negative aspects of the study and application of AI in school and university curricula of many subjects.

Keywords: artificial intelligence; education; semiotics; narrative theory; linguistics; intertextuality; invariant/variants; metaphor; creativity

Introduction

Article goal

The goal of this article is to analyse in an attractive, interesting and friendly way the role of artificial intelligence (AI) for the educational process in linguistics, literature, and art educational disciplines (painting, cinema, music, etc.) from the standpoints of some important semiotic concepts.

The importance of this topic

AI is one of the most important topics now and in the future because it directly affects the future of human civilization.

Materials and methods

The materials in this article are images generated by AI and posted on Facebook.

The main analytical method used here is semiotics. Semiotics is the most important science with regard to the different and numerous sign systems. For this reason, semiotics is the most adequate science in relation to this article.

Literature Review

Artificial Intellect (AI)

The basic topic of this article is the Artificial Intellect (AI). The book “Applications of Artificial Intelligence, Big Data and Internet of Things in Sustainable Development” is about the IT-based advances in different fields - such as healthcare, finance, bioinformatics, industrial automation, ecology and others. The authors analyse the dynamics, challenges and opportunities for sustainable development of society using artificial intelligence. (Singh et al. (Eds.) 2022)

David Espindola in his book “Soulful. You in the Future of Artificial Intelligence” studies how the AI creates phenomena that we consider only typical for human beings. The author explains how the collaboration between people and AI will make education, healthcare, science, etc. better. (Espindola 2023)

The author of “Artificial Intelligence, Design Law and Fashion” Hasan Yilmaztekin analyses how AI is already an intrinsic part of our culture. The advent of AI-driven technologies increasingly affects the entire lives of people around the world and the AI defines human civilization and its well-being. (Yilmaztekin, 2023)

Stéphane Tufféry analyses in her book “Deep Learning: From Big Data to Artificial Intelligence with R” the practical instructions for various software tools and methods for deep learning – relying on three main libraries: MXNet, PyTorch, and Keras-TensorFlow. She also explores processing optimization, neural network applications, natural language processing, and image recognition. (Tuffery, 2022)

In the book “Artificial Intelligence and Economics: the Key to the Future” several authors explore the main advances of AI, digital and circular economy and innovation. Other important topics in relation to AI are economics, territorial policies, law, resource allocation strategies, information technology and learning for inclusion. (Marino et al. 2022)

AI is a technological breakthrough that changes drastically human life. In the book “International Perspectives on Artificial Intelligence” several authors analyse how the specialists integrate AI into various industries - healthcare, financial services, commerce, etc. (Maurya et al. 2022).

The use of artificial intelligence in digital technology transforms society. Several authors in the article “Ethical framework for Artificial Intelligence and Digital technologies” analyse some of the most important aspects of ethical use of AI.

These authors present a conceptual model with twelve propositions that highlight the impact of digital ethics on society. (Ashok et al. 2022)

Two authors in the article “Artificial Intelligence in Utilitarian vs. Hedonic Contexts: The “Word-of-Machine” Effect” study the challenges of AI applications. The authors present evidence of the “word-of-machine” effect. This is a phenomenon in which trade-offs between utilitarian and hedonic attributes determine preference or rejections of AI-based recommendations – compared to traditional word-of-mouth or human factors-based recommendations. (Longon et al. 2020).

The authors of “Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020” explore the numerous and different applications of AI in online higher education and the empirical research in this regard. (Ouyang et al. 2022).

Stanford’s “Artificial Intelligence and Life in 2030: The One Hundred Year Study on Artificial Intelligence” project (AI100) is an assessment of AI and its impact on society for a long period. This report examines eight areas of the typical urban environment that AI will affect in the coming years: transportation, home and service robots, healthcare, education, public safety and security, low-resource communities, employment and workplace, and entertainment. (Stone et al. 2016).

The two authors of “Definition, roles, and potential research issues of the metaverse in education: an artificial intelligence perspective” analyse Metaverse and how the specialists use it in education. Important part of the article is about the role of artificial intelligence in Metaverse and in Metaverse-based education. (Hwang et al. 2022).

Yang Weipeng in his article “Artificial Intelligence education for young children: Why, what, and how in curriculum design and implementation” analyses the innovative pedagogical models for early childhood AI literacy education. The author also introduces the “AI for Kids” curriculum to demonstrate this pedagogical model and explain how teachers can use AI in the educational process. (Weipeng 2022).

Human-made machines cannot only do the labour-intensive work, but also to develop human-like intelligence. AI already essential part of some of the most important humans’ activities - industry, healthcare, transportation, education, etc.

Five authors in “Quo vadis artificial intelligence? Discover Artificial Intelligence” analyse past, present and future development of AI and the integrations between AI and humans. (Yuchen et al. 2022)

Four authors in “Bringing artificial intelligence to business management” study the interactions between AI and management decisions. The applications of AI in management are almost routine decisions – not so significant. In practice, AI replaces only individual decisions or tasks (rather than entire job roles), i.e. AI only complement and do not substitute management actions. (Feuerriegel et al. 2022).

