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# GENERATIVE ARTIFICIAL INTELLIGENCE VS HUMANS IN THE PROCESS OF CREATING CORPORATE IDENTITY ELEMENTS

**Abstract.** The emergence of new tools, the appearance of new technologies and improvements to existing ones have resulted in expansion of generative artificial intelligence. The technologies of generative artificial intelligence have already been used by people to perform not only intellectual tasks, but also creative ones, in particular in the field of design. Therefore, their capabilities in graphic design need to be studied. One of the routine tasks of a designer is the development of corporate identity elements (a logo, font, and colour). Designers can spend a lot of time on this, choosing different style options. Therefore, delegating this routine work to generative artificial intelligence may be appropriate. With this practical need in mind, the capabilities of modern AI tools for image and logo generation were studied in the research, and the results of AI logo generation compared to the work of novice designers were analysed. As a result, conclusions were drawn about the expediency of using generative AI technology in the work of designers, in particular, for the development of corporate identity elements, and the appropriateness of studying generative artificial intelligence technology in the training of future designers. These conclusions were made on the basis of a survey of 41 experts in the field of design, information technology and artificial intelligence. Based on the findings of the survey, we can note that it was difficult for experts to distinguish between logos generated by artificial intelligence and logos created by novice designers. Logos developed by novice designers (5) were recognized as the most attractive among the 45 logos presented in the survey. Images generated in some AI tools (Tailor Brands, Hatchful) are considered attractive by design, information technology and artificial intelligence professionals. Therefore, they can be used to create corporate identity elements. Thus, the vast majority of experts agreed that artificial intelligence tools for generating images and logos should be used in the process of creating corporate identity elements. In addition, the vast majority of experts found it advisable to use generative artificial intelligence technologies in the process of professional training of future designers.

**Keywords:** generative artificial intelligence; advertising graphic; logotype; digital design; professional training; higher education.

## 1. INTRODUCTION

**The problem statement**. Nowadays the issue of artificial intelligence (AI) is becoming increasingly important for debate or discussion. In particular, L. Martinkenaite states that there is progress in AI and more specifically in machine learning (ML). Progress is everywhere as software is helping us to navigate in streets and avoid traffic jams, filtering email spam, recommending our most favourite songs, food or movies, or even reducing power consumption on energy grids [1]. Global Technology Policy Council of Association for Computing Machinery in "Principles for the Development, Deployment, and Use of Generative AI

 

Technologies" points out that great care must be taken in researching, designing, developing, deploying, and using generative AI [2].

Research on artificial intelligence is conducted in various areas of human activity. AI replaces and supports humans in many tasks that require not only intelligence, but also creativity. Therefore, the results of generative artificial intelligence in relation to its use in the field of digital design are particularly interesting.

The first attempts of generative artificial intelligence can be dated back to 1980 when M. Toy and G. Wichman developed the Unix-based game Rogue, which used procedural content generation to dynamically generate new game levels. In 1985 J. Pearl introduced the Bayesian networks causal analysis that led to methods for generating content in a specific style, tone or length. Developments in the field of generative artificial intelligence were inactive for some time.

In 2014 D. Kingma and M. Welling introduced variational autoencoders to generate images, videos and text. Finally, in 2021 OpenAI introduced Dall-E, which could generate images from text prompts and in 2022 Researchers from Runway Research, Stability AI and CompVis LMU released Stable Diffusion as open-source code that could automatically generate image content from a text prompt [3].

Since the time of the emergence of generative artificial intelligence technologies for creating images, various tools (online services, mobile applications, desktop applications, API) for generating different types of images started to be developed, for example, AI online services for image generation (Bing Image Creator, DALL-E 2 by OpenAI, Dream by WOMBO, Craiyon, Midjourney and others), logo generation (Brandmark, Free Logo Design, Logomakr, Logomaster, Logo AI, Tailor Brands and others) or web design (Colormind and Khroma, Vance AI, Stable Diffusion, Designs AI, Sketch to Code, Sensei by Adobe and others).

**Analysis of recent studies and publications.** The issues of AI application in the field of design have been studied by such scientists as B. Wang, Y. Gong, C. Liu, M. W. Steenson and others. B. Wang [4] has appealed to the use of AI for Digital Design of Smart Museum Based and points out that the emergence of AI has endowed the exhibition with the characteristics of power, interactivity, and virtualization in the digital age, and the museum display space has changed due to its ability to provide 3D design, interactive display and information dissemination to incorporate these data into mobile information systems. Y. Gong [5] has described the application of the virtual reality teaching method and AI technology in digital media art creation, pointing out that the virtual reality teaching method which combines the advantages of AI algorithm has potential application value and good practical significance in the teaching of digital media art creation. C. Liu, Z. Ren, and S. Liu [6] have investigated AI technology to study the design of colour matching and image application in visual media communication design so as to better use colour art in visual communication design and graphic art and design excellent works. As a result, the authors have noted that the application of AI for visual media communication design is extensive, while the colour matching and image use are very prominent, and the public is willing to accept AI visual media communication design works. M. W. Steenson [7] explores projects of four architects in the 1960s and 1970s who incorporated elements of interactivity into their work, including cybernetics and artificial intelligence, and influenced digital design practices from the late 1980s to the present day.

The conclusions reached by E. Karaata [8] are important for our research, which are as follows:

1. The graphic design process is sure to gain speed along with the advancement of artificial design.
2. AI does not have creative awareness, which may be a temporary problem that may be overcome in time with methods like creative learning or adapting neural networks of the human brain to AI.

