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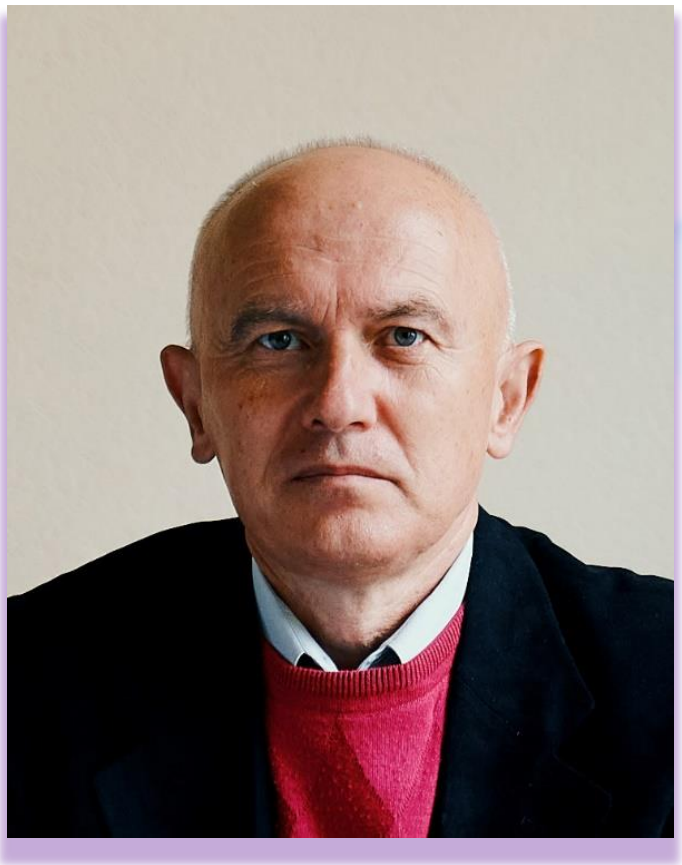
GENERATIVE DESIGN AND CYBERNETIC ANTHROPOLOGY OF ARTIFICIAL INTELLIGENCE



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Abstract. The convergence of generative design practices with cybernetic anthropology of artificial intelligence is explored. A transformation of the main forms of design activity took place as part of the convergence. One of the aspects was the topic of modernizing design methodology, considering the preservation of its core professional competencies and the subject ontology of creative activity. Another aspect of consideration is focused in the article on the development of

cybernetic anthropology of artificial intelligence, the product of which was synthetic people. Their main function is communication. It was formed by the practice of using chatbots and digital assistants in the functions of administrators and consultants. A new direction in the cybernetic anthropology of artificial intelligence has become the formation of generative functions in computer programs through deep machine learning. This technological trend raises questions about employment prospects and copyright and related rights to creative works.

Keywords: generative design, designer, cybernetic anthropology, artificial intelligence, synthetic people, distributed man, digital law, digital environment, convergence.

Introduction

An analysis of works on the subject of professional activities of designers shows that significant transformations are taking place in this activity, created by the evolution of artificial intelligence technologies and computer modeling [Loiko 2023]. Artificial intelligence through deep machine learning has reached the level of solving generative design problems [McCormack et al. 2004]. In its evolution, there is a tendency to evolve from holographic volumetric modifications to cybernetic anthropology of artificial intelligence modeling in the format of digital twins [Meierhofer et al. 2020]. As a result, the space of a distributed person is formed not only in aspects of bodily anthropology, but also in intellectual and creative ontology. This ontology is represented by cognitive artifacts of culture [Loiko 2022a]. A distributed person faces problems in the field of copyright and related rights [Петкилёв 2022].

Main part

By generative design we mean the ability of a computer program, formed by the developer, to evolve on the basis of deep

machine learning to implement creative functions and use it in the status of artificial intelligence in creative activities, in particular in design [Bohnacker 2012].

