

Title



# ART TUTOR

Unlock Your Creative Potential with Art Tutor's AI Insights!

DONE BY

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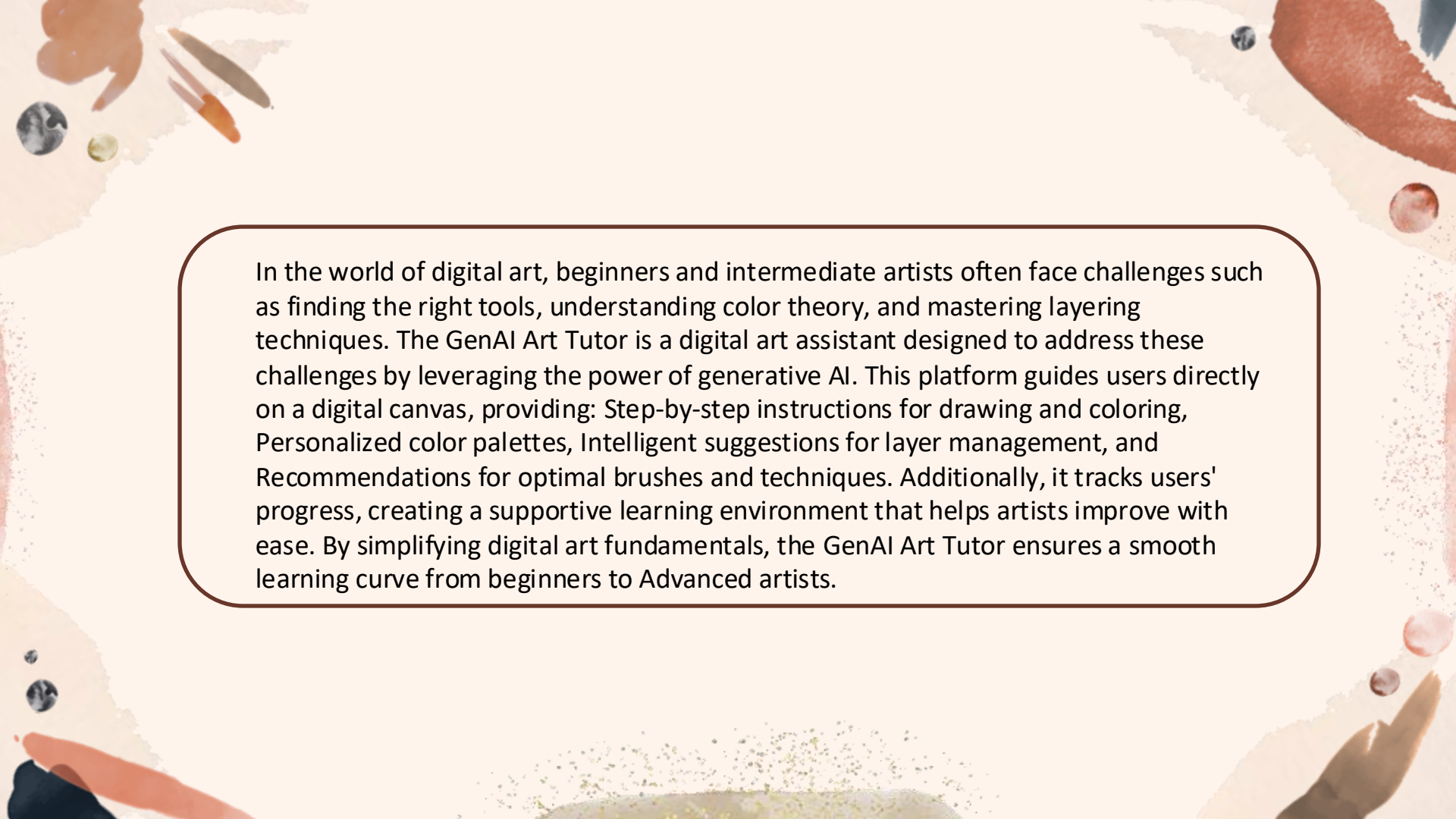
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- Detailed Design
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- Screen shots/videos of the output
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- References



The background is a light cream color with abstract watercolor-style splatters and washes in various colors including red, orange, yellow, grey, and dark blue. There are several small circular dots in different colors scattered across the page.