3. As the usage area of AI grows, the need for instructors of design programs that work on AI and machine learning may grow in graphic design training.

4. With the integration of AI and machine learning, programs of computer graphics become easier to use and accelerate the design process.

5. AI-running graphic design programs of our time are devoid of creativity, so the graphic design profession does not appear to be under threat.

**The research goals.** Despite the proliferation of platforms for generating different types of images and the growing number of research papers on the use of artificial intelligence in design, the following issues remain insufficiently studied:

(RQ1) What are the capabilities of modern AI tools for image and logo generation?

(RQ2) Are the results of image generation by artificial intelligence satisfactory compared to the work of novice designers?

(RQ3) Can the results of generative AI be used in the work of designers, in particular, to develop corporate identity?

(RQ4) Is it recommended to incorporate the learning of generative artificial intelligence technologies into the education of future designers?

Thus, the purpose of the study is to explore the potentials of artificial intelligence-based image and logo generation technology for developing corporate identity elements (a logo, font, and colour) in order to use this technology in the process of training of future designers.

## 2. THE THEORETICAL BACKGROUNDS

The beginning of the use of AI in the field of design can be considered since the emergence of such a phenomenon as computational creativity which is defined as:

1. A multidisciplinary endeavour that is situated at the intersection of the fields of artificial intelligence, cognitive psychology, philosophy, and the arts. The goal of computational creativity is to model, simulate or replicate creativity using a computer [9].

2. A research field that addresses computer-based modelling, design, simulation, and implementation of creativity, including various creative areas, such as arts, entertainment, artefacts, content, ideas, and knowledge [10].

3. Studies conducted into the possibility of a computer acting creatively in arts and science, combining research from artificial intelligence, cognitive psychology, philosophy, and the arts [11].

4. The process of building software that exhibits creative behaviour, such as inventing mathematical theories, writing poems, painting pictures, and composing music [12].

The next stage of technology development in this area was AI art which was not only computer assisted but computer generated [13]. This means that at least one part of the artistic process is left to the machine: an artist gives AI some data and waits, in order to see how it will elaborate them. Then they can intervene in their turn on the outcomes, through an interplay between a man and a machine that is virtually infinite [14]. F. Tao expands on this notion by stating: AI art is a special form, existing between natural beauty and human art: AI art, first of all, is not a natural aesthetic object, given that it is the product of artefacts. Its appreciation is mixed with interests, and its artistic generation is a kind of "purposeful non-purposefulness" [15].

Developing in parallel with the above technologies generative artificial intelligence (GenAI) has gained the highest level of popularity over the past year (Fig. 1). The tech community, scientists, educators and many people in general were impressed by the release of the ChatGPT neural network. It can communicate with people very naturally, write books, theses and articles at the level of copywriters, and create simple but working code. After that, other developments of well-known and unknown companies in the field of artificial intelligence (AI) became available: Google AI is a one-stop shop for everything related to artificial

intelligence; Bing AI is a language model and graphics creation tool; DALL-E 2 is a graphics generation tool; Tome is a website that uses AI to visualise ideas and create presentations; Beatoven.ai uses advanced AI generation methods to create unique music based on mood, etc. So, generative AI technologies continue to be developed and used in digital art.

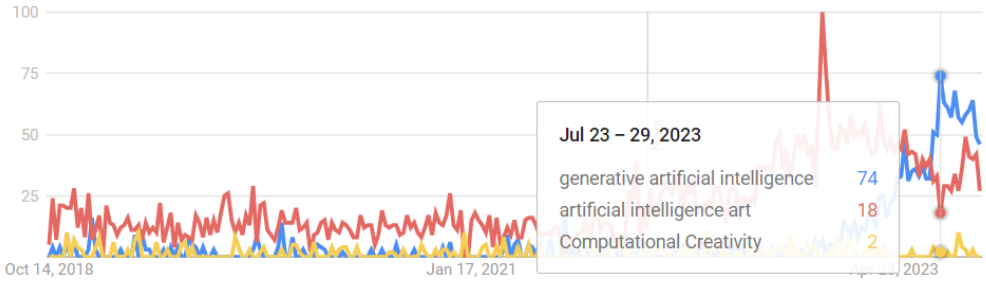


*Fig. 1. Growing popularity of generative artificial intelligence according to Google Trends. Source: https://trends.google.com/trends/explore*

In our research, we will use the definition of generative AI as a subfield of artificial intelligence and deep learning that focuses on generating new content, such as images, text, music, and video, using algorithms and models trained on existing data using methods of machine learning [16]. Generative AI have the ability to process and generate various types of data, such as natural language, audio or images, because they are used in many domains that require different kinds of information.

## 3. RESEARCH METHODS

The following tasks were set to achieve the research purpose: 1) to analyse existing AI tools for image generation in order to select the most useful ones for their application in the process of developing corporate identity elements (logo, font, and colour); 2) to generate examples of logos and summarise the results of the generation in order to select the logos that best conform to the task set out in the brief; 3) to conduct a study on the possibilities of AI-based image and logo generation technologies for developing corporate identity elements in order to use this technology in the work of graphic designers and in the training of future designers by surveying IT and graphic design experts.

In order to analyse the existing AI tools for image generation, it was necessary to define criteria for comparing images generated by AI and images made by novice designers. For this purpose, we analysed scientific articles about generative AI tools and online articles which considered the best image generation AI tools.

The following are the statements that influenced the selection criteria for AI tools for image generation: "... the generative design considers the various criteria set by the software, such as cost and performance" [17], "... meeting or exceeding human performance is actually an especially strong criterion to enforce on the AI system" [18].