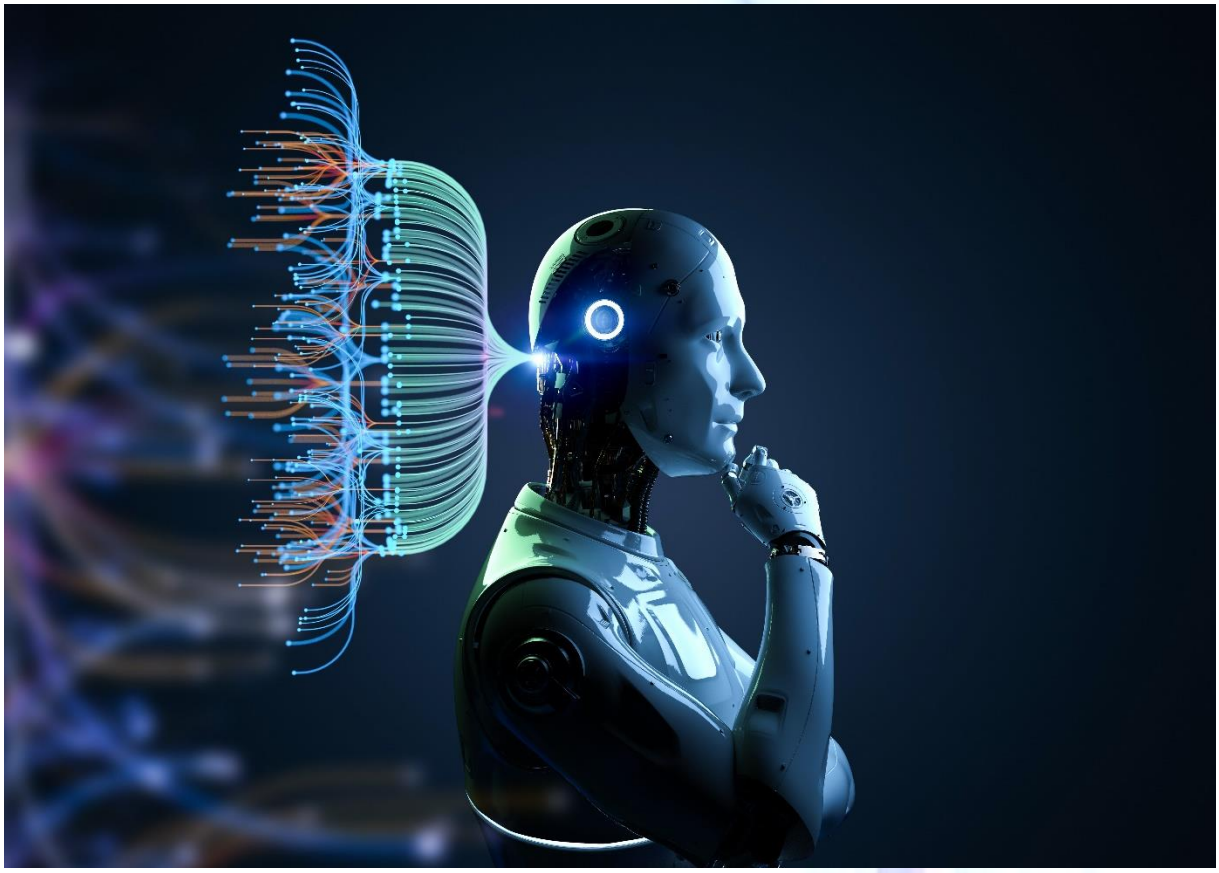
The goal of generative design is to generate quickly many design options based on a single concept. Parameters such as goals, constraints, and materials can be set to control the generation of all possible solutions through software testing and training at each iteration. The goal is to enhance a person's cognitive abilities to create things that would otherwise be inaccessible.

The designer plays the role of curator, using the iterative power of AI to create and test concepts that would otherwise be nearly impossible to implement. Each modification generates new iterations, displays them next to the old iterations to see the evolution. This allows you to select one option to start a new iteration branch.