The specialists analyse digital journalism and artificial intelligence. They propose a pedagogical model for academic training in journalism and mass communication that uses visual and media literacy. Through this model, the educational institutions can improve the students' visual, media and communication skills. (Valkanova et al. 2023).

The specialists use actively artificial intelligence in sound engineering - in sound processing, to examine and decompose stereophonic mix, to clean up the phonogram and in some other areas (Stefanov 2023).

Artificial intelligence helps a lot for the digitalization of educational institutions. The specialists create the digital transformation based on infrastructural analysis, curriculum integration, digital tools and resources, student engagement and other important variables (Beloev et al. 2023).

The experts use actively artificial intelligence maritime industry – for example, in smart ships, autonomous solutions, safety and a number of other activities. They do this by combining of technology and expertise (Biolcheva et al. 2023).

AI images' generative programs

Creating art and mages with the help of AI is a mainstream phenomenon in recent years. One of the latest applications of AI is the generation of visual artworks using natural language descriptions. That is, anyone can create thousands art images with minimal effort.

This provokes the questions: what is the nature of artistic creation and who can create art now? Therefore, the scientists conducted experiment in which ten artists and ten people without artistic gifts created artistic images with the help of Midjourney (Yanru et al. 2022).

According to some studies – “Is midjourney-AI a new anti-hero of architectural imagery and creativity? an atypical era of AI-based representation & its effect on creativity in the architectural design process”, AI helps a lot for the development of art, however, raises some concerns in architecture. Therefore, researchers analyse how the specialists can use the AI positive characteristics to boost architectural creativity (Radhakrishnan, 2023).

The interest in AI programs (mostly Stable Diffusion and MidJourney), which generate images, grows steadily. Due to this, some companies start to create products, based on AI programs. However, without proper testing and experimentation, there are some risks for the companies using them. Scientists analyse in one article what can happen if people use such models without additional testing (Aničin et al. 2023).

Prompts

One of the most important phenomenon in the interactions with AI is the prompt. Even not so trained people can generate together with AI many and different images with the help of prompts. However, in many cases the use of prompts with the AI

is a process of trials and errors. Therefore, the authors of one paper propose some models, which can make these prompts more efficient. (Dang et al. 2022)

AI can generate numerous proficient images. However, this mainly depends on the adequate prompts. Some of the basic problems with them are because of the undefined (fuzzy) meaning of several words. The authors of a paper on these problems propose a prompt-based cross-modal generation framework (PCM-Frame) that uses two powerful pre-trained models (Ma et al. 2022).

Semiotics and Semantics

The education of semiotics with the help of AI is the central topic of this article. Kate Kearns is one of the world's top experts in semantic theory. In one of her books, she thoroughly analyses some of the key semantic concepts – referentiality, semantic composition, different tenses in narratives, semantic representations, etc. (Kearns 2011).

Cliff Goddard is the world's leading scholar in cross-linguistic semantics. The writings of Anna Wierzbicka influenced his books. Some of the main topics in his research are about the different interpretations of the same phenomenon - depending on different languages and cultural contexts (Goddard 2008).

Intertextuality

Significant part of this article is about the linguistic and semiotic concept “intertextuality”. Allen Graham in his book “Intertextuality” analyses the numerous connections between different texts and between texts and the context in artistic works. He explores the major theories of intertextuality from the perspectives of structuralism, deconstruction, Marxism, feminism, psychoanalysis, etc. (Graham 2011).

Several Anglo-Saxons analysed the concept of “intertextuality” and studied the relation of intertextuality to ontology, the classifications of intertextuality, the connections between different texts, etc. (Worton et al. 1990).

The concept “influence” is one of the most important in the theory of intertextuality. John Clayton in one of his works, studies it in depth the intertextuality and relates it to various cultural, historical, psychological, linguistic, semiotic and social phenomena (Clayton 1991).

Borrowings are not only within one art – for example, only in literature. Painters also borrow from literature, cinema producers borrow from fine arts, musicians take ideas from theatre plays, etc. Wendy Steiner explores some of these types of intertextual appropriations in the article “Intertextuality in Painting” (Steiner, 1985).

Margarete Landwehr proves the importance of intertextuality in the different communicative situations. She analyses the interrelations between verbal and visual media genres – in literature, cinema, theatre, etc. (Landwehr, 2002).

John Clayton analyses the different kinds of influences in his book “Influence and Intertextuality in Literary History”. He explores different texts as an interdependent discursive network, created based on numerous cultural, historical, media and other social and psychological phenomena (Clayton, 1991).

Metaphors

The metaphors, as intertextuality, play an important role in the AI creative process. Due to this, the metaphors are also an essential part of this article. The book “Metaphors We Live By” is one of the world’s most significant achievements in this field. This book is also important for the various mass and marketing communications because the tropes are one of their key constituents. Therefore, metaphor is not only a stylistic figure – it is also a leading communicative strategy (Lakoff et al. 1980).