01

# Introduction



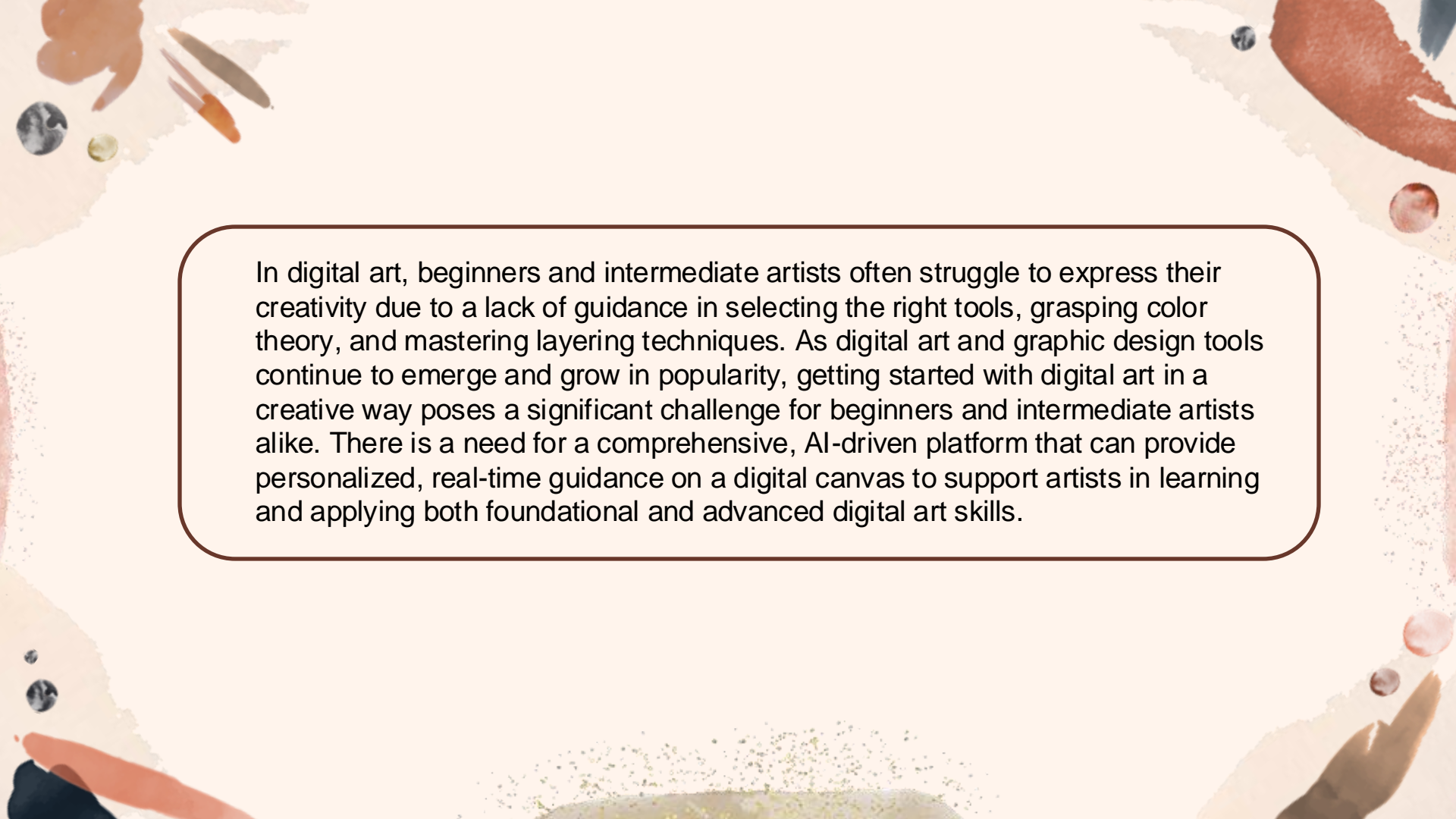
In the world of digital art, beginners and intermediate artists often face challenges such as finding the right tools, understanding color theory, and mastering layering techniques. The GenAI Art Tutor is a digital art assistant designed to address these challenges by leveraging the power of generative AI. This platform guides users directly on a digital canvas, providing: Step-by-step instructions for drawing and coloring, Personalized color palettes, Intelligent suggestions for layer management, and Recommendations for optimal brushes and techniques. Additionally, it tracks users' progress, creating a supportive learning environment that helps artists improve with ease. By simplifying digital art fundamentals, the GenAI Art Tutor ensures a smooth learning curve from beginners to Advanced artists.




The background is a light cream color with abstract watercolor-style splatters and brushstrokes in shades of red, orange, yellow, grey, and dark blue. A large, textured red circle is centered in the upper half, containing the number '02'.

02

ProblemStatement



In digital art, beginners and intermediate artists often struggle to express their creativity due to a lack of guidance in selecting the right tools, grasping color theory, and mastering layering techniques. As digital art and graphic design tools continue to emerge and grow in popularity, getting started with digital art in a creative way poses a significant challenge for beginners and intermediate artists alike. There is a need for a comprehensive, AI-driven platform that can provide personalized, real-time guidance on a digital canvas to support artists in learning and applying both foundational and advanced digital art skills.

