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THE POWER OF ARTIFICIAL INTELLIGENCE IN PACKAGING DESIGN

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Introduction

Artificial intelligence (AI) plays a significant role in various industries in this era. Similar to the packaging industry, packaging companies readily utilize the power and potency of artificial intelligence in creating, designing, producing, or experiencing packaging designs. AI packaging is designed to generate the most appealing and enticing packaging designs for consumers, which directly increase business sales and profits.
AI in packaging is a disruption, braced to transform the processes of end-use industries beyond recognition.
Over the last decade, sustainability emerged as a paramount focus in the packaging industry, attracting numerous market players to make ground-level changes in their strategies. However, efficiency remained a de facto need for the packaging industry to realize its sustainability goal. AI now focuses on personalization intelligent packaging solutions, supply chain optimization, and other solutions predictive analytics. The global artificial intelligence in packaging market size is estimated to grow from USD 2,021.3 million in 2022 at 10.28% CAGR (2023-2032) to reach USD 5,375.28 million by 2032, shown in Figure 1.

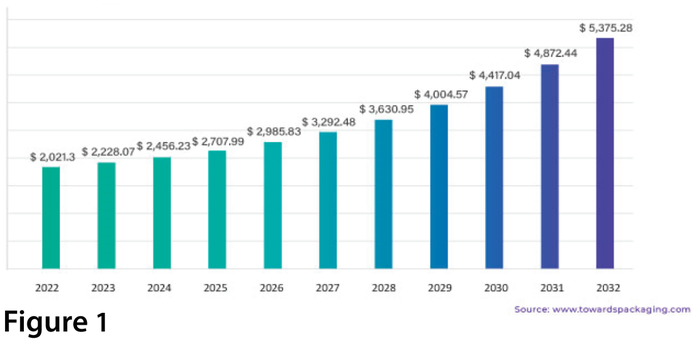

Figure 1
The potential growth of Artificial Intelligence in Packaging industry

Problem Description

- The problem of research is the lack of AI applications in packaging design.
- AI applications are not widely utilized in packaging design.

Methods

In this part of the study, the tools and materials used to implement the research idea are summarized according to the research observations of the researcher about the focused discussion with experts and interested in the field of printing and packaging at paper me & print2pack2024, located in Egypt's Center for International Exhibitions in New Cairo, Egypt, after a set of questions about the role of artificial intelligence in packaging design. A questionnaire was made by 75 people interested in the field and most in food packaging.
Overview of expert and packaging industry responses on AI in packaging is the following:
- Most of those interested in the packaging industry are looking forward to emerging technologies.
From AI tools used in packaging design
- Photo re-coloring tool (a tool trained in a huge number of color images that enables it to understand the image composition)
- Photo background removal tool (is a tool used to remove photo background by image analysis)

Results

AI can help in compliance with packaging regulations by analyzing design specifications against legal requirements, minimizing the risk of costly recalls and penalties. These results demonstrate how analytical methods powered by AI not only enhance the packaging design process but also contribute to more effective, sustainable, and consumer-oriented packaging solutions. Thus, some design proposals have been made using AI tools to improve the graphic and construction design of food packaging by selecting certain requirements such as colors, design style, packaging dimensions and packaging size.In figure 2, 3 the cocoa packaging, baby pasta and milk different design style were displayed such as choosing a different design type for the cocoa packaging to become more attractive in the shelves and choosing a suitable style with children for the pack of pasta by Using clear window to suitable for graphic design of the baby pasta package .

Figure 2
The proposal of graphic and structural design for cocoa packaging by using AI tools.

Figure 3
The proposal of graphic and structural design for baby pasta packaging by using AI tools.

Following the great responses to the role of artificial intelligence tools in improving packaging design the researcher presented the project idea to fourth-year students 2024 at Higher Institute of Applied Arts, Department of Printing, Publishing and Packaging, Titled The Added Value of design in the field of printing and packaging using artificial intelligence and its connection to the Drupa 2024 exhibition.

Discussion / Conclusion

AI is perfect for A/B testing packaging designs at the concept stage. This will quicken design variations such as color, placement and type alternatives when creating initial concepts. Using AI in packaging design is a challenge that requires high skills and expertise, and works best with the involvement that comes from a close partnership throughout the design journey. This approach has certainly paid off in helping to generate positive feedback from users as well as experts interested in the packaging industry.
The role of AI in packaging design for 2024 is not just a technological advancement; it's a symphony of innovation. The collaboration between human creativity and AI-driven insights produces a composition that goes beyond the canvas, creating an unforgettable experience for consumers.
Combining AI with professional human expertise is the secret to surpassing your competitors this year. Leveraging this technology to streamline your operations and reduce overall costs will give you a better edge over your competitors. AI recommended to help companies reduce their environmental impact. This will make a change by optimizing packaging to reduce waste as well as assisting in find a more sustainable packaging solution. AI is not everything. You will need a creative mind and experience to know what creative or art direction you will be taking, AI will not take all of human jobs.
Needless to say, I would most definitely recommend AI tools for any designer looking to improve and accelerate their workflow.

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