Technologically, three main factors create the prospect of AI humans [Korteling 2021]. This is ever-increasing CPU and GPU power in the cloud and at the edge. These are continuous and incremental improvements through deep learning research.

The synthetic human model uses more than one neural network. This is a large number of sets of algorithms that work in ensemble with each other. This is the essence of generative design technology. This is the creation of an architecture for a combination of technologies. The task of a computer designer is to combine technologies into a pipeline. It represents a sequence of actions where the result of one algorithm is correctly transferred to another algorithm and a new result is obtained. The designers design the approximate range, the pictorial

range and teach the synthetic man new styles and connect new fonts to it.



An example of visualization of human artificial intelligence.
The image is freely available on the platform: https://goo.su/qMJv

The designer's task is to apply the visual solution in the right context, because the suppliers of needs are people. Now let's look at how a synthetic person implements the designer function.

The customer fills out a brief and describes their company. A synthetic human (neural network) interprets the brief. From the text of the brief, they pull out some images that may fit the visual representation of this company, how it can be presented in the form of some kind of capacious symbol or sign. And then it is transmitted along a chain, and these visualizations of images appear. They are enriched

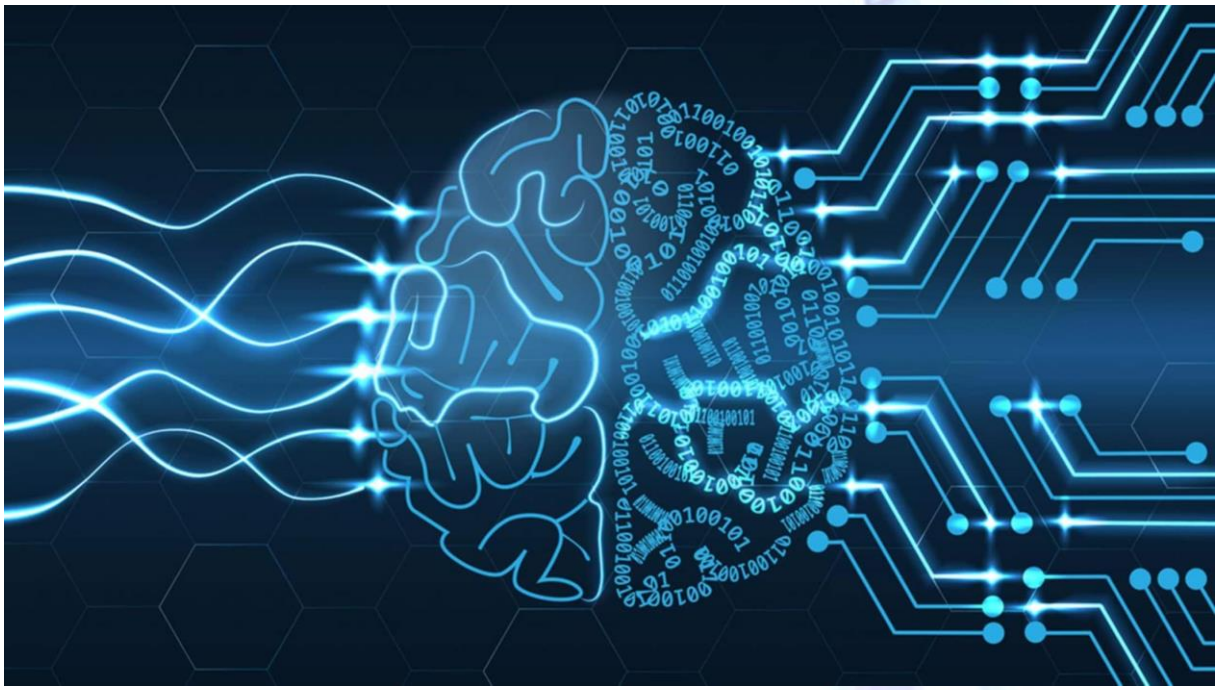
with different font combinations. Separate algorithms are connected that select color combinations.