Thus, the researchers emphasize the importance of such criteria as cost and performance. Among the signs of productivity, design experts [19], [20] determine the following characteristics: accessibility on different digital platforms (Web, Mobile, Desktop, API), the number of generated images at a time and generation speed in seconds or minutes.

Scientists also determine such criteria as functionality [21], i.e., the set of functions that particular software implements.

Design experts [22], [23] identify the following characteristics as important features of AI tools for image generation: the ability to formulate queries in simple language, the ability to formulate queries using prompts, the ability to choose several graphic styles, the ability to edit generated images, as well as additional characteristics, such as advantages and disadvantages of these tools.

As a result of this analysis the following criteria for selecting AI tools for image generation have been chosen: 1) cost (paid or free); 2) availability (API, Web, Mobile or Desktop based); 3) the number of generated images at one time; 4) the way of creating prompts (formulating queries in simple language and/or using templates); 5) choice of several graphic styles; 6) additional characteristics.

We have excluded such characteristics as the speed of image generation and the ability to edit the generated images. The first one has been excluded because it is difficult to calculate it objectively, and this is not the purpose of our study. The second one has been excluded because it is not important for evaluating AI tools for image generation, as we evaluate the results of image generation, but not the possibility of further processing.

In the process of generating logo examples by AI, queries in a natural human language have been used. In fact, the vast majority of people or professional designers will use a natural language because they do not have the skills to use prompts for AI tools.

To determine whether the results of generative AI can be used in the work of designers, particularly for the development of corporate identity, we have conducted a survey among experts in the fields of information technology and graphic design. The purpose of the survey was to ask experts to demonstrate their opinion on which images were generated by AI and which images were more attractive among all the proposed ones. For the study, we chose the logos developed by second-year design students in the Computer-Aided Advertising Design course. The attractiveness of logos was determined based on intangible criteria, such as feelings of comfort, pleasantness, fascination, amusement, surprise or spirituality [21].

## 4. THE RESULTS

### 4.1. Analysis of AI tools for image and logo generation

Based on the analysis of Internet sources, we have found 16 image generation tools (Tab. 1) of which 4 tools have been selected for logo generation based on the following criteria: cost, availability, the number of generated images at one time, the way of creating prompts, choice of styles, and additional characteristics.

*Table 1*

**GenAI tools for image generation**

| № | Title | Cost | Availability | Number of images | Way of creating prompts | Choice of styles | Additional characteristics |
|---|---|---|---|---|---|---|---|
| 1 | Artbreeder | Has a free version | Web | 3 | Simple language | + | - use of a combination of pictures to form a single image<br>- transparent background |
| 2 | Bing Image Creator | Free | Web, Bing Chat | 4 | Simple language | - | - need for a Microsoft account<br>- taking longer to generate images when the credit is finished |

| № | Title | Cost | Availability | Number of images | Way of creating prompts | Choice of styles | Additional characteristics |
|---|---|---|---|---|---|---|---|
| 3 | Craiyon | Has a free version | Web | 9 | Simple language | + | - no registration or signup<br>- use of the 'Negative Word'<br>- built-in suggestions for prompts using ChatGPT |
| 4 | Dall-E 2 | Has a free version | Web | 4 | Simple language | + | - images which are copyright free<br>- the results which occasionally may not be accurate |
| 5 | Deep AI | Has a free version | Web | 1 | Simple language | + | - resolution-independent vector image<br>- limited customization options with the free version<br>- straightforward and minimalist UI |
| 6 | Deep Dream Generator | Has a free version | Web | 1 | Simple language | + | - image preview available<br>- high-detail image generation which takes time to generate |
| 7 | Dream By Wombo | Has a free version | Web, mobile | 1 | Simple language | + | - enabled artwork to sell as NFTs<br>- a lot of ads in the free version<br>- free version restricted features |
| 8 | Images.ai | Has a free version | Web | 5 | Simple language | + | - various size options<br>- images which are copyright free<br>- required time to master the prompt for advanced-looking images |
| 9 | Fotor AI Image Generator | Has a free version | Web, mobile, desktop | 2-6 | Simple language | + | - no limit on the text description<br>- possibility of creating 3D images<br>- desktop apps taking up a lot of memory |
| 10 | Jasper Art | Paid | Web | 4 | Simple language | + | - 7 days' trial period<br>- working in 30+ languages<br>- no watermark on images<br>- no possibility to copyright images |
| 11 | Midjourney | Paid | Web, mobile, desktop | 4 | Simple language, prompts | - | - requirement of a Discord account<br>- image-to-text generator<br>- image URLs which can be added to a prompt |

| № | Title | Cost | Availability | Number of images | Way of creating prompts | Choice of styles | Additional characteristics |
|---|---|---|---|---|---|---|---|
| 12 | Nightcafe | Has a free version | Web | 1 | Simple language | + | - logo generator<br>- possibility to claim the copyright of artwork<br>- censorship in prompts sometimes filtering out even benign terms |
| 13 | Pixray | Free trial | API, web, desktop | 1 | Simple language, prompts | + | - coding<br>- employing a “latent text-to-image diffusion model”<br>- pixel art generation<br>- not beginner-friendly |
| 14 | Photosonic | Has a free version | Web | 2 | Simple language | + | - HD-quality image download<br>- watermark-free images |
| 15 | Stable Diffusion | Has a free version | Web, mobile | 4 | Simple language, prompts | - | - availability of a prompts library |
| 16 | Starry AI | Free to use | Web, mobile | 4 | Simple language, prompts | + | - full ownership of image rights<br>- lack of detailed previews of the art styles |

From the list of tools given in Table 1, we excluded paid tools that do not have a free version or a trial period, those that require programming skills, those that do not have a style choice, and those that do not generate logos. Logo generation was tested during the first attempts to generate images. For example, this query was entered in Nightcafe: “The logo of the architecture firm, which has the name Monolit, in a classic style, using black and gold colours, without the image of the building, the name of the firm Monolit”. The following results were obtained as shown in Fig. 2.

