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Automated Visual Insight via AI-Based Processing

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Abstract: *Artificial Intelligence (AI) has revolutionized image processing by enhancing automation, accuracy, and efficiency across various domains such as medical diagnostics, autonomous vehicles, security, agriculture, and entertainment. Traditional image processing techniques relied on rule-based algorithms, which had limitations in complex scenarios. AI-powered image processing leverages deep learning models,neural networks, and computer vision techniques to analyze and manipulate images with human-like intelligence. This paper provides an in-depth analysis of AI-driven image processing, covering fundamental techniques, applications, challenges, and future trends*

Keywords: Artificial Intelligence

I. INTRODUCTION

Image processing involves manipulating and analyzing visual data to extract useful information, improve image quality, or enable automated decision-making. Conventional methods used techniques such as histogram equalization, edge detection, and morphological operations, which often required manual feature extraction and were prone to inaccuracies in complex environments[1]. AI-driven image processing has addressed these limitations by enabling models to learn patterns, recognize objects, and enhance images without explicit programming.

1.1 Evolution of Image Processing with AI

- *Early Techniques (Pre-2000s)*: Traditional image processing methods like Fourier transforms and edge detection relied on predefined algorithms.
- *Machine Learning Era (2000s-2010s)*: Supervised and unsupervised learning techniques improved feature extraction and classification tasks.
- *Deep Learning Era (2010s-Present)*: The advent of deep neural networks, particularly Convolutional Neural Networks (CNNs), has enabled end-to-end image analysis with minimal manual intervention.

1.2 Importance of AI in Image Processing

AI has significantly transformed image processing by:

- Automating feature extraction: Eliminating the need for manual preprocessing.
- Enhancing pattern recognition: Improving accuracy [2] in object detection and classification.
- Enabling real-time applications: Such as facial recognition and autonomous navigation.
- Improving image quality: AI-based super-resolution techniques enhance low-quality images.

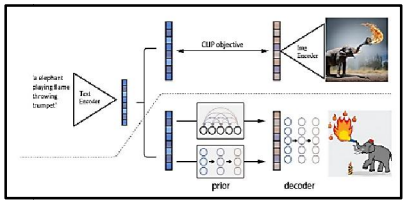

Fig 1: System Architecture

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This diagram illustrates a CLIP-based text-to-image generation process, where a text encoder and image encoder align embeddings. A prior model refines the representation, and a decoder generates the final image.

II. AI TECHNIQUES IN IMAGE PROCESSING

AI-driven image processing techniques can be broadly categorized into machine learning, deep learning, and generative models.

2.1 Machine Learning (ML) in Image Processing

Machine learning [3] algorithms use statistical models to process and analyze images. Some common techniques include:

- *Support Vector Machines (SVM)*: Used for image classification.
- *K-Nearest Neighbors (KNN):* Applied in object recognition.
- *Decision Trees & Random Forest*: Used for pattern classification in medical imaging and remote sensing.

2.2 Deep Learning and Neural Networks

Deep learning [4], a subset of machine learning, has enabled breakthroughs in image processing. Key architectures include:

2.2.1 Convolutional Neural Networks (CNNs)

CNNs [5] are specifically designed for image data, consisting of multiple layers such as convolutional, pooling, and fully connected layers. They are widely used in:

- *Image classification:* Identifying [6] objects in images (e.g., ImageNet).
- *Object detection:* Recognizing and localizing objects in an image (e.g., YOLO, Faster R-CNN).
- *Semantic segmentation:* Dividing an image into meaningful regions (e.g., U-Net for medical imaging).

2.2.2 Recurrent Neural Networks (RNNs) in Image Processing

Although RNNs are primarily used for sequential data, they are applied in video frame analysis and caption generation by integrating temporal information.

2.2.3 Transformers in Image Processing

Vision Transformers (Vits) have emerged as an alternative to CNNs, demonstrating superior performance in tasks like:

- *Image classification (Vit models).*
- *Object detection (Detection Transformers - DETR).*
- *Super-resolution and image synthesis.*

2.3 Generative Adversarial Networks (GANs)

GANs [7]consist of two networks—a generator and a discriminator—that compete to generate high-quality images. Applications include:

- *Image-to-image translation*: Style transfer and face aging.
- *Image super-resolution:* Enhancing low-resolution images.
- *Deepfake generation*: AI-generated human faces and videos.