At the end of the day, the client receives an experience comparable to the experience of communicating with a live designer. The synthetic designer is not capricious. They cannot be sick. The synthetic designer uses generative technologies, which have a rich history and various modifications. They are not limited to the neural network.

Previously, the tool was a brush. It involved mechanical action and experience. Now instead of a brush there is something else. Tomorrow there will be something else. This expands and redistributes design efforts. New professions are emerging. They are half design, half technical. Those who are engaged in industrial engineering learn to interact with this tool, ask it the right questions and get the right answers. The designer's tool is no longer a brush or graphics editing program, but a neural network.

Prompt engineering represents the strategies and tactics used in creating, evaluating, and improving queries. Requests refer to instructions that inform AI models about the needs of service users. A well-structured request means productive interactions with AI. Queries play an important role in guiding AI models. Optimizing their use can significantly enrich the experience of communicating with such systems. Requests are commands and directions. They shape the nature of the responses the client receives. Mastering the art of querying is essential to unlocking the full potential of AI.

While humans can intuitively understand the context and nuances of requests, AI models need clear instructions. They don't understand context the way people do. Prompt engineering involves understanding logic and functionality, and then using this understanding to achieve the best result. This means precise word choice, correct format specification, clear context, and sometimes even AI-like thinking [Gruber 1993].



Artificial intelligence is a projection of the natural principles of human thinking. The image is freely available on the platform: https://clck.ru/3EAN6A

By developing efficient queries, AI models become more interactive, useful, and smarter. An effective inquiry must be open to allow for in-depth exploration and clear to focus on the chosen topic. Understanding AI logic is essential. The more accurate and complete the query, the more correct the conclusion will be.

While there is no complete set of rules for prompt engineering, the principles can help you write more effective queries. The AI model

uses patterns and inferences based on its training data to produce an answer. The more specific the language, tone, and style for teaching her, the better the response. AI models do not understand complex reasoning the way humans do. Queries should be simple and understandable [Loiko 2023].

AI needs clear direction. AI models perform much better if they can adhere to the structure given to them. Ignoring the design or structure of the request will lead to unexpected results. AI doesn't understand context the way humans do. He can't read between the lines or see the hidden subtext. Expectations for requests need to be clear.

You can guide the AI's tone by making this clear in the request. If the developer wants a specific structure in response, they must direct the AI using the plan in the request. Temperature and Max Tokens usage options can be changed to influence AI output. Temperature controls the randomness of output. Low values make the output more focused and deterministic. The maximum number of tokens controls the length of the output.

Iterative improvements and feedback play an important role in prompt engineering. After receiving feedback and test results, this information is used to improve queries. If necessary, change the wording, clarify the instructions and change the tone. A testing phase follows to get more feedback and continue improvement.

Currently, the job of industrial engineers includes understanding the logic of the AI, guiding its learning progress, and changing its parameters to optimize its performance.

The commercial use of AI technologies is important, since these technologies are not cheap [Loiko 2023]. Therefore, the main thing is to find large imperfections that can be automated using these technologies. One of these resources is represented by a logo.

Constructs become iconic not because of their original form. They become iconic because of the context in which they appeared at the right moment.

Design technology generates samples of icons in a specific genre. They are sold en masse. The best designers are those who understand context. One known application of AI is the production of high-quality artistic media for fine art, concept art, music and literature, as well as video and animation. Diffusion models can synthesize high-quality images, and large language models (LLMs) can produce intelligent-sounding prose and poetry in a wide range of contexts. The generative capabilities of these tools will revolutionize the creative processes through which creators formulate ideas and bring them to life.

Generative AI relies on training data made by humans. Models learn to generate art by extracting statistical patterns from existing art tools. This dependence on training data raises new questions, such as where the data comes from, how it influences the output, and how to determine authorship.