*Fig. 2. Results of logo generation in Nightcafe*

For comparison, the Artbreeder service produced another results, which is more relevant to the query, although still not perfect (no company name) (Fig. 3).

*Fig. 3. Results of logo generation in Artbreeder*

So, from the above list (Tab. 1) the following tools have remained: Artbreeder, Bing Image Creator, and Dall-E 2. While analysing the tools for logo generation (Tab. 2), it became clear that the principle of image generation with the help of these tools is different: for image generation, requests in the form of image descriptions are not used.

For example, image generation in the Wix logo maker is carried out according to the following algorithm:

1) add the name of your brand, business or organization, plus a tagline;
2) select your industry;
3) choose style options;
4) choose one logo from the options offered and customize it;
5) download your logo.

In other words, options set up in the logo generation tool itself are used rather than prompts.

*Table 2*

**GenAI tools for logo generation**

| № | Title | Cost | Availability | Number of images | Way of creating prompts | Choice of styles | Additional characteristics |
|---|---|---|---|---|---|---|---|
| 1 | AI LogoBrainstorm | Free trial | Web | 12 | Tool options, keywords | + | - requirement of a paid version for watermark removal |
| 2 | Brandmark | Paid | Web | >100 | Tool options, keywords | + | - a deep learning algorithm used |
| 3 | Designs.AI | Free trial | Web | 12 | Tool options | + | - requirement of credit card information for the trial period |
| 4 | Fiverr Logo Maker | Paid | Web | 11 | Tool options | + | - requirement of a paid version for watermark removal |
| 5 | Hatchful | Free | Web | 73 | Tool options | + | - creation of a branding kit |
| 6 | LogoAI | Free | Web | 24 | Tool options | + | - an animated version of the logo provided<br>- requirement of a paid version for watermark removal |

| № | Title | Cost | Availability | Number of images | Way of creating prompts | Choice of styles | Additional characteristics |
|---|---|---|---|---|---|---|---|
| 7 | Logobean | Paid | Web | >100 | Tool options | + | - numerous editing options |
| 8 | Logo.com | Free | Web | >100 | Tool options, keywords | + | - only three keywords used<br>- provision of a brand board |
| 9 | LogoliveryAI | Free trial | Web | n/a | prompts, tool options | + | - use of the Discord platform to generate images |
| 10 | Logomaster.ai | Free | Web | 12 | Tool options | + | - requirement of a paid version for watermark removal |
| 11 | LogoCreatorAI | Paid | Web | 10 | Tool options | + | - assistance available for users not satisfied with generated logos |
| 12 | Looka | Free | Web | 75 | Tool options | + | - possibility of further editing your logo without limitations once it is created |
| 13 | Tailor Brands | Free | Web | >10 | Tool options | + | - besides logos, generating business card designs, merch, etc. |
| 14 | Wix logo maker | Free | Web | 127 | Tool options | + | - provision of a logo in eight file formats, including full-colour, grayscale, and monochrome versions |

From the list of the tools presented in Table 3, we excluded the paid tools, those with a short trial period, and those that use watermarks. Thus, the tools remaining on the list are as follows: Hatchful, Logo.com, Looka, Tailor Brands, and Wix logo maker.

Based on the analysis of the capabilities of the modern image and logo generation tools presented in Table 2 and Table 3, the advantages and disadvantages of the tools were identified. They were divided into three groups on the basis of their functionality.

Capabilities of the image generation tools include:

1) general capabilities of the tool:
   - pixel art generation,
   - generating images into text,
   - using multilingualism,
   - enabling artwork to sell as NFTs,
2) capabilities related to image quality:
   - using a combination of pictures to form a single image,
   - using a transparent background,
   - creating resolution-independent vector image,
   - creating various size options for images,
   - allowing for the creation of 3D images,
   - downloading HD-quality images,

3) capabilities related to the formulation of requests:
- using the “Negative Word”,
- having built-in suggestions for prompts using ChatGPT,
- using the text description,
- using a prompts library.

Limitations of the image generation tools are as follows:
- copyright free images,
- occasional inaccuracy of the results,
- limited customization options with the free version,
- high-detail image generation taking time to generate,
- desktop apps taking up a lot of memory,
- censorship in prompts sometimes filtering out even benign terms,
- requirement of knowledge of coding for some tools,
- a lack of special tools for generating logos in most tools.

Capabilities of the logo generation tools are listed below:

1) general capabilities of the tool:
- using a deep learning algorithm,
- creating a branding kit,
- availability of numerous editing options for logos,

2) capabilities related to image quality:
- providing an animated version of the logo,
- high quality and high resolution logo creation,
- provision of logos in multiple file formats,

3) capabilities related to the formulation of requests:
- availability of numerous settings for better logo generation,
- using tool options to generate the logo,
- occasional use of keywords to generate logos.

Limitations of the logo generation tools are as follows:
- requirement of a paid version for watermark removal,
- use of few keywords to form the query.

Thus, the analysis of the image and logo generation tools suggests that they have powerful functions and use a variety of options for high-quality image generation to develop corporate identity elements (a logo, font, colour). In our opinion, this allows obtaining satisfactory results in the process of logo development.