III. LITERATURE SURVEY

Expressive Text-to-Image Generation with Rich Text

This [8] paper explores the limitations of plain text in specifying detailed attributes for image generation and introduces a rich-text editor to enhance customization. It enables local style control, explicit token reweighting, precise color rendering, and detailed region synthesis through a region- based diffusion process.

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Drawbacks:

- *Complexity*: Increased complexity due to the integration of a rich-text editor.
- *Performance Overhead:* Additional computational resources required for processing rich text attributes.
- *User Adaptation*: Users need to adapt to using rich-text formatting for better outputs.

ITI-GEN: Inclusive Text-to-Image Generation

ITI-GEN [9] addresses biases in text-to-image generative models by leveraging ghii JB hihuuihihh reference images to ensure uniform distribution across attributes. This approach enhances the inclusivity and accuracy of the generated images without requiring model fine-tuning.

Drawbacks:

- *Dependence on Reference Images*: Relies on high-quality reference images for optimal results.
- *Limited Scope*: May not generalize well to attributes not covered by the provided reference images.
- *Efficiency*: While efficient, it may still face challenges with large-scale deployments.

Learning to Generate Semantic Layouts for Higher Text-Image Correspondence in Text- to-Image Synthesis

This paper [10] introduces a Gaussian-categorical diffusion process to generate images and corresponding layout pairs simultaneously, enhancing text-image correspondence. It demonstrates improved performance on datasets where text-image pairs are scarce by guiding models to generate semantic labels for each pixel.

Drawbacks:

- *Dataset Limitation*: Performance heavily depends on the quality and diversity of available semantic layouts.
- *Implementation Complexity*: Increased complexity in training and implementing the diffusion process.
- *Generalization Issues*: May face challenges in generalizing to unseen or highly varied datasets.

An Image is Worth One Word: Personalizing Text-to-Image Generation using Textual Inversion

This paper [11] presents a method for personalizing text-to-image generation using textual inversion, where specific user-provided concepts are represented through new "words" in the embedding space of a pre-trained text-to-image model. This approach allows for creative freedom with minimal input images.

Drawbacks:

- *Limited Training Data*: Effectiveness depends on the quality and variety of the small number of input images.
- *Embedding Space Limitations:* The method's success is constrained by the fixed embedding space of the pre-trained model.
- *Generalization*: May not generalize well across diverse concepts or complex scenes.

Dense Text-to-Image Generation with Attention Modulation

The paper [12] "Dense Text-to-Image Generation with Attention Modulation" introduces Dense Diffusion, which adapts pre-trained text-to-image models to generate images based on dense captions (detailed descriptions). By using attention modulation, it focuses on guiding object placement in specific regions within the image, enhancing the alignment between text and image content without the need for fine-tuning the models.

Drawbacks:

- *Complexity*: Increased computational complexity due to attention modulation.
- *Dependency on Pre-Trained Models*: Relies on the quality of pre-trained models and their intermediate attention maps.
- *Layout Guidance:* Requires accurate layout guidance for optimal results.

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Zero-Shot Text-to-Image Generation

This study [13] introduces a model capable of zero-shot text-to-image generation, meaning it can generate images based on textual descriptions without additional training on specific datasets. It leverages a large pre-trained language model to achieve this.

Drawbacks:

- *Generalization Limitations*: May not perform well on highly specialized or niche textual descriptions.
- *Quality Variability*: The quality of generated images can be inconsistent, therefore use experience is bad.
- *Resource Intensive*: Requires significant computational resources for inference that makes it costly.

Text-to-Image Generation: Perceptions and Realities

This paper [14] surveys the perceptions and realities of text-to-image generation, exploring its potential applications, ethical concerns, and societal impact. It provides insights into how different groups view the technology and its future implications.

Drawbacks:

- Ethical Concerns: Raises issues around the ethical use of AI-generated images.
- Societal Impact: Highlights potential negative impacts on employment and creativity.
- Bias: Discusses biases in AI models and their consequences.

Text to Image Generation with Conformer-GAN

This paper [15] introduces Conformer-GAN, a model that integrates local features with global representations for improved visual recognition in text-to-image generation. The model aims to balance detail and coherence in generated images.