Natural language-based interfaces accompany generative AI models, including chat interfaces that use the pronoun "I", which can give users a sense of human interaction and agency. Such perceptions can undermine trust in the creators whose work underpins system

outcomes and divert responsibility away from developers and decision-makers when these systems cause harm. Further work is needed to understand how perceptions of the generative process influence attitudes toward results and authors. This could facilitate the development of systems that reveal the generative process and avoid misleading interpretations.

An example of a robotic warehouse complex.
The image is freely available on the platform: https://clck.ru/3EANka

The specific capabilities of generative AI are giving rise to new aesthetics that could have a lasting impact on art and culture [Schnitzer 2021]. As these tools become more common and their use becomes commonplace, it remains an open question how the aesthetics of their results will impact artistic results.

A low barrier to entry for generative AI can increase the overall diversity of artistic output by expanding the pool of creators engaged in artistic practice. At the same time, aesthetic and cultural norms and biases embedded in the training data may be captured, reflected, and even reinforced, thereby reducing diversity. Content shapes future models. Ways to quantify and increase the diversity of output should be explored, and how generative AI tools can influence aesthetics and aesthetic diversity should be explored.

Maximizing engagement can further homogenize content. The question remains which styles are amplified by recommendation algorithms and how this prioritization affects the types of content creators create and distribute. The complex, dynamic systems formed by the interactions between generative models, recommendation algorithms, and social media platforms, and their resulting impact on aesthetics and conceptual diversity, require research.

Legal and ethical issues regarding authorship arise. Copyright law must balance the benefits for creators, users of generative AI tools, and society at large [Loiko 2023]. Laws may treat the use of training data as non-infringing as long as the protected works are not directly copied. Fair use is only permitted if the creators provide an explicit license or if there is a compulsory license that allows the data to be used for learning as long as the creators are compensated. Much of copyright law relies on judicial interpretation, so it is unclear whether collecting third-party data to teach or imitate an artist's style would violate copyright.

Even in cases where models do not copy directly from existing works, it is unclear whether or how artists' individual styles should be protected. What mechanisms could protect and compensate artists whose work is used for teaching, or even allow them to opt out, allowing new cultural contributions to be made through generative models. Answering these questions and determining how copyright law should treat training data requires significant technical research to develop and understand AI systems, social science research to understand the perception of similarity, and legal research to apply existing precedents to the technologies.

Answering this question requires understanding the creative contributions of system users versus other stakeholders such as system designers and training data creators. In contrast, if users of the system have shown meaningful creativity (for example, the process is not fully automated or does not imitate specific works), then they can be considered copyright holders by default. But how significant must users' creative influence be before they can claim ownership? These questions are related to the study of the creative process of using AI-based tools and may become more complex if users are given more direct control.

New opportunities for creating photorealistic synthetic media may undermine trust in verifiably captured media through the so-called "liar's dividend". False content benefits liars by undermining trust in the truth, as well as increasing the threat of fraud and non-consensual sexual images.

