



HARNESSING GENERATIVE AI FOR PRODUCTION DESIGN IN AUDIO-VISUAL CREATIONS: EXPLORING OPPORTUNITIES, OVERCOMING CHALLENGES, AND SHAPING THE FUTURE

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An audio-visual creation's visual environment is designed as part of the production design process. In the pre-production stage, the production designer drafts the visual elements related to the creation and applies relevant notes. For this, the production designer should have basic knowledge of drawing and colour use, which affects the essence of the creation. Through generative artificial intelligence technology, it is possible to generate an image of the relevant visual elements based on the instructions given to the AI service. However, due to generative AI technology, a situation has arisen where the production designer can perform their work very easily. The main purpose of this research is to explore the impact of using generative AI technology for production design in the audio-visual creation process on traditional production design. The qualitative research method was used. Images were generated using Leonardo.ai and Stable Diffusion, an open-access generative AI service, to collect primary data, and it was hoped that generative AI could be used for production design. Fifteen students at the University of Kelaniya, selected through random sampling, participated in this test. Books, research articles, and internet sources related to this scope were used as secondary data sources. According to the results of this research, it was confirmed that production design for audio-visual creations using generative AI can be done very efficiently, in less time, and with less effort, but it still cannot challenge human creativity and imagination. Compared to the traditional production design method, the advantages, challenges, and future directions of production design using generative AI were comparatively analyzed in this research.

Keywords: Generative Artificial Intelligence, production design, creativity, work efficiency, artificial intelligence

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INTRODUCTION

The emergence of Generative Artificial Intelligence (AI) in the field of audio-visual creations offers a revolutionary prospect for production design in films, advertising, and other visual creations. Generative AI is a network of technical AI systems that can generate new content that is not explicitly programmed and can generate text, audio, imagery, and synthetic data. Production design is an important part of the audio-visual creation process, involving the design and construction of the appropriate visual environment for the creation. This includes the planning of visual elements such as sets, costumes, props, and make-up as appropriate for the production. Intelligent technology known as generative AI accelerates the creative process by quickly generating sets, costumes, and props in response to prompts (commands). Filmmakers, visual directors, and advertisers stand to benefit greatly from this technology in terms of time and cost savings, as well as expanded creative exploration.

Early production designers sketched the relevant visual elements. Today, some production designers use software such as Photoshop for these tasks. However, with the spread of revolutionary Generative AI technology, tasks such as image generation have become much easier, allowing designers to generate visual elements as images. Therefore, it is possible to use this technology for production design in audio-visual creations. But this technology is still not widely used in planning tasks because many production designers do not have the basic knowledge or understanding to utilize it. However, with generative AI, production designers gain the ability to generate relevant visual elements with minimal time and effort. Many text-to-image generations AI services that can be used for production design are now publicly available. Most of them can be used in free versions, and by paying for a service, designers can generate more accurate and higher-quality images. Images generated in this way can be animated by generative AI services, providing an opportunity to gain a preliminary understanding of the three-dimensional nature of visual elements before they are physically constructed. The main purpose of this study is to explore whether generative AI technology can achieve the desired creative work in production design, compared to human creativity.

RESEARCH PROBLEM

Compared to traditional production design, does using generative AI technology improve production productivity? In the process of production design, the most popular method is for the designer to draw the visual elements of the design by hand or use software such as Photoshop. But with the popularity of generative AI technology, a situation has arisen where generative AI tools can generate relevant visual elements as images, videos, or 3D animations. At first glance, this appears to be a very easy method. In relation to this research, the research problem is based on the effectiveness and productivity of using AI tools in comparison to traditional methods. It is possible to generate something using generative AI tools, but it is not possible to get 100% of the output expected by the user. In such cases, the generated design must be fine-tuned through other software or by hand drawing. For example, if a production designer gives a prompt to a generative AI service to generate a particular costume, the costume may not include the design the production designer expected. In such a case, the generated image must be fine-tuned using other methods until the desired output is reached. However, in the traditional production design process, a skilled production designer can perform related tasks quickly and efficiently, saving time. The research problem for this study is: How



effective and productive are traditional production design approaches that involve drawing/illustrating or hand-drawn sketches in comparison to the use of generative AI in audio-visual production?

METHODOLOGY

This research utilized a qualitative research method with an experimental design as the primary data source, supplemented by secondary sources such as research papers and internet sources. The study explored the potential and limitations of generative AI tools for production design in audio-visual productions using this experimental approach. The sample consisted of 15 students from the Drama, Cinema, and Television Studies department at Kelaniya University. The students were allowed to use two generative AI services, 'Leonardo AI' and 'Stable Diffusion,' at their discretion. The researcher provided an idea for an object, and based on that idea, the students generated images using these two AI tools. The goal was to explore the possibilities, limitations, and challenges of using generative AI services for production design.

The purpose of this experimental design was to enable the researcher to directly observe and evaluate the production design elements—such as sets, costumes, and props—that can be generated through generative AI techniques. The study aimed to assess the efficiency and productivity of generative AI in this context by comparing the AI-generated creations with traditional methods, like hand-drawn sketches or software such as Photoshop. Alongside primary data gathered from the experimental design, secondary sources—research publications and relevant websites—were studied to provide further context and insights into the broader field of generative AI in production design.

This research seeks to provide an in-depth analysis of the possibilities of generative AI for production design in audio-visual creations by integrating experimental design with knowledge from secondary sources. Additionally, it aims to highlight the practical challenges, limitations, and considerations involved in applying generative AI in this context. Ultimately, the findings will enhance our understanding of how generative AI can improve the creative process in audio-visual production design.

RESULTS AND DISCUSSION

A discussion based on the primary and secondary data collected for this research reveals several key themes from the experimental design. The usability and effectiveness of generative AI technology for production design were observed by comparing the images generated during the experiment and the process of creating them. One of the main findings was that, compared to traditional production design methods, generative AI technology significantly saves time and effort. However, a key challenge is that achieving the desired output from generative AI requires careful attention to prompting and a solid understanding of how to craft effective prompts.

Additionally, creations generated by free AI services may not fully meet the user's expectations. While the images generated by these services often closely resemble the given prompts, they may still require fine-tuning and editing to achieve the desired results. This limitation arises because generative AI produces new creations based on the thousands of works it has been trained on. As a result, production designers do not always have complete control over the output.

Although the AI-generated images do not always meet 100% of user expectations, they often closely match the prompt provided. A more detailed and carefully crafted prompt typically yields better results. In the experimental design, although the researcher provided the same concept to all 15 participants, each participant generated different images based on their own interpretation of the prompt. Even when a common prompt was given to all participants, each resulting image was unique, demonstrating the variability in AI-generated outputs.



It was also discovered that when using generative AI for production design, detailed prompts are crucial for generating relevant outputs. Another key finding was that applying quantitative values in prompts is still challenging for AI to interpret accurately. Furthermore, when generating an image with specific words, even if the relevant image is produced, the expected words are not always rendered as anticipated. Therefore, although generative technology can be used for production design, it is clear that it cannot fully replicate human creativity.

ACKNOWLEDGEMENT

I am profoundly grateful to the Open University of Sri Lanka who provided a valuable opportunity to present my research abstract at the International Research Conference of The Open University of Sri Lanka 2024 (IRC-OUSL 2024). I would like to acknowledge my lecturers at University of Kelaniya and my voluntary participants who helped in gathering data. I also give credit to the original authors of the research articles, web pages, magazines that I have used for data compilation.

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