Visual metaphors significantly increase the effectiveness of various communications – including marketing ones. That is why scholars actively study them - to what extent visual metaphors help consumers to know and to remember the brand and its products, how the metaphors influence retail, i.e. shopper behaviour, etc. (Kim et al. 2017).

We can also study metaphors from the standpoint of rhetoric. Many academic scholars believe that rhetoric is an academic discipline from the past. Some authors, however, update rhetoric and prove the benefits of visual rhetoric for the effectiveness of contemporary communications. Important part of visual rhetoric is the theory of iconic tropes (Peterson, 2019).

Visual metaphors and intertextuality are key and interdependent concepts with regard to creativity in mass and marketing communications. For this reason, some scientist analyses these two concepts in depth (Zantides 2016).

Paul Ricoeur is the author of the outstanding book “The Rule of Metaphor: The Creation of Meaning in Language”. He explores there some of the most important aspects of metaphor and its relationships to key linguistic and semiotic concepts (Ricoeur 2004).

Variant/Invariant

Important part of this article is also about the semantic concepts and relations “invariant/variants”, redundancy, etc. and their connections with AI. Edward Keenan and Edward Stabler analyse relation “invariant-variant” and its connections with the notion “linguistic universal” (Keenan et al., 2010).

Redundancy

Isabella Chiari examines redundancy and its application in artificial languages from semiotic point of view. Redundancy is also a communicative strategy in different communications. Communicators actualise this strategy using all sign systems – images, music, colours, etc., not just words. (Chiari 2007).

Main Analysis

Specific characteristics of communications generated by AI image generative programs and their applications in education of linguistics, literature, art, economics, etc.

AI is a key part of different human activities – education, science, economics, art, media, etc.

Some of AI characteristics are analysed in the literature review.

The study of AI in this article is about the following phenomena:

- type of work with AI;
- time saving with AI;
- results of AI compared to older generation computers;
- communication with AI;
- degree of creativity of AI

1. The characteristics of AI images' generative programs

1.1. Less routine and boring work

AI is by no means superior to human intelligence. AI cannot create anything fundamentally new that people did not already do.

However, AI works differently than generations of computers before it. One of the most important features of computers is that they save the routine and boring work and time of people. The same is true for AI.

1.2. Time saving

For example, a skilled specialist using AI and the images generative programs (Midjourney, Images.ai, GetIMG, NightCafe, Shutterstock, DALL-E 2, Deep Dream Generator, Artbreeder, DeepAI, StarryAI, CF Spark, etc.) in a few hours can create images with excellent quality as dozens experienced and hard-working artists.

Professor who knows how the AI functions can write scientific paper of good quality in a few days. Such activity without the AI might take her/him a month of intensive writing. As result, AI generates quite quickly numerous high quality images, verbal texts, music and videos for different and numerous communications. (In parentheses, we would like to point out that we wrote this article one month, without using any kind of GPT, just with the laptops.)

1.3. More impressive results compared to older generation computers

Artificial intelligence can do much more work compared to us. For example, AI programs can create a large (huge) amount of quality versions of the same image in no time.

This is precisely one of the most important advantages of AI compared to humans.

1.4. Easier communication with AI images' generative programs

Our professional communications with classic computers happens only if we know the abstract machine languages. However, very few people possess this divine gift.

We communicate now with AI much more easily – almost as we talk with other people. This means many new possibilities for many people in their discourses and collaborations with AI.

However, these communications between humans and AI are not the so easy. We, as humans, must possess specific empathic skills. Thanks to them, AI can more easily understand exactly what people want from it and how to perform the required tasks in the best possible way.

1.5. The degree of creativity of AI images' generative programs

In this respect, AI is by no means superior to the creative thinking of humans. AI cannot generate anything new that the humans has not created already.

The main reason for this is that the specialists, who created AI, completely copied the creative mechanisms based on which humans think and act.

1.6. Prompts

One of the most important elements of successful work with AI programs is the accurate prompts.

The prompt is the task' verbal specification that the AI must perform. AI will generate the best image, if the prompt is of good quality.

A qualitative prompt means that the words should be specific (concrete), not too many, and they must describe the expected outcome according to its most important characteristics.

One Midjourney artist generated an impressive symmetrical lion head with the following prompts - lion, headshot, icon, logo, sports team graphic, minimalist, low poly, monotone, grayscale, high contrast, isolated, flat white background.

<https://www.facebook.com/photo/?fbid=6617986091597383&-set=gm.626257502999151&id=395755276049376>



Figure 1

2. AI images' generative programs and their applications in education of linguistics, literature, art, painting, cinema, architecture, advertising, economics, etc. – the semiotic aspects

We can use AI in the different and numerous educational disciplines.

The main goal of this paper is to analyse the ways in which we apply AI in terms of some basic linguistic, semiotic and narrative concepts.

The leading concept in this paper is semiotics. Linguistics analyses the words as a sign system, while semiotics analyses all signs – colours, clothes, gestures, architecture, spaces, music, images, etc. This is the main difference between linguistics and semiotics.