The background is a light cream color with abstract watercolor-style splatters and washes in shades of red, orange, yellow, grey, and dark blue. A large, textured red circle is in the upper left, and a large, textured red circle is in the lower right. A small yellow circle is in the upper left, and a small red circle is in the lower left. A dark blue brushstroke is in the upper right, and a dark blue brushstroke is in the lower right. A yellow brushstroke is in the lower left.

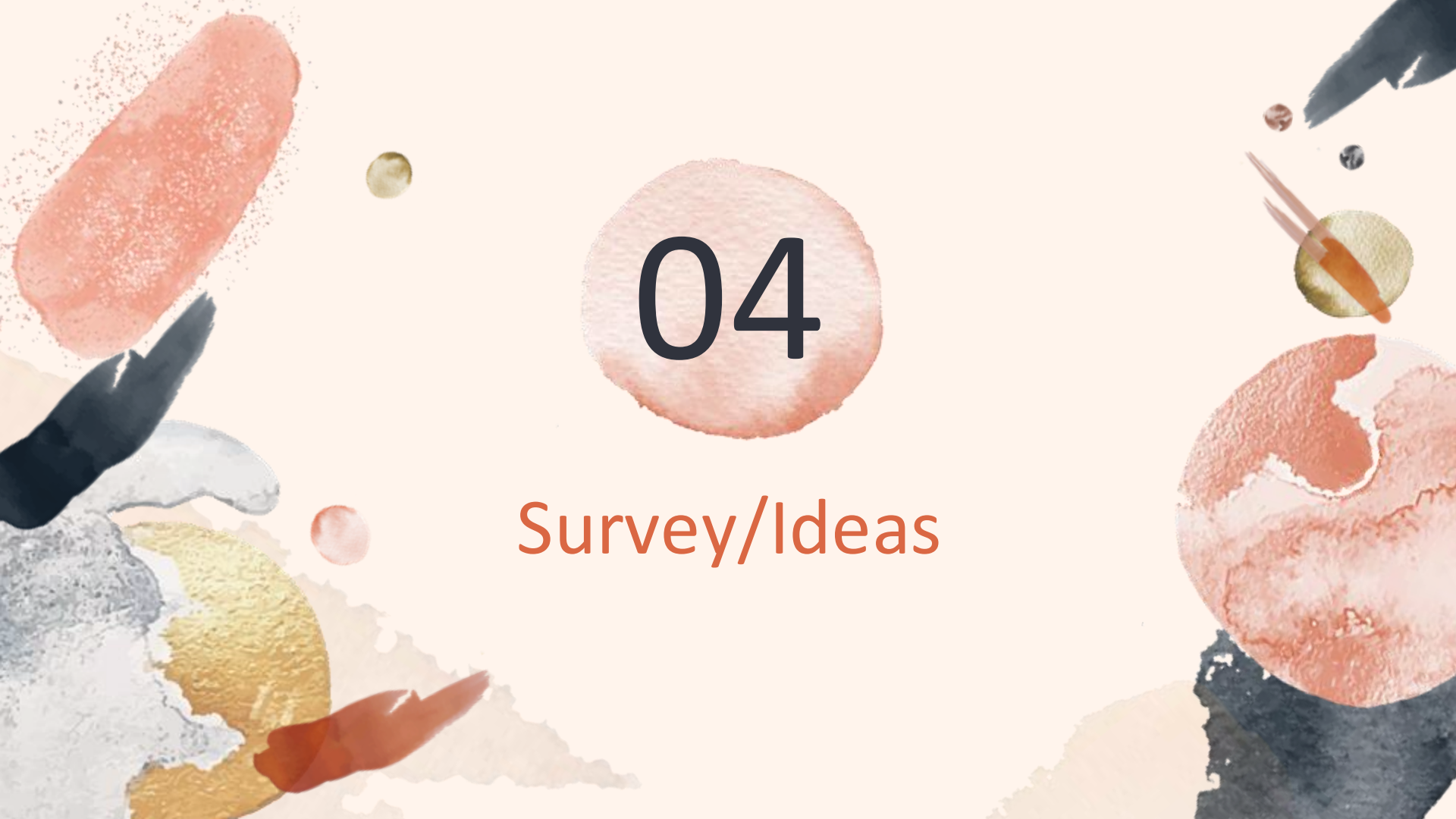
03

Objectives

- Enhance Learning in Digital Art: Provide tutorials and step-by-step guidance to help users focus on drawing, layering, coloring, and style transfer in digital art.
- Simplify Complex Digital Art Techniques: Offer assistance for advanced techniques, such as layer management, shading, and contour outlines, to make digital art creation more accessible for beginners.
- Provide Real-Time, Contextual Assistance: Deliver real-time guidance and automated suggestions based on the user's preferences, ensuring they have the step-by-step instructions needed at each stage of their art creation.
- Enable Precision and Accuracy in Art Creation: Incorporate a precision grid and contour outline features to help users maintain proportion, symmetry, and accuracy, making it easier to achieve desired results.
- Promote Creative Experimentation: Allow users to explore and apply various artistic styles through AI-driven style transfer options, encouraging experimentation with numerous art images and enabling the possibility to draw anything.