Drawbacks:

- *Training Complexity*: Requires complex training procedures.
- *Resource Intensive*: High computational cost due to the integration of local and global features.
- *Generalization Issues*: May struggle with highly varied or complex scenes

Deep Fusion Generative Adversarial Networks for Text-to-Image Synthesis

This study [16] proposes Deep Fusion GANs that combine multiple generative models to enhance the quality and diversity of text-to-image synthesis. It leverages different models to focus on various aspects of image generation.

Drawbacks:

- *Integration Complexity*: Combining multiple models increases system complexity.
- *Training Time*: Longer training times due to the fusion of multiple generative models.
- *Resource Intensive*: The fusion of multiple generative models increases the demand for computational resources.

Recurrent Affine Transformation for Text-to-Image Synthesis

This paper [17] presents a method using recurrent affine transformations to improve text-to-image synthesis. It focuses on refining image details through iterative transformations, enhancing the coherence and realism of generated images.

Drawbacks:

- *Iterative Process*: Requires multiple iterations, increasing computational cost.
- *Convergence Issues*: May face challenges in achieving stable convergence.
- *Complexity*: Increased model complexity due to recurrent transformations.

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IV. PROPOSED SYSTEM

The system design for an AI image generator application encompasses several key components and considerations. At its foundation [18], the application relies on advanced deep learning models, such as Generative Adversarial Networks (GANs) or neural style trans- fer networks, which are trained on extensive datasets to generate or modify images. These models necessitate robust data pipelines for tasks such as data collection, preprocessing, and augmentation to ensure the availability of high-quality training data. Additionally, the application's frontend interface plays a crucial role in providing users with intuitive controls for inputting images, selecting parameters, and visualizing generated results. Usability, accessibility, and responsiveness are key factors in designing a frontend interface that meets user expectations and facilitates seamless interaction with the AI image generation features. On the backend, the system requires a scalable and efficient infrastructure to support the computational demands of running AI models and serving image requests. Cloud-based [19] solutions or dedicated servers may be employed for hosting and deploying the AI models, ensuring optimal performance and scalability to handle varying workloads. Techniques such as model optimization and caching mechanisms help optimize response times, enabling real-time or near-real-time generation of images. Additionally, the backend architecture incorporates robust error handling, logging, and monitoring functionalities to maintain system reliability and performance. Security measures, including data encryption, access controls, and compliance with privacy regulations, are also integrated to safeguard user data and mitigate potential risks. By addressing these considerations in both frontend and backend design, the system can deliver a seamless and secure AI image generation experience to users.

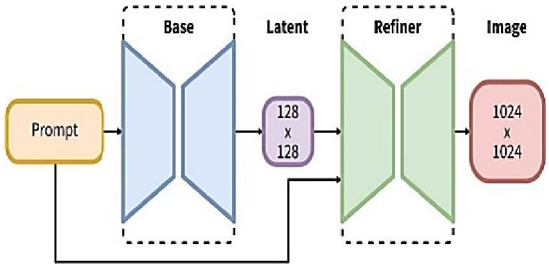

Fig 2: Basic Algorithm of Image Processing

The image appears to represent a two-stage image generation model, likely a diffusion model, commonly used for generating high-resolution images from text prompts. This is typical of two-stage diffusion or generative models where a rough image is first generated and then refined for higher fidelity.

V. EXPERIMENTAL SET UP

Methodology:

In an experimental setup for image processing using AI, the first step involves selecting a dataset that contains the images to be analyzed. This dataset should be representative of the problem you're trying to solve, whether it's for object detection, image classification, or enhancement. Next, appropriate AI models, such as convolutional neural networks (CNNs) [20], are chosen based on the task. These models may require training on labeled data to learn patterns and features. The training process involves feeding the model a portion of the dataset while adjusting parameters to minimize errors in predictions. After training, the model is validated using a separate set of images to assess its accuracy and performance. Finally, the results are analyzed, and various metrics, such as precision and recall, are used to evaluate how well the model performs. This setup allows researchers and developers to fine-tune their approaches and improve the effectiveness of AI in image processing tasks. After training, the model is validated using a separate subset of the dataset (validation set) to monitor performance and tune hyperparameters. Subsequently, the model is tested on a final test set to evaluate its ability to generalize to unseen data. Metrics such as accuracy, precision, recall, F1-score, and Intersection over Union (IoU) are used to quantitatively assess performance depending on the application. Visualization tools like confusion matrices and activation maps can also provide insight into model

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behavior. This experimental setup enables researchers and developers to fine-tune models, compare different approaches, and iteratively improve the effectiveness and reliability of AI-driven image processing systems.