### 4.2. Comparison of the results of image generation by AI with the works of novice designers

In this part of the article, we would like to answer the questions of our research on the satisfaction with the results of AI image generation compared to the work of novice designers and the feasibility of using the results of generative AI in the work of designers, in particular, for the development of corporate identity elements (a logo, font, colour). To achieve this goal, the second-year students of the Digital Design programme at Bogdan Khmelnitsky Melitopol State Pedagogical University were given the task of developing logos for imaginary or existing organisations (private, public, charitable, etc.) while studying Computer Advertising Design.

The students developed briefs, whose short descriptions are given in Table 3. To reach the purposes of the research, five logos were selected, and their images and descriptions are presented in Table 3.

*Table 3*

**Examples of logos designed by students**

| № | Logos | Name, field of activity | Short description of the logo (brief) |
|---|---|---|---|
| 1 |  | ACC<br>Dentistry | Target audience: premium and business class<br>Slogan: We work for you<br>Task: to attract attention<br>Desired brand image: moderation, classicity, elegance, solidity, professionalism, quality<br>Colour range: orange, blue, white<br>Logo structure: sign, name, slogan |
| 2 |  | Feedback<br>Consulting | Target audience: premium and business class<br>Slogan: Solutions that transform your business<br>Task: to attract attention, create an image of a friend who is always ready to help<br>Desired brand image: innovation, modernity, activity, experience, efficiency, professionalism, help<br>Colour range: yellow, black<br>Logo structure: sign, name, field of activity |
| 3 |  | UniSchool<br>Education | Target audience: working mothers who hold managerial positions and have an income above the average<br>Slogan: The future starts here<br>Task: to rebrand<br>Desired brand image: development, success, modernity, individual approach, solid ground<br>Colour range: yellow, blue, white<br>Logo structure: sign, name, field of activity, shaped as a coat of arms |
| 4 |  | Mantis<br>Eco shop | Target audience: people who care about health and nature conservation<br>Slogan: Getting closer to nature<br>Task: to attract attention, inform about the mission<br>Desired brand image: honesty, purity, simplicity, conciseness, commitment to the goal, openness, transparency<br>Colour range: green, black, white<br>Logo structure: sign, name, field of activity |
| 5 |  | Mokosh<br>Face and body care cosmetics | Target audience: women 25+<br>Slogan: -<br>Task: to attract attention, return to national roots<br>Desired brand image: authenticity, nationality, antiquity, eternity, beauty, Old Slavic motifs<br>Colour range: burgundy, ochre<br>Logo structure: sign, name inside the sign |

After that, using the selected image and logo generation tools (Artbreeder, Bing Image Creator, Dall-E 2, Hatchful, Logo.com, Looka, Tailor Brands, and Wix logo maker), images were generated to meet the requirements given in the description of each logo (brief) (Tab. 4). These AI tools for image generation create several variants of an image. In this case, in the process of discussing with the co-authors, we chose the most successful variant of the generated image, according to the attractiveness criteria we presented above (see section 3).

*Table 4*

**Examples of generated logos using generative artificial intelligence tools**

| № | Artbreeder | Bing Image Creator | Dall-E 2 | Hatchful | Logo.com | Looka | Tailor Brands | Wix logo maker |
|---|---|---|---|---|---|---|---|---|
| 1 |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |

The following prompts were used to formulate queries in such GenAI tools as Artbreeder, Bing Image Creator, and Dall-E 2:

1. A classy and elegant logotype for ACC, a dental clinic, in orange, blue and white, featuring a symbolic image of a tooth. The curved shape gives the tooth icon a more organic look, adding a sense of warmth and accessibility. The design exudes modernity, classicism, and solidity, emphasizing professionalism, quality of premium and business class. The slogan “We work for you” emphasizes dedication and commitment to customer service. Trending on Dribbble and Behance.

2. An innovative and modern logotype for Feedback, a consulting firm, in yellow and black colours. The design exudes activity, experience, efficiency, and assistance, emphasizing professionalism, quality of premium and business class. The logotype features a subtle geometric element to enhance the modern feel. The slogan “Solutions that transform your business” emphasizes innovative character and persistence of the firm’s activities. Trending on Dribbble and Behance.

3. A solid and modern logotype for UniSchool, a private gymnasium, in yellow, blue and white. The design exudes development, success, modernity, an individual approach, and solid ground. The logotype should be in the form of a coat of arms, similar to the coat of arms of an American or English college. The slogan “The future starts right here” means that the task of the institution is to develop children.

4. A concise and simple logotype for Eco shop, an ecological products shop, in green, black and white. The design exudes honesty, purity, dedication to the goal, openness, and transparency. The logotype must contain elements of vegetation. The slogan "Everything is closer to nature" means that the task of the shop is to pay attention to environmental problems and care for nature.

5. A laconic, abstract, simple logotype in the style of Old Slavic ornaments for Mokosh, a care cosmetics brand, in burgundy, ochre and white. The design makes an impression of authenticity, nationality, antiquity, eternity, and beauty. The logotype must contain abstract elements of geometric ornament. The font of the logotype should be in an ancient style.

It should be noted that these 3 tools work very poorly with fonts, so the fonts on the images are hardly readable. To generate logos with the help of such GenAI tools as Hatchful, Logo.com, Looka, Tailor Brands and Wix logo maker, their options (business name, business space, visual style, slogan (optional), colour themes (colours), keyword) were used.

Logos are generated in the vector format with these tools, so their quality is much better than logos generated with the image generation tools.

