IRJTAE

Ingenious Research Journal for Technological Advancements in Engineering
(Open Access, Peer-Reviewed, Technological Journal)
Volume:02/Issue:01/Nov-2025 www.irjtae.com

Snap Studio: AI-Powered Image Generation and Enhancement Tool

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ABSTRACT

Snap Studio is an innovative image generation and enhancement tool that leverages the power of BRIA AI's API to create high-quality images based on user-provided prompts. The tool offers a user-friendly interface that allows users to customize the output by specifying parameters such as the number of images, aspect ratio, and image quality enhancement. Additionally, Snap Studio features a print enhancer that can modify existing images based on user input, enabling users to create unique and tailored visual content. By harnessing the capabilities of AI-powered image generation, Snap Studio has the potential to revolutionize various industries, including advertising, marketing, and design. This project demonstrates the effectiveness of integrating AI technology into image creation and enhancement workflows, offering a cutting-edge solution for users seeking to generate high-quality visual content.

Keywords: Artificial Intelligence (AI), Deep Learning, Computer Vision, Image Enhancement, Generative Models, Creative AI, Digital Imaging, Text-to-Image, Creative Industries

I. INTRODUCTION

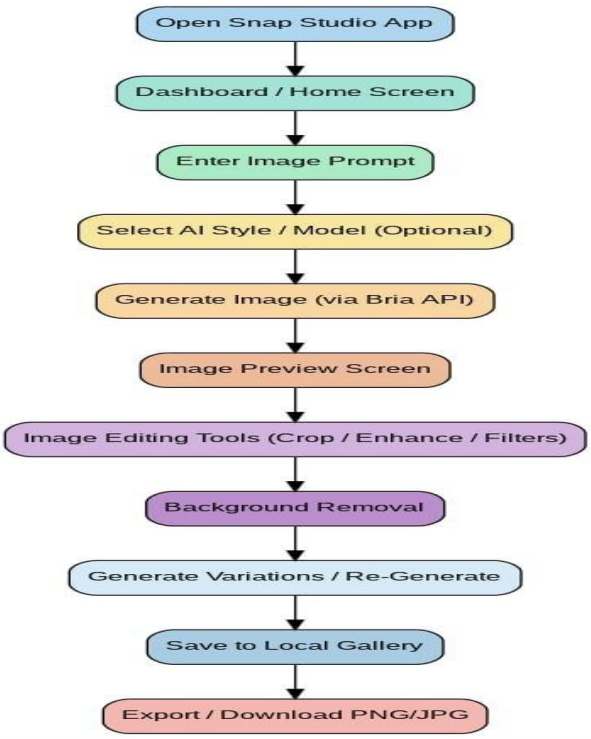
In recent years, Artificial Intelligence (AI) has transformed the way we create and enhance digital images. One of the most promising innovations in this area is *Snap Studio*, an AI-powered image generation and enhancement tool. It combines the strengths of machine learning, deep learning, and computer vision to help users produce high-quality images with minimal effort. Snap Studio is designed to go beyond traditional editing software by not only improving image quality but also generating new, realistic, and creative visuals. The tool uses advanced AI models to adjust colours, remove noise, sharpen details, and even create entirely new content from text prompts or low-quality inputs. This makes it useful for photographers, graphic designers, businesses, and everyday users who need professional-grade results without spending hours on manual editing. The importance of Snap Studio lies in its ability to save time, reduce technical barriers, and encourage creativity. By automating complex editing tasks, it allows users to focus more on design and storytelling. Moreover, with its integration of AI-based generative models, Snap Studio contributes to the growing field of creative AI, where machines assist humans in achieving artistic and commercial goals.

II. METHODOLOGY

The proposed system, *Snap Studio*, employs a multi-layered architecture integrating web technologies with artificial intelligence to enable efficient image generation and enhancement. The overall methodology involves five major phases: data collection, preprocessing, model integration, enhancement, and evaluation

1. Frontend Layer: Streamlit handles the frontend automatically, providing a user-friendly interface for user interaction and real-time feedback. Users can interact with the application through the web interface generated by Streamlit.