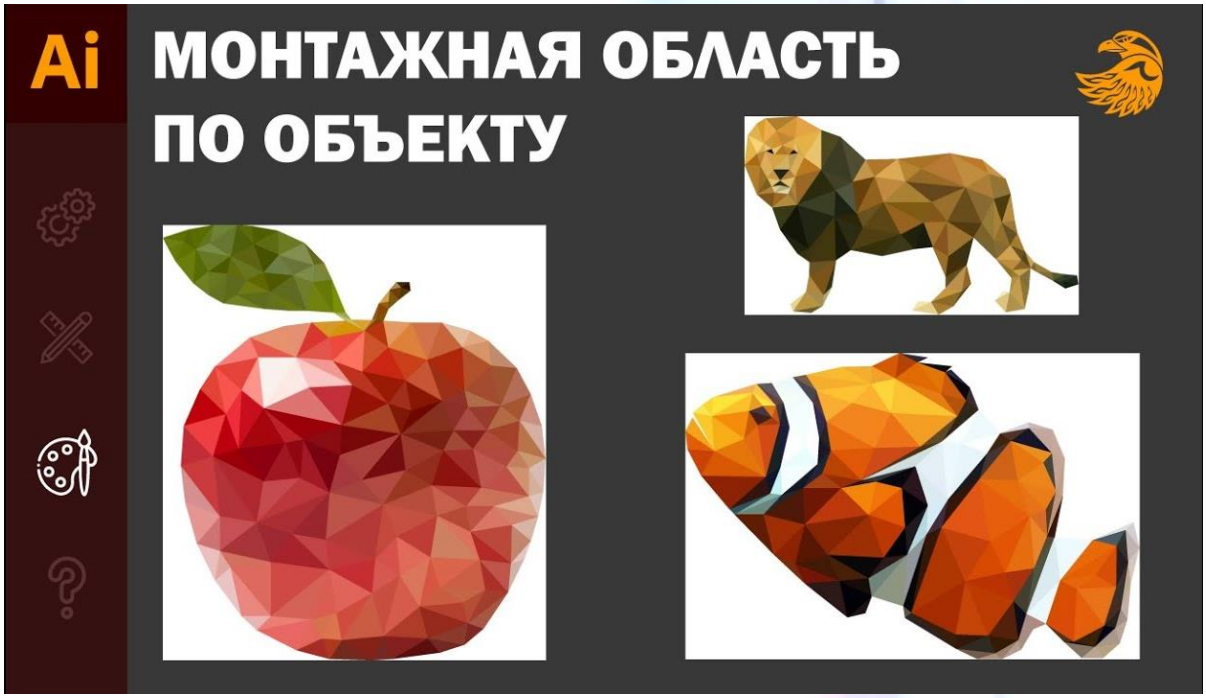
If a neural system generated a product that was perceived by a fairly representative audience as a work of art, then can the name of this development be considered an identifier of some artist and writer?

Inceptionism. An example of a picture "painted" by neural networks – Meduza. The image is freely available on the platform: https://clck.ru/3EALbt

If someone built a mathematical model and trained it to generate content that was accepted by a representative audience as a work of art, should he be called the author of that work?

The generation of harmonious accidents depends on how powerful the ensemble of arbitrary moments from which they are selected (generated) is, and on the internal organization of this ensemble. The degree of creativity can be increased by complicating the organization of the generating machine. AI gives physical designers a range of capabilities that help them make more informed,

efficient decisions. It ensures projects are up to date with the latest trends, allowing designers to focus on the bigger picture. AI does a lot of the heavy lifting, freeing designers' minds and giving them more room to be creative. Instead of spending hours analyzing reams of data trying to find ways to improve a design, you can use AI to understand the problem and guide the designer in the right direction. AI optimizes the workflow by analyzing huge amounts of data and suggesting solutions from which the designer can then select the most suitable ones.



Itten color wheel for the selection of color combinations in order to meet the design needs of users. The image is freely available on the platform: https://clck.ru/3EAM9V

Designers are always looking for a tool that can simplify the process of creating color palettes for projects. Choosing the right colors can be a challenging task because it affects how users perceive a brand. AI is used here to learn what colors you like, and then use that data to create a huge number of palettes that you can view and use

in your design. Selecting colors trains an artificial neural network algorithm to generate combinations that the user likes.

When choosing fonts, designers strive to find ones that share common characteristics but also have enough contrast. AI uses deep learning technology to create font pairs. Choosing two fonts that look harmonious is a classic design problem.

AI scans sketches and automatically transforms them into editable prototypes. The service uses machine vision and learning to turn sketches into digital displays and components. AI helps create microcopy, product descriptions, digital ads, blog content, sales copy, homepage headlines, and much more. You need to enter the name of the brand or product and its brief description. AI analyzes the content of each movie and TV series and predicts what you'd like to watch based on the choices you've made in the past. AI eliminates the need for designers to create identical movie covers in different languages by personalizing and localizing them.