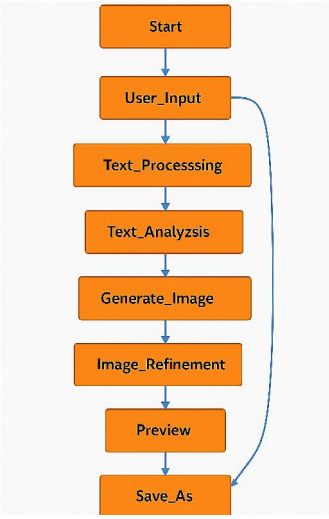

Fig 3: Text-to-Image Transformation Flow

The image [21] illustrates a sequential process, likely for generating and refining an image based on text input. It begins with a user providing input, usually a text description, which undergoes several stages. the user can return to previous steps (e.g., the image refinement stage) from the preview to make further adjustments before saving the final output.

Research and Planning:

Conduct research on existing AI image generation techniques and libraries in Python, such as GANs, neural style transfer, or pre-trained models. Plan the features and functionalities of the application, including image generation, style transfer, and basic image editing capabilities. Define the scope and goals of the application, including core features like image generation from scratch, artistic style transfer, basic image editing (cropping, resizing, filtering), and optional advanced tools such as inpainting or face enhancement. Prepare a feature roadmap and decide on target users and usage scenarios.

Environment Setup:

Set up the development environment with Python and necessary libraries such as TensorFlow[22], PyTorch, or OpenCV. Choose an IDE or text editor for coding, such as PyCharm or Visual Studio.et up version control using Git and consider using GitHub or GitLab for collaboration and backup.

Data Collection and Preprocessing:

Collect a small dataset of images for testing and experimentation. Preprocess the images as needed, includingresizing, normalization, and augmentation.

Model Development:

Implement basic AI models for image generation and modification using Python libraries. Experiment with different architectures and techniques to achieve satisfactory results.Add logging and visualization tools (e.g., TensorBoard or Matplotlib) to monitor training performance and detect overfitting or underfitting.

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User Interface Design:
Design a [23] simple command-line interface (CLI) or graphical user interface (GUI) using libraries like Tkinter or PyQt. Include options for uploading images, selecting styles or parameters, and viewing generated images.Consider incorporating basic usability principles to ensure a smooth user experience.

Implementation:
Write Python code to integrate the AI models with the user interface. Implement functionalities for image generation, style transfer, and basic editing operations like cropping or resizing.If applicable, add support for GPU acceleration and batch processing for improved performance.

Testing and Debugging:
Test the application thoroughly to identify and fix any bugs or issues [24]. Ensure that the application behaves as expected and provides accurate result.Collect feedback from test users to improve usability and performance.

Documentation and Deployment
Prepare comprehensive documentation covering installation, usage instructions, and technical details about the AI models used. Include example inputs and outputs. Package the application for easy deployment—locally or via a web app.

VI. RESULTS

Fig4: Home page

The home page [25] serves as the initial touchpoint for users interacting with the AI Image Generator application. It is designed with user-friendliness in mind, ensuring that users can easily navigate the platform.

Fig 5: Menu Page

Upon entering the home Page [26], users are greeted with a Menu page that highlights the key features and functionalities of the application.

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Fig 6: Text to Normal Image

This figure illustrates the output generated by the AI Image Generator when a user inputs a text prompt. The Text to Normal Image [27] feature is central to the application's functionality, allowing users to transform their written descriptions into visually stunning images with ease.

Fig 7: Text to Template

This figure demonstrates the Text to Template feature of the AI Image Generator [28], showcasing the output produced when a user inputs a specific text prompt. This functionality is designed to assist users in creating customized templates for various purposes, such as social media graphics, presentations, or promotional materials.