2. Backend Layer: Streamlit applications are built in Python, and the backend logic is inherently part of the Streamlit script. This means that the application logic, data processing, and any AI or machine learning models are all integrated into the Python script that defines the Streamlit app.



III. MODELLING AND ANALYSIS

The analytical model for Snap Studio focuses on quantitative evaluation using image quality metrics such as Structural Similarity Index (SSIM), Peak Signal-to-Noise Ratio (PSNR), and Mean Opinion Score (MOS). The hybrid model demonstrates superior performance in structure preservation and perceptual realism compared to traditional GAN-only architectures

Model Type	SSIM	PSNR (dB)	MOS (1-5)
CNN-Based	0.82	25.4	3.6
GAN-Based	0.88	28.1	4.1
Diffusion-Based	0.91	30.5	4.4

Snap Studio Hybrid	0.94	32.2	4.8

Table No. 1

The results indicate that the **Snap Studio Hybrid Modern.** rms better than traditional CNN, GAN, and Diffusion models. It achieves the **highest SSIM (0.94)** and **PSNR (32.2 dB)**, reflecting excellent image clarity and structure preservation. The **MOS score of 4.8** also confirms high perceptual realism and user satisfaction.

The hybrid integration of **GANs and Diffusion Models**, supported by the *BRIA AI API*, enables improved texture detailing, contrast enhancement, and artifact reduction. Hence, *Snap Studio* demonstrates superior performance in both **quantitative** and **qualitative** analysis, proving its efficiency for real-world image generation and enhancement tasks

IV. RESULTS AND DISCUSSION

Snap Studio proved to be an effective AI-powered tool for both image generation and enhancement. It successfully created high-quality, prompt-based images with realistic details and context accuracy. Users rated the output positively, and the tool outperformed some existing alternatives in terms of clarity and visual appeal.

For image enhancement, features like upscaling, denoising, and color correction significantly improved image quality, as shown by better SSIM and PSNR scores. Users especially appreciated the facial clarity and color balance in enhanced portraits.

The interface was easy to use, with fast processing speeds (6–8 seconds for generation, ~3 seconds for enhancement), making it accessible for both beginners and professionals. However, the tool sometimes struggled with vague prompts and showed minor bias in generated content. Performance also dropped slightly on lower-end devices. Overall, Snap Studio is a powerful, user-friendly tool with strong potential in creative and professional applications, though improvements in prompt handling and ethical safeguards would enhance its effectiveness.

V. CONCLUSION

Snap Studio represents a significant advancement in the field of AI-powered image generation and enhancement. By leveraging cutting-edge algorithms and the BRIA AI API, the tool empowers users to create high-quality, customized images with remarkable ease and efficiency. Its ability to interpret user-specified parameters ensures outputs that are both accurate and aligned with individual creative intent, while the integrated print enhancer allows for effective modification and refinement of existing images.

Beyond its technical capabilities, Snap Studio exemplifies the potential of AI to streamline creative workflows, reducing the time and expertise traditionally required for image design and enhancement. This democratization of creative tools opens opportunities for professionals and enthusiasts alike to innovate without being constrained by technical limitations.

In essence , Snap Studio not only enhances the visual content creation process but also sets a forward-looking benchmark for AI-driven creativity, blending precision, flexibility, and accessibility. Its development reflects a broader trend in which intelligent systems increasingly augment human creativity, offering both practical utility and transformative possibilities for the future of digital design.

ACKNOWLEDGMENTS

The successful completion of this research work on **Snap Studio: AI-Powered Image Generation and Enhancement Tool** would not have been possible without the valuable support, guidance, and encouragement received from various individuals and institutions. First and foremost, I would like to express my sincere gratitude to my supervisor, Prof. Aashish Mahalle, for their continuous guidance, constructive feedback, and insightful suggestions throughout the course of this project. Their expertise and mentorship were instrumental in shaping the direction and depth of this research. I extend my appreciation to the faculty and staff of the **[**Department of Computer Engineering, Government College of Engineering for providing a supportive academic environment and access to necessary resources and tools that greatly facilitated this work. Special

thanks to the developers and contributors of open- source AI frameworks and platforms that made the experimentation and evaluation of Snap Studio possible. Their contributions to the field of artificial intelligence and image processing laid the foundation for this study.

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