The announcement and subsequent demonstration of GPT-3 gave designers a glimpse of what design tools might look like in the future. GPT-3 is an artificial intelligence modification that generates text using Open AI. This is currently the largest language model. Experiments demonstrated its ability to create persuasive text in a variety of styles, considering several parameters, as well as the ability to output code that could then be used in design tools. Jordan Singer's demo of a plugin called "Designer" can generate a functional prototype from raw text. This is an app that has a navigation bar with

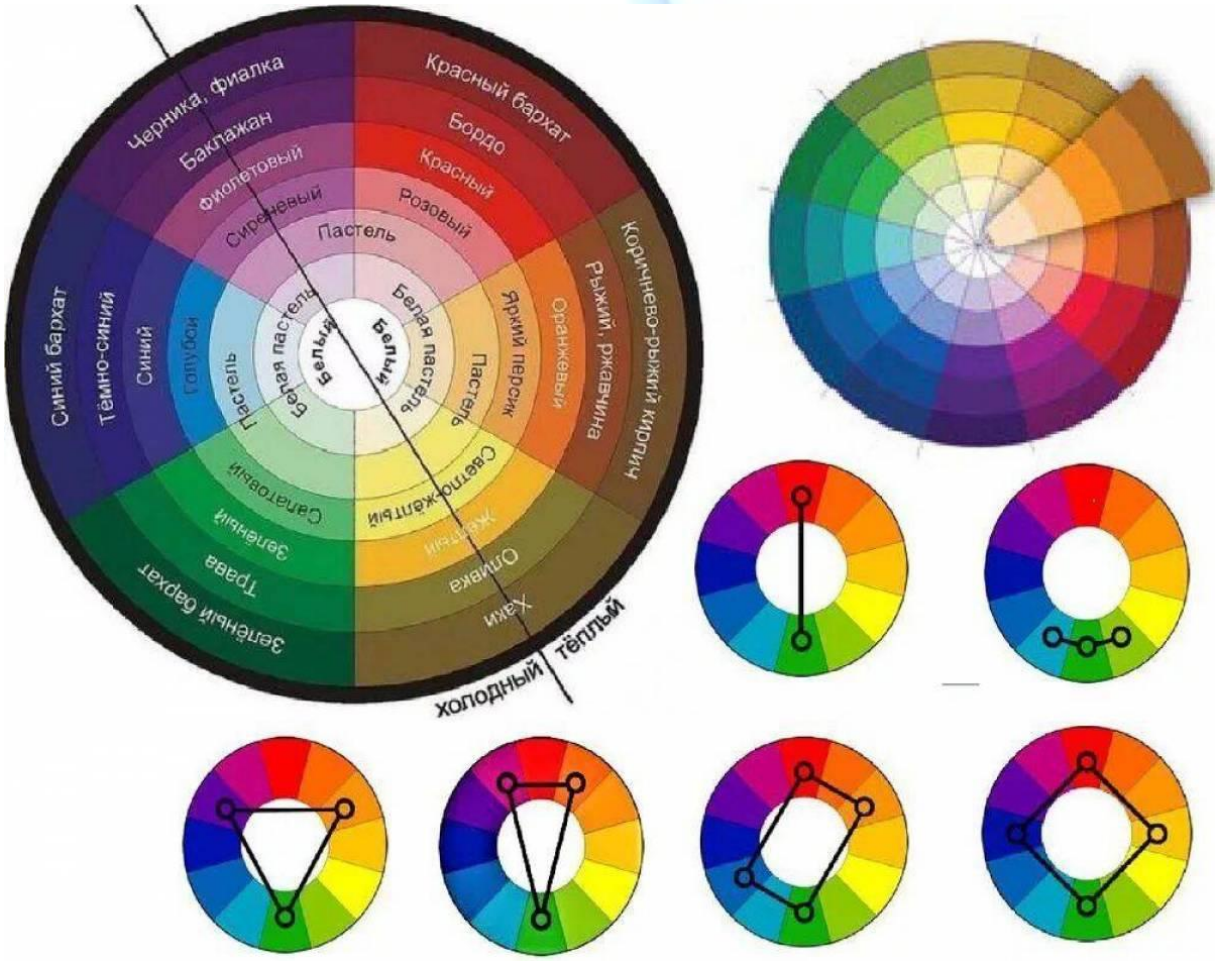
a camera icon, a Photos header, a message icon a photo feed each with a user icon, a heart icon, and a chat bubble icon.