Linguistics is the leading school and university discipline, and the school systems around the world represent semiotics only in a fragmented way.

This is a little bit strange because the key definition of language is “means of communication”. At the beginning of the 21st century, we communicate actively with all sign systems, not only with the words.

The basic topics of article are semiotics and AI, and one of the main reasons is the social networks. They are quite attractive because thousands of eye-catching images, created by AI, dominate the social nets.

Obviously, these tendencies influence actively the educational process – from primary education to universities.

The biggest part of these images:

- are visual (iconic) metaphors.;
- are done on the basis of linguistic (semiotic) concept “intertextuality”.
- are done on the basis of the linguistic (semiotic) notion “diachrony”.

One of the most appropriate program, by which the artists create (generate) images, is Midjourney.

3. Analysis of AI images’ generative programs’ characteristics

Midjourney is a generative artificial intelligence program, created and hosted by the Midjourney lab. This program generates images, using command (prompts) that the artists write in natural language.

The creator of the program is David Holz, and according to him, Midjourney is very useful to the artists. The main reason is that Midjourney saves a lot of their time and the artists’ tedious routine work.

The students from different disciplines can create many images for numerous educational purposes, using this program.

Similarly, with this program, for example, the artists from the advertising business can create quickly quality prototypes that they then discuss with their clients.

4. Visual (iconic) metaphors created by AI images’ generative programs and educational disciplines

Metaphor is the most important stylistic figure. Its main characteristic is transfer (relocation). With the help of metaphor, we attribute (transfer, relocate) characteristics from one phenomenon to another.

Some important characteristics of metaphors are analysed in the literature review.

The importance of metaphor for the ways by which the language function and progress is incomparable. Metaphorical mechanism is one of the most important characteristics of human thinking and communications. For example, more than 90 percent in creative approaches in mass and marketing communications use the metaphor (trope) communicative approach.

One of the biggest challenges to AI is to start to think and to communicate metaphorically – like any normal human.

This is why the training and development of metaphorical thinking is so important for the school and university courses of linguistics, semiotics, literature, art, design, cinema, etc.

The scientists classify metaphors according to different variables – zoomorphic/anthropomorphic; vegetal; instrumental; temporal; topos, ontological, etc.

4.1. Zoomorphic metaphors

People create zoomorphic metaphors by attributing characteristics from one animal to another. With the help of a Midjourney, an artist attributed (transferred) the

characteristics of extra-terrestrial birds to terrestrial ones¹.

The bird is somewhat like an alien dinosaur. In another picture of the same series, the bird is dressed in a black leather military uniform and it is with many and different technological gadgets on its head. Due to this, the bird resembles to super warrior.



Figure 2.1, 2.2

4.2. Instrumental metaphors

The communicators create these metaphors with the transfer of different instruments.

An AI artist has created with a guitar metaphorical image. In it, super paratroopers (amidst of explosions and bullets) attack enemy positions with guitars instead of assault rifles².



Figure 3

4.3. Art metaphors – metaphors based on the transfer of artistic styles

An artist using AI created image that replicates Matisse's famous painting 'The Dance', but with three female figures.

The image, however, possesses the characteristics of the Renaissance paintings. The reason is that the transfer follows the art style of English Tudors³:



Figure 4

One of the most important parts of working with AI is the adequate communication with it. The artist of this image stated that she achieved better results using the word 'female', and not the very close synonym 'woman', when she discussed the painting with the AI.

5. Semantic concepts and AI

5.1. Intertextuality and AI

Communicative strategies based on intertextuality are some of the most favourite of artists who actively use AI images' generative programs.

In the literature review, some of the most important characteristics of intertextuality were analysed.

Intertextuality is a concept from linguistics, semiotics and theory of literature and art.

The authors use intertextuality by borrowing to some extent the content of already existing books, paintings, songs, films, etc. The main stylistic figures, by

which the communicators actualize intertextuality, are remake, allusion and parody.

Remake, as well as intertextuality, are generic terms for the borrowing of already created texts. A remake retells (reimagines) in a relatively neutral way previous text (book, film, etc.).

The authors use allusion to interpret earlier texts in a subtle and delicate way.

Authors use parody to interpret satirically already created texts.

Artists from the Facebook site Midjourney cat constantly create wonderful intertextual paintings and drawings using AI⁴.

This site publishes all the time paintings of cats, interpreted in the style of various artists. The artist Hennadii Kutomanov created some images with cats in the style of Dutch Renaissance painter Jan van Scorel⁵:



Figure 5

Jan van Scorel is a Renaissance Dutch artist. He studied in Harlem and Amsterdam, and then - in Italy, where Raphael and Michelangelo paintings inspired him. Van Scorel skilfully combined Dutch and Italian styles, a proof of intensive Renaissance intercultural (and intertextual) dialogue.

Andy Warhol is a world famous pop art painter. A Midjourney artist interpreted his works, adding a few cats⁶:



Figure 6

Typical features of Warhol's style are its similarity to photography, the dense and saturated colours, the many variations with the help of different colours of the same phenomenon (for example Merlin Monroe, Campbell's soup cans), etc.