After that, a survey of IT and graphic design experts was conducted to determine the perception of the logos designed by novice designers and the logos generated by the AI tools. The questionnaire contained the following 5 questions:

1) Are you relating to the field of information technologies, artificial intelligence, or graphic design?

2) Which of the following logos do you think are designed with the help of artificial intelligence?

3) Which of the following logos do you think is the most attractive? To assess attractiveness, use such intangible criteria as feelings of comfort, pleasantness, fascination, amusement, surprise or spirituality.

4) Do you consider it appropriate to use generative artificial intelligence tools to create elements of corporate identity (a logo, font, and colour)?

5) Do you think it is appropriate to use generative artificial intelligence tools in the training of future designers?

### 4.3. Survey results

The survey was conducted in September 2023. 41 experts in the field of graphic design, information technology and artificial intelligence took part in the survey (Fig. 4).

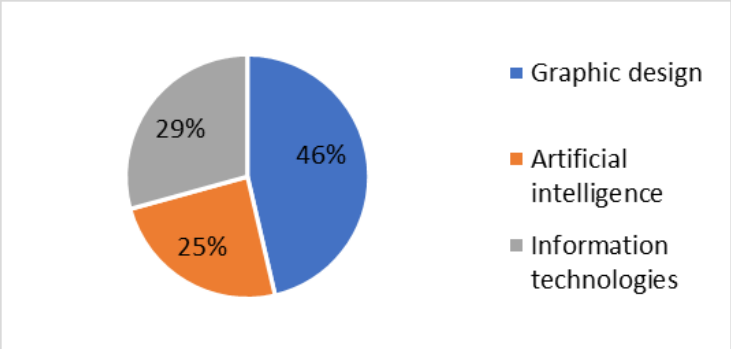


*Fig. 4. Distribution of survey participants by field*

Analysing the answers of the experts to the second question of the survey regarding the identification of those developed by artificial intelligence among 45 logos, we can draw the following conclusions (Fig. 5):

1. The experts had a hard time distinguishing between the AI-generated logos and those created by novice designers. They noted this in the comments to the survey. This is also evidenced by the fact that 8 % of the selected logo options are the logos developed by novice designers.

2. The majority of experts unmistakably identified the logos created by using image generation services, namely Artbreeder (17 %), Bing Image Creator (19 %) and Dall-E 2 (15 %). Therefore, it is advisable to use these services only for inspiration, searching for ideas and references, and not for developing elements of corporate identity.

3. Among the proposed logos, the smallest number of experts marked the logos generated by such logo generation services as Logo.com (7 %) and Tailor Brands (4 %) as those which were created by artificial intelligence. So, in our opinion, these services can be used to develop elements of corporate identity.

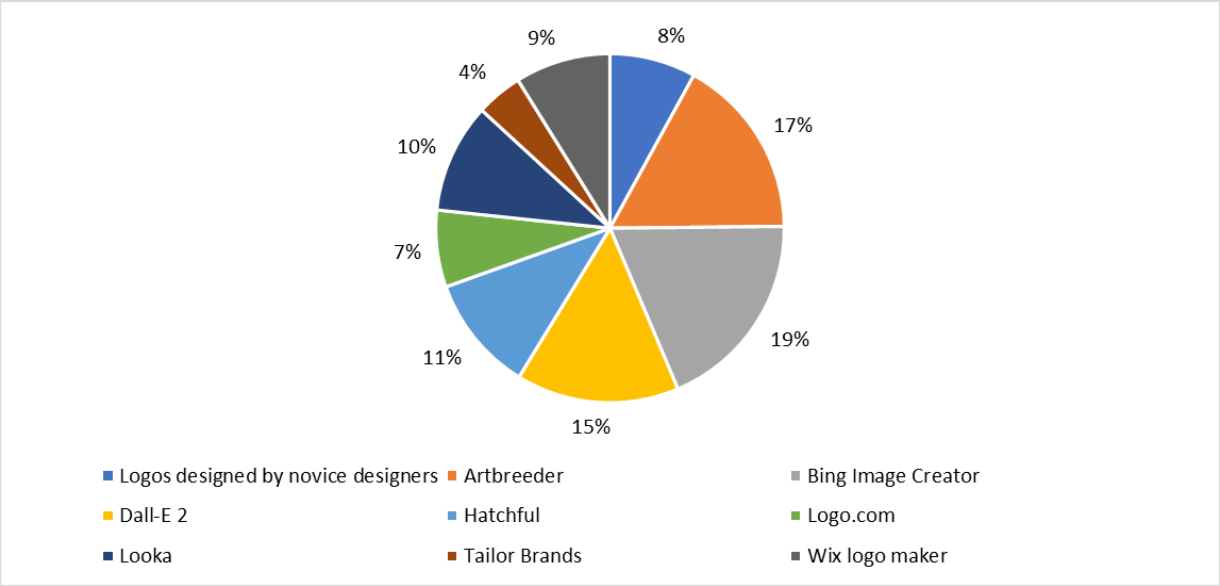


*Fig. 5. The experts' answers to the question about identification of the logos designed with the help of artificial intelligence*

Analysing the answers of the experts to the third question of the survey regarding the identification of the most attractive logo, we can draw the following conclusions (Fig. 6):

1. The logos developed by novice designers (5) were recognized as the most attractive among the 45 logos (21 %) that were presented in the survey. Therefore, it can be considered that the analysed generative artificial intelligence tools have not reached the level of creativity that even novice designers have reached to be liked by people.