Algorithm-driven design is already used in the industry. AI automatically creates documentation, specifications and patterns [David et al. 2018]. It allows you to automatically generate specification details such as font size, colors, spacing and other important information. It customizes the output based on the intended target platform and allows resource extraction for development.

AI creates code prototypes from blueprints, translates prototypes into component specifications, and translates production code into design files for iteration [Krämer et al. 2012].

AI generates code from low-quality wireframes. There are usability tests that can be conducted using AI-based tools, eliminating the need to recruit participants. AI simulates eye tracking studies and preference tests using predictive technology [Loiko 2022b]. The plugin is compatible with all popular design tools, providing instant results without leaving the tool or browser window.

Exploration and iteration are paramount when designing an interface. Designers often copy and paste artboards to make small changes to get the composition and style right. One use case for AI could be the ability to easily generate multiple UI layout options using a design tool of choice, speeding up the iteration process. The required number of options can be generated, with the level of detail controlled through settings and based on the designer's choices and preferences.



Examples of the designer's work with artboards or artboard areas. The image is freely available on the platform: https://clck.ru/3EAMHp

Conclusions

Design systems have completely changed the way design teams create digital products and services. By focusing on a set of reusable components that adhere to clear standards and can be assembled to create any number of applications, design teams can speed up and scale their productivity. While creating and managing a design system still requires a significant investment of time and resources, the benefits to the team are well worth it. What if we could reduce the level of effort

required by creating them automatically, and therefore lower the barrier for teams to create and manage them?

Allowing AI to track digital properties, create design system components, and then support real-time updates will allow designers to focus more on client needs and be confident that their designs will scale accordingly. This task is performed by automatic heuristic evaluations that occur as the design process progresses. Similar to the accessibility tools that designers use to check color contrast, an automated report based on the selected artboard can provide recommendations or feedback that will help guide the design process as it goes along. It can be built into your design tool of choice and will help ensure your design adheres to best practices. Teams can even train AI on specific design principles and receive feedback long before the team reviews, helping to shorten design cycles.

AI is only as good as the data it is trained on. AI algorithms and datasets will reflect and reinforce unfair biases. The ultimate risk is that the hidden biases built into design tools will end up harming the people using the products and services.

It is important to ensure that any use of AI in design tools is focused on empowering designers rather than replacing them.

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ГЕНЕРАТИВНЫЙ ДИЗАЙН И КИБЕРНЕТИЧЕСКАЯ АНТРОПОЛОГИЯ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Александр Лойко

Аннотация. Исследована конвергенция практик генеративного дизайна с кибернетической антропологией искусственного интеллекта. В рамках конвергенции произошла трансформация основных форм дизайнерской деятельности. Один из аспектов составила тема модернизации методологии дизайна с учетом сохранения его основных профессиональных компетенций и предметной онтологии креативной деятельности. Еще один аспект рассмотрения сфокусирован в статье на развитии кибернетической антропологии искусственного интеллекта, продуктом которой стали синтетические люди. Основная их функция коммуникационная. Она формировалась практиками использования чат-ботов и цифровых помощников в функциях администраторов и консультантов. Новым направлением кибернетической антропологии искусственного интеллекта стало формирование у компьютерных программ через посредство глубокого машинного обучения генеративных функций. Подобная технологическая тенденция формулирует вопросы о перспективах занятости и авторских и смежных правах на произведения творческой деятельности.

Ключевые слова: генеративный дизайн, дизайнер, кибернетическая антропология, искусственный интеллект, синтетические люди, распределенный человек, цифровое право, цифровая среда, конвергенция.

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