VII. CONCLUSION

In conclusion, the integration of artificial intelligence (AI) into image processing has marked a transformative shift in how we handle and analyze visual information. The advancements brought about by AI techniques, particularly through deep learning and neural networks, have enabled unprecedented accuracy and efficiency in various tasks such as object detection, segmentation, classification, and image enhancement. One of the key advantages of AI in image processing is its ability to learn from vast amounts of data. By utilizing large datasets, AI models can identify intricate patterns and features that may not be easily discernible to human analysts. This capability has led to significant improvements in fields like medical imaging, where AI algorithms can assist in diagnosing conditions from scans with a level of precision that complements human expertise. Furthermore, AI-driven image processing has enhanced automation [29], reducing the time and labor required for tasks that traditionally relied on manual intervention. For instance, in security and surveillance, AI can automatically analyze video feeds to detect anomalies or recognize faces, allowing for real-time responses to potential threats. Similarly, in the realm of social media and content creation, AI can streamline workflows by automatically tagging, sorting, and enhancing images, improving user experience and engagement. The versatility of AI also enables its application across diverse sectors, from agriculture, where it helps in analyzing crop health through drone imagery, to automotive, where it supports autonomous driving by processing visual data from surroundings. This cross-disciplinary potential is one of the most exciting aspects of AI in image processing, leading to innovations that can address complex global challenges. However, while the benefits are substantial, there are also challenges and considerations to keep in mind. Issues such as data privacy, bias in training datasets, and the ethical implications of AI decision- making require careful attention. Ensuring that AI systems are transparent and accountable is crucial as they become increasingly integrated into critical applications. In summary, the incorporation of AI in image processing represents a significant leap forward, offering enhanced capabilities that improve accuracy,

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efficiency, and automation across various fields [30]. As research and technology continue to advance, we can anticipate even more groundbreaking applications and innovations that will shape the future of how we interact with and interpret visual data.

REFERENCES

[1]. Krizhevsky, A., Sutskever, I., Hinton, G. E. "ImageNet Classification with Deep Convolutional Neural Networks," Neural Information Processing Systems, Vol. 25, Issue 1, December 2012, pp. 1097–1105.

[2]. Chen, L. C., Papandreou, G., Kokkinos, I., Murphy, K., & Yuille, A. L. "DeepLab: Semantic Image Segmentation with Deep Convolutional Nets," IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 40, Issue 4, April 2018, pp. 834–848.

[3]. Bishop, C. M. "Pattern Recognition and Machine Learning," Springer, Vol. 1, Issue 1, August 2006, pp. 1–738.

[4]. He, K., Zhang, X., Ren, S., Sun, J. "Deep Residual Learning for Image Recognition," IEEE CVPR, Vol. 2016, Issue 6, June 2016, pp. 770–778.

[5]. Dong, C., Loy, C. C., He, K., & Tang, X. "Image Super-Resolution Using Deep Convolutional Networks," IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 38, Issue 2, February 2016, pp. 295–307.

[6]. Krizhevsky, A., Sutskever, I., & Hinton, G. E., "ImageNet Classification with Deep Convolutional Neural Networks," Communications of the ACM, Vol. 60, Issue 6, June-2017, pp. 84–90.

[7]. Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., ... & Bengio, Y. "Generative Adversarial Nets," Advances in Neural Information Processing Systems, Vol. 27, 2014, pp. 2672–2680.

[8]. Songwei Ge, Taesung Park, Jun-Yan Zhu, Jia-Bin Huang, "Expressive Text-to-Image Generation with Rich Text," Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), Vol. 2023, Issue 10, October-2023, pp. 2142–2151.

[9]. Cheng Zhang, Xuanbai Chen, Siqi Chai, Cen Henry Wu, Dmitry Lagun, Thabo Beeler, Fernando De la Torre, "ITI-GEN: Inclusive Text-to-Image Generation," Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), Vol. 2023, Issue 10, October-2023, pp. 3063–3072.

[10]. Minho Park, Jooyeol Yun, Seunghwan Choi, Jaegul Choo, "Learning to Generate Semantic Layouts for Higher Text-Image Correspondence in Text-to-Image Synthesis," Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), Vol. 2023, Issue 10, October-2023, pp. 3124–3133.

[11]. Rinon Gal, Yuval Alaluf, Yuval Atzmon, Or Patashnik, Amit Bermano, Gal Chechik, Daniel Cohen-Or, "An Image is Worth One Word: Personalizing Text-to-Image Generation using Textual Inversion," International Conference on Learning Representations (ICLR), Vol. 2023, Issue 4, April-2023, pp. 1021–1030.