The Midjourney artist has also interpreted Warhol's work. We see four versions of painted cats that are almost as photos, and in solid and contrasting colours.

These numerous examples are important evidence why concept "intertextuality" is so important, and why we must actively study it in various school and university disciplines.

AI images' generative programs' images are very popular in social nets. This is an eloquent proof of their educational potential for the various school and university disciplines – mother tongue and foreign languages, literature, painting, cinema, marketing, advertising, architecture, design, etc.

The Midjourney site is also important for the art education. The main reason is that the AI art communicators of this site interpret in original, creative and pleasant way the most important style characteristics of many famous artists who worked in the past.

With the help of this site, an inspired author can write a wonderful book on history and theory of art.

5.2. Diachrony/synchrony and AI

Diachrony/synchrony are important semantic concepts and, at the same time, – communicative strategies. Synchrony means action or state now (current action or current state). Diachrony means action or state in the past.

AI artist recreated diachronically Paris from the Belle Époque (late nineteenth and early twentieth century). The painting combines the poetics of vintage travel posters and that of French vintage fashion. The illustrator has depicted elegant lady and gentleman, walking on Champs-Élysées⁷:



Figure 7

The artist with the help of AI images' generative programs artist could develop this poster into a series of images to illustrate in a better way the concept "diachrony".

Synchrony expresses the current moment. Therefore, the artist could create synchronical poster to demonstrate this wonderful pair in Paris in 2023.

Diachrony expresses a number of different times in the history of the same phenomenon. Therefore, the Midjourney artist could show what the same couple would have looked like in Paris during the Second World War, the First World War, the time of Napoleon, the Great French Revolution, the time of Louis XIV, etc.

5.3. Paradigm and AI

Another important semantic concept is “paradigm”. Paradigm in linguistic discipline “morphology” means a table in which we arrange the forms of some morphologic category – for example, the different tenses of the verb, the different variants of the noun, etc.

Typical paradigm is also the wardrobe, because we arrange there the clothes.

The Midjourney artist has created image in which she or he arranged some typical Paris’ characteristics⁸:



Figure 8

Here the artist assembled architectural and gastronomic phenomena, which are emblematic for Paris – the Eiffel Tower, cheese, vegetables, red wine, etc.

The artist has also used the notion “semantic field”. Semantic field is the sum of the signs for all things by which communicators express the phenomenon in question. Here, this phenomenon is “French gastronomy”.

5.4. Redundancy and AI

Another important semantic concept is “redundancy”. Redundancy means big quantity, multiplicity, excess, surplus. Redundant texts express the meanings by many signs.

Typical architectural styles of redundancy are Baroque and Rococo.

A Midjourney artist generated redundant portrait of an attractive woman, which is composed of hundreds mechanical instruments and gadgets⁹:

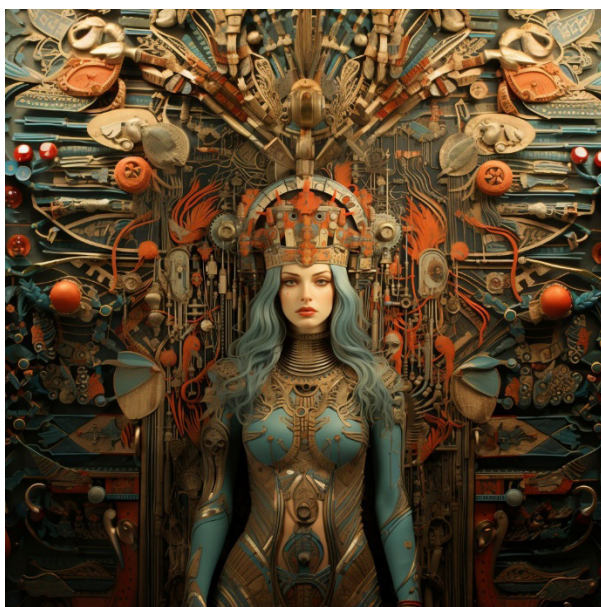


Figure 9

Redundancy is one of the most important characteristics of AI images. The main reason for this is that the specialists with the help of AI generate these images quite easily and in no time. That is why the AI images are so many.

Laconism (lapidary) is the opposite concept. People express the content with a few signs with the help of laconic texts. In some special cases is even possible not to use any signs to denote the meanings. The concept in this case is “zero morpheme”.

The typical architectural style of laconism is German functionalism. The architects’ functionalists create their buildings with clean lines and they do not use any ornaments and decorations.

In this case, the Midjourney artist generated 23 related images. This redundant series also illustrates the concept “descending gradation”. Gradation is the stylistic

figure of gradual increase (ascending gradation, or climax) or gradual decrease (descending gradation, or anticlimax).

Some specialists also denote this phenomenon by the term “zoom”. Zoom is a photographic concept. It expresses the fact that the photographed phenomenon gradually recedes or gradually approaches with the help of photo lens.

