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## OPTIMIZING ROUTINE TASKS IN DESIGN USING ARTIFICIAL INTELLIGENCE

POLISHCHUK Olena, TSMOKH Roman  
Zhytomyr Ivan Franko State University, Zhytomyr, Ukraine  
[polishchuk.o.p.2015@gmail.com](mailto:polishchuk.o.p.2015@gmail.com); [mysticvillagefilms@gmail.com](mailto:mysticvillagefilms@gmail.com)

*This thesis explores how the use of AI-based tools can transform design practice, reducing the burden on designers and increasing the efficiency of design processes. In the contemporary world, artificial intelligence (AI) is being intensively integrated into various spheres of human activity, offering highly efficient solutions for automation and process optimization. In the field of design, AI is opening up new possibilities for enhancing designers' productivity by optimizing routine tasks, freeing up time for creativity and innovation, which is a positive attribute.*

**Keywords:** artificial intelligence, automation, process optimization, design, designers' productivity, innovation.

### INTRODUCTION

The development of artificial intelligence technology prompts a rethinking of traditional approaches in modern design. Thanks to AI's capabilities in data analysis, machine learning, and automation, designers have a unique opportunity to focus on the creative aspects of their work, relying on intelligent systems for executing routine and time-consuming tasks.

### PURPOSE

The primary objective of this research is to explore the potential of artificial intelligence (AI) in optimizing routine tasks in the field of design. Specifically, this research focuses on analyzing the capabilities of AI-based tools to enhance designers' productivity, reduce time spent on standard operations, and foster innovative development in design practice.

### RESULTS AND DISCUSSION

Research in the field of artificial intelligence and its application in design reveals a growing interest in optimizing routine tasks, contributing to the efficiency and creativity of design processes. The importance of this direction is supported by a number of fundamental works.

Ben Shneiderman, in his book *The New ABCs of Research: Achieving Breakthrough Collaborations*, emphasizes the importance of collaboration between researchers from different fields, including design and artificial intelligence, to create innovative solutions. Although his work is not focused exclusively on design, it offers valuable insights into the integration of the latest technologies into creative processes [1]. But Donald Norman examines how technologies can expand human capabilities, including creativity. His ideas about human-computer interaction are particularly relevant for understanding how AI can facilitate the optimization of



design tasks [2]. Alan Turing, in his work *Computing Machinery and Intelligence*, had proposed fundamental ideas [3] that laid the foundation for the development of artificial intelligence. While this work is theoretical, it is important for understanding the potential of AI in automating and optimizing tasks across various fields, including design. The recent study by Habeeb et al. (2023) in the field of artificial intelligence has focuses on AI-based design optimization methods for repair and restoration using additive manufacturing technology [4]. The results of this study show that the integration of AI can significantly improve additive manufacturing processes, particularly through design optimization, forecasting, and automation, leading to more efficient and innovative design. These and other studies highlight that successful integration of artificial intelligence into design requires a deep understanding of both technological capabilities and creative processes. Reviewing these works provides a comprehensive view of AI's potential to transform the design industry, particularly through the optimization of routine tasks.

To achieve the objectives of this research, a mixed methodology combining quantitative and qualitative approaches is used. This approach allows for a deep understanding of both the impact of artificial intelligence on routine tasks in design and its overall influence on the creative process. Quantitative Analysis: A survey among professional designers will be conducted to assess the effectiveness of using AI-based tools in their everyday work. The survey aims to measure the reduction in time spent on routine tasks and its impact on productivity and work quality. Qualitative Analysis: Detailed interviews with designers who actively use AI in their work will collect in-depth data about their experiences, perceptions, and reasoning regarding the integration of AI into design processes. This will help identify key benefits and potential limitations of using AI. Case Analysis: Examining specific examples (cases) of design projects where AI was used to optimize processes will provide valuable information on the practical application of AI tools. This includes analyzing the effectiveness of using AI for specific tasks, such as automatic generation of design options, color selection optimization, and integration with data visualization, among others. The implementation of artificial intelligence (AI) in design processes and the optimization of routine tasks play a key role in enhancing efficiency, reducing development time, and improving the quality of final products. The study by Habeeb et al. (2023) illustrates the importance of integrating AI into additive manufacturing processes for repair and restoration, offering new opportunities for improving component design considering their operational characteristics and strength requirements. To our mind the use of AI can significantly enhance the quality of design-related decisions, allowing for the automation of routine tasks such as material selection, manufacturing parameter optimization, and environmental aspect consideration. This includes, but is not limited to, the potential for reducing material costs through resource optimization and minimizing environmental impact through waste reduction. The application of AI is expected not only to improve the functional characteristics of products but also to expand the possibilities for personalization and adaptation of the design to specific user needs, ensuring higher customer satisfaction and increased product competitiveness.



Special attention in the study by Habeeb et al. (2023) is given to the development of hybrid methods based on AI, combining the advantages of different approaches, such as artificial neural network algorithms and genetic algorithms, to achieve optimal solutions in complex design tasks. This integrated use of AI is aimed at solving problems related to the need for rapid adaptation of design under changing manufacturing conditions and market requirements, as well as improving innovation processes and the development of new products.

Thus, the implementation of AI in design and the optimization of routine tasks not only enhance the efficiency of development and manufacturing processes in different field but also open new paths for innovation and creative approaches to creating products that meet the high demands of the modern market.

### **CONCLUSIONS**

The use of artificial intelligence in design opens new perspectives for optimizing routine tasks and increasing the overall efficiency of design processes. AI not only enhances the creative abilities of designers but also fosters the development of innovative approaches in design, which is key to creating higher quality and more personalized design solutions. Further research in this area is crucial for understanding the potential of AI and its impact on the future of design.

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### **ПОЛІЩУК О., ЦЬМОХ Р.**

#### **ОПТИМІЗАЦІЯ РУТИННИХ ЗАВДАНЬ У ДИЗАЙНІ ЗА ДОПОМОГОЮ ШТУЧНОГО ІНТЕЛЕКТУ**

У цій розвідці досліджується, як використання інструментів на основі ШІ може змінити практику проектування, зменшивши навантаження на дизайнерів і підвищивши ефективність процесів проектування. У сучасному світі штучний інтелект (ШІ) інтенсивно інтегрується у різні сфери людської діяльності, пропонуючи високоєфективні рішення для автоматизації та оптимізації процесів. У сфері дизайну ШІ відкриває нові можливості для підвищення продуктивності дизайнерів шляхом оптимізації рутинних завдань, звільняючи час для творчості та інновацій, і це є його позитивною властивістю.

**Ключові слова:** штучний інтелект, автоматизація, оптимізація процесів, проектування, продуктивність проектувальників, інновації.