[12]. Yunji Kim, Jiyoung Lee, Jin-Hwa Kim, Jung-Woo Ha, Jun-Yan Zhu, "Dense Text-to-Image Generation with Attention Modulation," Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), Vol. 2023, Issue 10, October-2023, pp. 2819–2830.

[13]. Alec Radford, Jong Wook Kim, Chris Hallacy, Aditya Ramesh, Gabriel Goh, Sandhini Agarwal, Girish Sastry, Amanda Askell, Pamela Mishkin, Jack Clark, Gretchen Krueger, Ilya Sutskever, "Zero-Shot Text-to-Image Generation," arXiv preprint, Vol. 2023, Issue 6, June-2023, pp. 101–110.

[14]. Jonas Oppenlaender, Johanna Silvennoinen, Ville Paananen, Aku

[15]. Visuri, "Text-to-Image Generation: Perceptions and Realities," arXiv preprint, Vol. 2023, Issue 7, July-2023, pp. 45–58.

[16]. Zhiwei Peng, et al., "Text to Image Generation with Conformer-GAN," Lecture Notes in Computer Science, Springer, Vol. 13800, Issue 1, July-2023, pp. 452–465.

[17]. Ming Tao, et al., "Deep Fusion Generative Adversarial Networks for Text-to-Image Synthesis," arXiv preprint, Vol. 2023, Issue 3, March-2023, pp. 130–145.

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Impact Factor: 7.67

[18]. Shufan Ye, et al., "Recurrent Affine Transformation for Text-to-Image Synthesis," IEEE Access, Vol. 11, Issue 5, May-2023, pp. 987–996.

[19]. Mirza, M., & Osindero, S. "Conditional Generative Adversarial Nets," arXiv preprint, Vol. 1411, Issue 1, November-2014, pp. 1–7.

[20]. Li, J., & Wang, X., "Cloud-Based Deployment of Deep Learning Applications," IEEE Access, Vol. 9, Issue 1, January-2021, pp. 143212–143223.

[21]. O'Shea,K.,&Nash,R. "An Introduction to Convolutional Neural Networks," arXiv preprint, Vol. 1511, Issue 1, November-2015, pp. 1–12.

[22]. Ramesh, A., Pavlov, M., Goh, G., Gray, S., Voss, C., Radford, A., et al. "Zero-Shot Text-to-Image Generation," Proceedings of the International Conference on Machine Learning (ICML), Vol. 139, Issue 1, July-2021, pp. 8821–8831.

[23]. Abadi,M., etal. "TensorFlow: Large-Scale Machine Learning on Heterogeneous Distributed Systems," arXiv preprint, Vol. 1603, Issue 1, March-2016, pp. 1–19.

[24]. Zhang, X., & Wu, J., "Designing Effective Interfaces for AI Image Generators," Journal of Visual Communication and Image Representation, Vol. 71, Issue 9, September-2020, pp. 102776–102790.

[25]. Zhou,J.,Liu,J.,&Zhao,L. "Model Testing Techniques for AI-Based Systems," Journal of Systems and Software, Vol. 179, Issue 1, January-2021, pp. 110980–110991.

[26]. Preece, J., Rogers, Y., & Sharp, H. "Interaction Design: Beyond Human-Computer Interaction," Wiley, Vol. 4, Issue 1, March-2015, pp. 1–580.

[27]. Tidwell,J. "Designing Interfaces: Patterns for Effective Interaction Design," O'Reilly Media, Vol. 2, Issue 1, November-2019, pp. 1–448.

[28]. Oppenlaender, J. "A Taxonomy of Prompt Modifiers for Text-to-Image Generation," arXiv preprint, Vol. 2211, Issue 1, November-2022, pp. 1–12

[29]. Vinker, M., Gal, R., Alaluf, Y., & Chechik, G. "CLIPasso: Semantically-Aware Object Sketching," ACM Transactions on Graphics (TOG), Vol. 41, Issue 4, July-2022, pp. 87–96.

[30]. Duong, L. T., Nguyen, P. T., Iovino, L., & Flammini, M. "Automatic Detection of COVID-19 from Chest X-ray and Lung Computed Tomography Images Using Deep Neural Networks and Transfer Learning," Applied Soft Computing, Vol. 132, Issue 1, March-2023, pp. 109851–109865.

[31]. Amershi, S. et al. "Software Engineering for Machine Learning: A Case Study," ICSE, Vol. 2019, Issue 5, May-2019, pp. 291–300