Zoom is also an integral part of AI communicative approaches of images. The artist in these 23 images gradually moves away from the original central image. The physical distance is probably a kilometre. Due to this we cannot see, in the last images the beauty from the first image with her numerous (redundant) mechanical gadgets.

5.5. Invariant/Variants and AI

Invariant/variants relation is a concept of linguistic discipline “phonetics”. The “invariant” denotes a function, quantity or property that remains unchanged, when we try to transform it. In phonetics, the invariant is the abstract articulatory mechanism of a phoneme.

In real life, however, speakers pronounce this phoneme in different concrete variants – depending on their physical characteristics, the phoneme position in the word, etc.

AI artist created many variants of Snow White from the famous fairy tale. We could tentatively define the image from Walt Disney’s Snow White as the invariant, because it is the most widely used¹⁰:



Figure 10

The AI artist created 23 snow-whites, respectively – Pixar Snow-white, Fashion Snow-white, Gore Snow-white, Soviet Snow-white, Medieval Snow-white, Biker Snow-white, Body Builder Snow-white, Sci fi Snow-white, Gothic Cartoon Snow-white, Steampunk Snow-white, Horror Snow-white, Revolutionary Snow-white, African Snow-white, Egyptian Snow-white, Adventurer Snow-white, Russian Snow-white, Constructivist Snow-white, Expressionist Snow-white, Nordic Snow-white, Game of thrones Snow-white and Street fight Snow-white.

The multiple (redundant) variants express different standpoints regarding the same phenomenon. Point of view is a key concept of the semiotic discipline “pragmatics”.

Pragmatics analyses not so much the signs themselves (in contrast with the semiotic disciplines “alphabetics”, “semantics” and “syntactics”), but the communicators’ attitudes towards the phenomenon in question.

The signs, which express the same phenomenon from different perspectives, are not quite similar to the permanent sign (invariant). That is why the twenty-three snow-whites are different, even though they have some comparable characteristics.

Discussion and conclusions

AI artists generate many high quality images relatively easily. Thus, they save a lot of time and eliminate the unpleasant and tedious routine part of artistic work.

Another advantage of these programs is the relatively easy communication with them – compared to the obligatory knowledge of machine languages in human-computer communications of the pre-artificial intelligence time.

By these programs, the pupils and the students can learn how to create efficient images that will help them in their personal and professional communications.

This is why the AI programmes should enter the compulsory school and university curriculum. Almost all school and university students can learn to use AI programs effectively.

The main reason for this is that these programs are not abstract and they are relatively easy to work with.

We can and we must use AI programs in all school and university subjects.

In this paper, some of the most important phenomena of artificial intelligence were analysed from the perspective of linguistics and semiotics. One of the important conclusions from the analysis is that we can apply easily all linguistics and semiotics concepts in different areas with the help of AI.

The benefits of AI images’ generative programs are the following:

- With the AI, pupils and students can easily create large (huge) amounts of images;
- AI saves a lot of time and tedious, routine and monotonous work;
- Working with AI is much easier for most students because they do not need to use the abstract, mathematic languages of older generations of computers.

Language is one of the foundations of human development and civilization. Language is also universal phenomenon, which we apply to various human activities – including education.

That is why we can use different AI programs and linguistic and semiotic concepts in different educational disciplines - both in school universities' curricula.

In the paper was demonstrated how we can generate easily numerous high quality AI images, which illustrates important linguistic (and semiotic concepts).

We can actively use such images in the teaching of mother tongue and foreign languages, literature, art, design, architecture, cinema, advertising, etc. in school and in universities.

This way the pupils and students will be more competitive and more employable in the labour market.

One proof of this is that all over the world, the high tech companies are actively looking for AI specialists. The same applies to the universities - they also actively introduce AI disciplines. The AI is also becoming a central topic in many scientific books, conferences, etc.

Working with AI is an important part of the skillset of various professions. For example, the specialists in Singapore are currently the fastest in the world to develop new skills related to AI. The Finns, the Irish, the Indians and the Canadians follow them.

However, we must not forget about the big dangers of AI. For example, with the AI programs probably some artists already generate adult content (the recent scandal with the adult deep fake AI images of world singer Taylor Swift), falsify money, etc.

This is very unpleasant and reprehensible; nevertheless, there are also considerably bigger dangers. For example, the military is also actively using AI to create more sophisticated (and therefore) more lethal weapons and military strategies. Arguably, even now the military is actively using AI in the numerous wars and conflicts.

Illegal villains are also using AI to hack the world's key infrastructure - email passwords, banks, corrupted elections, defence and financial ministries, atomic power stations, transport, hospitals, commerce, communal services, etc.

Even worse, AI can attack nuclear submarines and navies, air forces, nuclear missiles, space satellites, etc.

AI can also become self-sufficient, i.e. it can go beyond human control and start acting for its own benefit and kill people and even the whole humankind.

With the help of AI, the terrifying scenario of "The Matrix" movie becomes completely realistic and achievable.