2. Images generated in some AI tools (Tailor Brands (17 %), Hatchful (11 %), Looka (11 %)) are considered attractive by design, information technology and artificial intelligence professionals. So, in our opinion, these services can be used to develop corporate identity elements.

3. Images generated with such artificial intelligence tools as Artbreeder (9 %), Bing Image Creator (9 %), Logo.com (8 %), Wix logo maker (8 %) and Dall-E 2 (6 %) are characterised by experts as the least attractive. Therefore, in our opinion, it is not advisable to use these services for the development of corporate identity elements.

The vast majority of experts (71 %) agree that the use of generative AI technologies is appropriate in the work of designers, in particular for the development of corporate identity elements. The majority of experts (68 %) expressed an opinion about the appropriateness of

studying the technology of generative artificial intelligence for the professional training of future designers.

It should be noted that in the comments, the experts highlighted some aspects that we consider important and that should be emphasized. In general, the experts stressed the importance of the research topic and awareness of it. They stated that if a designer uses artificial intelligence technology, this should be reported to the direct customer of the designer products. The experts also raised issues of copyright on images developed by artificial intelligence. It is worth noting that some generative artificial intelligence tools retain ownership of the generated images. This is stated in the terms of use of a specific tool by users. The experts in the field of graphic design are concerned about the fact that new technologies may deprive designers of work and opportunities for self-expression, and in the end, there will be no meaning in art. However, they argue that using artificial intelligence is useful and important because it saves time, simplifies work, and inspires as well.

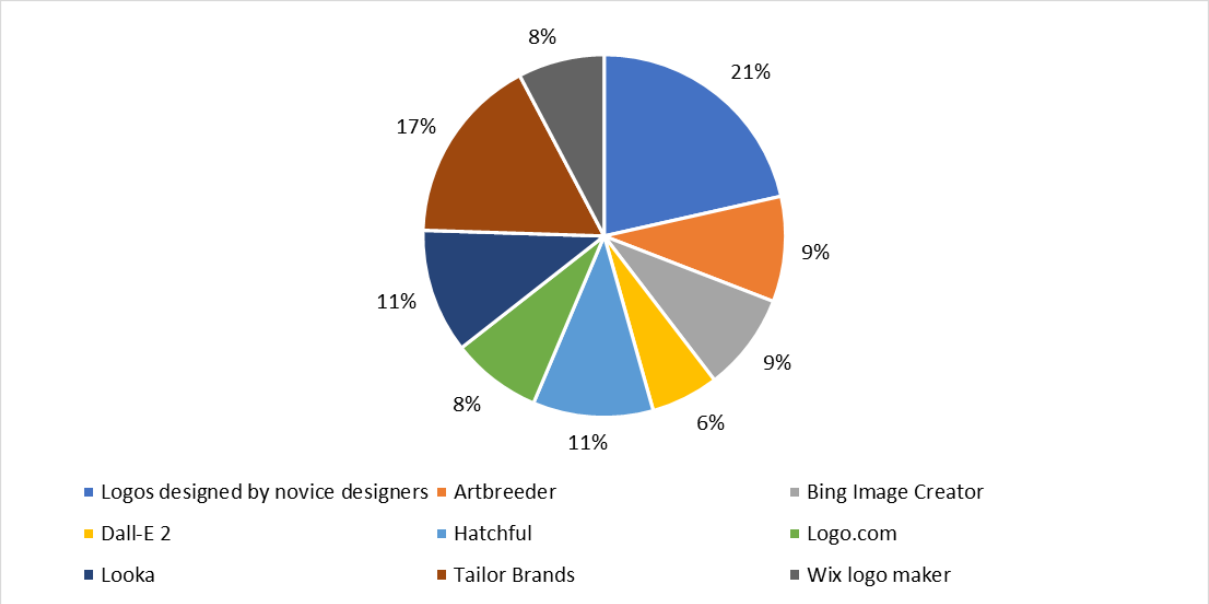


*Fig. 6. The experts' answers regarding attractiveness of the proposed logos*

Here is a crucial opinion of one of the experts in the field of design: "Getting ideas from the work of artificial intelligence is amazing, but it is not always worth just generating and taking the results of AI work. Because, in my opinion, it will not be able to completely replace the work of people. It can help, but not perform all the designer's work with high quality". One of the experts noted that "we must learn more about generative AI and have "more control" over it, make specific guidelines and regulations, and make strong constraints (if and whose necessary) before using it as a tool in professional training". We can partially agree with this because the use of AI technologies needs to be regulated. However, artificial intelligence technologies are developing very rapidly. We will lose time while we master them and agree on a regulatory framework. Thus, if we do not offer students to study such new technologies as generative AI, their training will be irrelevant and outdated.

## 5. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

Based on the analysis of 16 artificial intelligence tools for generating images and 14 tools for generating logos, as well as the analysis of scientific articles on generative artificial

intelligence tools and Internet articles that analysed the best tools for generating images, conclusions were drawn about the capabilities of modern Internet services of image generation.

(RQ1) Most AI image generation tools do not successfully cope with the generation of logos: they do not work with text (the company name and slogan are not displayed correctly), do not perceive the request for the use of specific colours, and do not understand the contextual nuances required in logo design. Meanwhile, they can generate an image that can inspire designers to develop their own ideas. Most AI logo generator tools provide access to a selection of styles (classical, modern, realistic, hyper realistic, abstract, pop art, cubist, surrealistic, etc.), ready-made industry-oriented templates (Fashion, Health and beauty, Home and garden, Food and drink, Sports and rec, Gifts and collectibles, Tech, Services, etc.), colours and fonts, adding text and symbols, resizing and scaling, editing elements, and exporting in different formats (PNG (with transparent background), SVG (vector format) etc). Some AI logo generation tools allow the creation of a branding kit (a collection of visual elements representing a brand, including your logo, colour palette, typography and graphic elements). However, one of the limitations of AI logo tools is the uniformity of templates and the inability to select a specific colour in some tools. The quality of the logo generation result may vary depending on the specific tool and technologies used. Some AI tools use advanced generative models, which allows creating logos that look good, with high precision and detail. However, if you need to create a particularly unique logo, take into account all the requests of the client and create a unique and attractive visual image for the brand, it is better to commission such a task to a person.

(RQ2) So, despite the fact that the results of logo generation are satisfactory, can gratify a completely undemanding client, demonstrate quite correctly designed logos (proportional, compositionally correct, and organic), the AI tools for logo generation are lacking in comfort, pleasantness, fascination, amusement, surprise or spirituality, which are characteristic of logos developed by novice designers. This was proven by the results of our research in which the vast majority of respondents noted satisfaction with the results of generating logos with artificial intelligence tools.

(RQ3) In our opinion, which coincides with the vast majority of respondents in our survey, the results of generative artificial intelligence can be used in the work of designers, in particular for the development of corporate identity. However, it should be noted that designers ought to be aware of the limitations and drawbacks of AI-based image and logo generation tools. They should be ready to refine the image generated by artificial intelligence or simply perceive the generation results as a search for ideas and references. Also, the results of logo generation can be presented to the client to find an original idea.

(RQ4) As the vast majority of respondents noted, studying generative AI technologies in the professional training of designers can be highly beneficial. Integrating generative AI technologies into the training of designers can enhance their skills and capabilities, as well as foster the development of designer products in future professional activities. By understanding and using generative AI, designers can apply its advanced methods and technologies to optimize the process of creating designer products. In addition, designers should be educated and trained to consider ethical considerations in their AI-driven design processes. In conclusion, studying generative AI technologies in the professional training of designers can bring numerous benefits.

The use of generative AI in design still needs further research, in particular, in terms of using this technology in the work of graphic designers and in the professional training of future designers. In our research, we have only outlined the capabilities of using generative artificial intelligence technologies for this. The technologies of generative artificial intelligence are developing very quickly, so our research is not comprehensive and has certain limitations, in particular: 1) during the publication process of the article, new technologies and new

characteristics of those AI tools that we studied could appear; 2) despite the fact that we tried to avoid subjectivity in the selection of AI-generated logos to be compared by involving experts for this choice, we may not have been able to avoid it to some extent. Meanwhile, we hope that the conducted research revealed the capabilities of modern artificial intelligence tools for image and logo generation, and allowed for proving that the results of AI image generation are satisfactory in comparison with the work of novice designers, that the results of generative AI can be used in the work of designers, in particular, for the development of corporate identity, and that it is worth studying the technology of generative AI during the training of future designers.

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# ГЕНЕРАТИВНИЙ ШТУЧНИЙ ІНТЕЛЕКТ ТА ЛЮДИНА У ПРОЦЕСІ СТВОРЕННЯ ЕЛЕМЕНТІВ ФІРМОВОГО СТИЛЮ

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**Анотація.** Нині сфера використання генеративного штучного інтелекту розширюється. З'являється все більше нових інструментів, створюються нові технології й удосконалюються вже існуючі. Технології генеративного штучного інтелекту використовуються людьми для виконання не лише інтелектуальних завдань, а й творчих, зокрема у сфері дизайну. Тому їх можливості використання в графічному дизайні потребують вивчення та осмислення. Одним з рутинних завдань дизайнера є розробка елементів фірмового стилю (логотип, шрифт, колір). На це дизайнери можуть витратити багато часу, обираючи різні варіанти стилю. Тому може бути доцільним делегувати цю рутинну роботу генеративному штучному інтелекту. Зважаючи на таку практичну потребу, у дослідженні було вивчено можливості сучасних

інструментів штучного інтелекту для генерації зображень і логотипів та порівняно результати генерації логотипів штучним інтелектом з результатами роботи дизайнерів-початківців. Тож було зроблено висновки про доцільність використання технології генеративного ШІ в роботі дизайнерів, зокрема для розробки елементів фірмового стилю, та доцільність вивчення технологій генеративного штучного інтелекту при підготовці майбутніх дизайнерів. Ці висновки були зроблені на основі опитування 41 фахівця у сфері дизайну, інформаційних технологій та штучного інтелекту. Спираючись на аналіз опитування, можемо зазначити, що експертам було важко розрізнити логотипи, згенеровані штучним інтелектом, та логотипи, створені дизайнерами-початківцями. Логотипи, розроблені дизайнерами-початківцями (5), були визнані найбільш привабливими серед 45 логотипів, що були представлені в опитуванні. Зображення, згенеровані у деяких інструментах штучного інтелекту (Tailor Brands, Hatchful), розглядаються фахівцями з дизайну, інформаційних технологій та штучного інтелекту як привабливі. Отже, вони цілком можуть бути використані для створення елементів фірмового стилю. Переважна більшість експертів погодилися з тим, що інструменти штучного інтелекту для генерації зображення та логотипів доречно використовувати при створенні елементів фірмового стилю. Також переважна більшість експертів вказали на доцільність використання технологій генеративного штучного інтелекту у професійній підготовці майбутніх дизайнерів.

**Ключові слова:** генеративний штучний інтелект; рекламна графіка; логотип; цифровий дизайн; професійна підготовка; вища освіта.