Therefore, we must bear in mind both the AI positive and the negative characteristics. Only after we have carefully weighed up its pros and cons, we can make recommendations on how and to what extent to use AI in our life.

NOTES

1. <https://www.facebook.com/photo?fbid=10229703067472143&set=pcb.822561419476955>
2. <https://www.facebook.com/photo?fbid=617144983894960&set=pcb.617145400561585>
3. <https://www.facebook.com/photo/?fbid=234588826204785&set=gm.618143233810578&idorvanity=395755276049376>.
4. <https://www.facebook.com/search/top?q=midjourney%20cat>.
5. <https://www.facebook.com/photo/?fbid=2300277523493768&set=pcb.834891174888993>.
6. <https://www.facebook.com/photo/?fbid=2302967106558143&set=pcb.837117881332989>.
7. <https://www.facebook.com/photo/?fbid=181381558281820&set=pcb.181381658281810>.
8. <https://www.facebook.com/photo?fbid=180858975000745&set=pcb.822239919509105>.
9. <https://www.facebook.com/photo/?fbid=10160862724061101&set=pcb.615030297455205>.
10. <https://www.facebook.com/photo/?fbid=10230897186398950&set=pcb.619768640314704>.

REFERENCES

- ANIČIN, L. AND STOJMENOVIĆ, M., 2023. Bias Analysis in Stable Diffusion and MidJourney Models. In: NANDAN MOHANTY, S.; GARCIA DIAZ, V.; SATISH KUMAR, G.A.E. (Eds.). *Intelligent Systems and Machine Learning. ICISML 2022. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. Springer*, vol. 471.
- ASHOK, M., MADAN, R., JOHA, A., & SIVARAJAH, U., 2022. Ethical framework for Artificial Intelligence and Digital technologies. *International Journal of Information Management*, vol. 62, pp. 67 – 78. DOI: 10.1016/j.ijinfomgt.2021.102433.
- BELOEV, H.; SMRIKAROV, A.; VOINHOVSKA, V.; IVANOVA, G., 2023. Determining the degree of digitalization of a higher education institution. *Strategies for Policy in Science and Education-Strategii na Obrazovatel'nata i Nauchnata Politika*, vol. 31, no. 4s, pp. 9 – 21, DOI: 10.53656/str2023-4s-1-det.

- BIOLCHEVA, P. & VALCHEV, E., 2023. Safety through Artificial Intelligence in the Maritime Industry. *Strategies for Policy in Science and Education-Strategii na Obrazovatelната i Nauchната Politika*, vol. 31, no. 3. DOI:10.53656/str2023-3-3-saf.
- CHIARI, I., 2007. Redundancy Elimination: The Case of Artificial Languages. *Journal of Universal Language*, no. 8, pp. 7 – 38.
- CLAYTON, J.; ROTHSTEIN, E. (Eds.). 1991. *Influence and Intertextuality in Literary History*. The University of Wisconsin Press.
- DANG, H.; MECKE, L.; LEHMANN, F.; GOLLER, S. & BUSCHEK, D., 2022. How to Prompt? Opportunities and Challenges of Zero- and Few-Shot Learning for Human-AI Interaction in Creative Applications of Generative Models. *Human-Computer Interaction; Computation and Language*, <https://doi.org/10.48550/arXiv.2209.01390>.
- ESPINDOLA, D., 2023. *Soulful. You in the Future of Artificial Intelligence*. Brainyus.
- FEUERRIEGEL, S., SHRESTHA, Y.R., VON KROGH, G. et al., 2022. Bringing artificial intelligence to business management. *Nature Machine Intelligence*, vol. 4, pp. 611 – 613. DOI:10.1038/s42256-022-00512-5.
- GODDARD, C., 2008. *Cross-linguistic Semantics*. John Benjamins Publishing.
- GRAHAM, A., 2011. *Intertextuality*. Routledge.
- HWANG, GWO-JEN; CHIEN, SHU-YUN. 2022., Definition, roles, and potential research issues of the metaverse in education: An artificial intelligence perspective. *Computers and Education: Artificial Intelligence*, vol. 3, DOI: 10.1016/j.caeai.2022.100082.
- KEARNS, K., 2011., *Semantics*. Bloomsbury Academic. ISBN 9780230232303.
- KEENAN, E. L.; STABLER, E. P., 2010. On Language Variation and Linguistic Invariants. *UCLA Working Papers in Linguistics, Papers in Mathematical Linguistics I*, vol. 15, article 1, pp. 1 – 17.
- KIM, S., KIM, J., & KIM, E., 2017. Metaphor as Visual Thinking in Advertising and Its Effects: Focus on Brand Familiarity and Product Involvement. *Journal of Promotion Management*, vol. 23, no. 5, pp. 654 – 672. DOI: 10.1080/10496491.2017.1297982.
- LAKOFF, G. & JOHNSON, M., 1980. *Metaphors we Live by*. Chicago, The University of Chicago Press.
- LANDWEHR, M., 2002. Introduction: Literature and the Visual Arts; Questions of Influence and Intertextuality. *College Literature*, vol. 29, no. 3, pp. 1 – 16.
- LONGON, L. & CIAN, L., 2020. Artificial Intelligence in Utilitarian

- vs. Hedonic Contexts: The “Word-of-Machine” Effect. *Journal of Marketing*, vol. 86, no. 1, <https://doi.org/10.1177/0022242920957347>.
- MA, Y.; YANG, H.; LIU, B.; FU, J. & LIU, J., 2022. AIIllustrator: Translating Raw Descriptions into Images by Prompt-based Cross-Modal Generation. *MM '22: Proceedings of the 30th ACM International Conference on Multimedia*, pp. 4282 – 4290. DOI: 10.1145/3503161.3547790.
- MARINO, D. & MONACA, M. (Eds.). 2022. *Artificial Intelligence and Economics: The Key to the Future*. Springer International Publishing.
- MAURYA, A. & MUNOZ, J. M. (Eds.), 2022. *International Perspectives on Artificial Intelligence*. Anthem Press.
- OUYANG, F., ZHENG, L. & JIAO, P., 2022. Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and Information Technologies*, vol. 27, pp.7893 – 7925. <https://doi.org/10.1007/s10639-022-10925-9>.
- PETERSON, M. O., 2019. Aspects of visual metaphor: an operational typology of visual rhetoric for research in advertising. *International Journal of Advertising. The Review of Marketing Communications*, vol. 38, no. 1. pp. 67 – 96.
- RADHAKRISHNAN, A. M., 2023. Is midjourney-ai a new anti-hero of architectural imagery and creativity? an atypical era of ai-based representation & its effect on creativity in the architectural design process. *Global scientific journal*, vol. 11, no. 1, pp. 95 – 104.
- RICOEUR, P., 2004. *The Rule of Metaphor: The Creation of Meaning in Language*. Routledge.
- SINGH, A.; PURWAR, A. & GOUNDAR, S. (Eds.). 2022. *Applications of Artificial Intelligence, Big Data and Internet of Things in Sustainable Development*. CRC Press Taylor & Francis Group.
- STEFANOV, P., 2023. AI in Sound Engineering. *Strategies for Policy in Science and Education-Strategii na Obrazovatelna i Nauchna Politika*, vol. 31, no. 4s, 2023, pp. 191 – 202, <https://doi.org/10.53656/str2023-4s-16-sou>.
- STEINER, W., 1985. Intertextuality in Painting. *The American Journal of Semiotics*, vol. 3, no. 4, pp 57 – 67.
- Stone, P.; Brooks, R.; Brynjolfsson, E. et al. 2022. *Artificial Intelligence and Life in 2030: The One Hundred Year Study on Artificial Intelligence*, <https://ai100.stanford.edu/2016-report>
- TUFFERY, S., 2022. *Deep Learning. From Big Data to Artificial Intelligence with R*. Wiley.
- VALKANOVA, V. & PANCHEVA, Y., 2023. Truth, Fake and Authenticity in the Age of Digital Journalism – a Model of Visual and Media Literacy Pedagogy. *Strategies for Policy in Science and Education-Strategii na*

- Obrazovatel'nata i Nauchnata Politika*, vol. 31, no. 2, pp 281 – 289.
DOI: 10.53656/str2023-3-4-tru.
- WEIPENG, Y., 2022. Artificial Intelligence education for young children: Why, what, and how in curriculum design and implementation. *Computers and Education: Artificial Intelligence*, vol. 3, <https://doi.org/10.1016/j.caeai.2022.100061>.
- WORTON, M.; STILL, J. (Eds.), 1990. *Intertextuality: Theories and Practices*. Manchester University Press.
- YANRU, L.; WANG, X.; LIN, R.; WU, J., 2022. Communication in Human – AI Co-Creation: Perceptual Analysis of Paintings Generated by Text-to-Image System. *User Experience for Advanced Human-Computer Interaction II*. <https://www.mdpi.com/2076-3417/12/22/11312>.
- YILMAZTEKIN, H. K., 2023. *Artificial Intelligence, Design Law and Fashion*. Routledge, Taylor & Francis Group.
- YUCHEN, J.; LI, X.; LUO, H.; YIN S. & KAYNAK, O., 2022. Quo vadis artificial intelligence? *Discover Artificial Intelligence*, vol. 2, article no. 4, <https://link.springer.com/article/10.1007/s44163-022-00022-8>.
- ZANTIDES, E., 2016 Visual Metaphors in Communication: Intertextual Semiosis and Deja Vu in Print Advertising. *Romanian Journal of Communication and Public Relations*. vol. 18, no. 3 (39), December, pp. 65 – 74.

✉ **Prof. Christo Kaftandjiev**

✉ **Prof. Vesselina Valkanova**

Faculty of Journalism and Mass Communication

Sofia University

Sofia, Bulgaria

E-mail: kaftandzhi@uni-sofia.bg

v.valkanova@uni-sofia.bg