- Support Effective Color Selection: Suggest color swatches and provide drawing technique suggestions to help users understand color theory, making their artwork visually appealing.
- Offer Constructive Art Reviews and Feedback: Provide AI-powered art critiques that offer insights on the art and add it to a progress gallery by providing feedback based on the similarity of the original art and the created piece, evaluating art impersonation.
- Create an Inclusive Learning Environment: Cater to users from beginners to intermediates, ensuring the platform is easy to navigate with mouse-hover tips to make users feel comfortable with the digital art environment.
- Art-Powered Chatbot: A chatbot trained on art that behaves as an art companion, providing conversations about art and learning about digital art, while simultaneously performing art on the digital canvas.
- Art Curated Content and Tutorials: A section to help artists get started with various art tutorials and techniques with which they may be unfamiliar, enhancing their skills. Short, precise content helps users learn art without feeling overwhelmed.

The background is a light cream color with abstract watercolor-style splatters and brushstrokes in various colors including red, orange, yellow, grey, and dark blue. A large, textured red circle is in the upper left, a smaller yellow circle is in the upper right, and a large red circle with a white crack is in the lower right. The number '04' is centered in a large, dark blue font.

04

Survey/Ideas

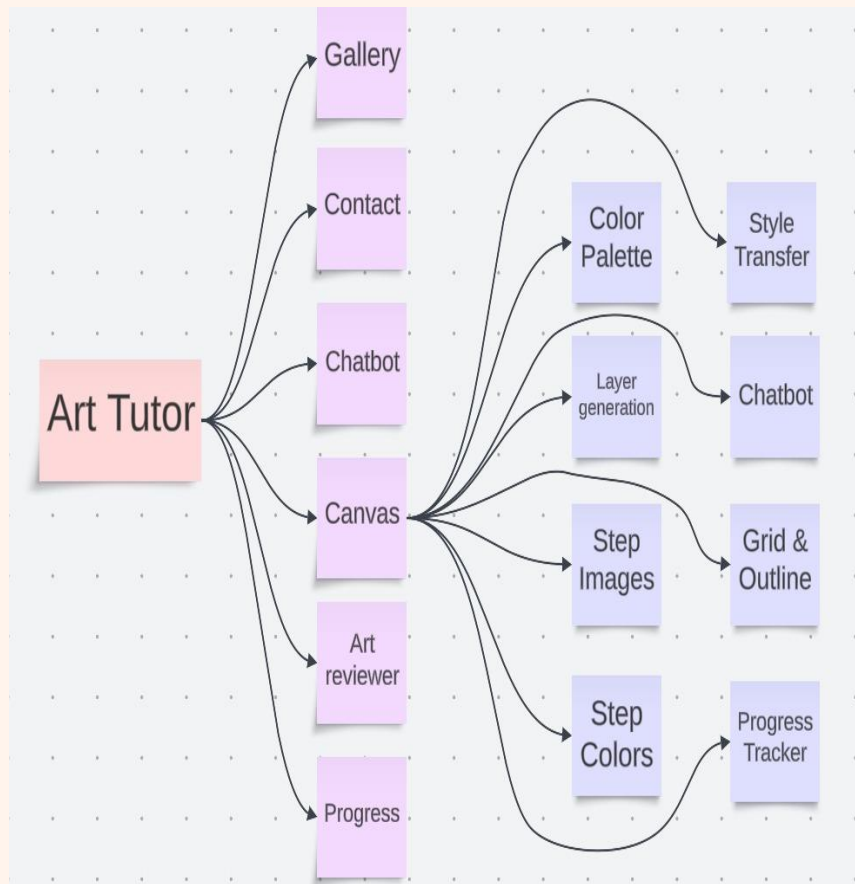
- **Survey Insights:** Summarize feedback from art learners (e.g., common challenges, preferred tutorial formats, favorite tools).
- **User Needs:** Highlight key areas of demand like personalized feedback, step-by-step guidance, and skill-based learning paths.
- **Idea Generation:** Outline innovative ideas gathered (e.g., AI-driven feedback, interactive challenges, real-time guidance).
- **Trends in Art Education:** Mention popular trends (like digital art tools, remote learning) influencing the project's direction.
- **Project Goals Based on Survey:** Briefly state goals shaped by survey data, like making tutorials more interactive or adaptive.



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● System Architecture

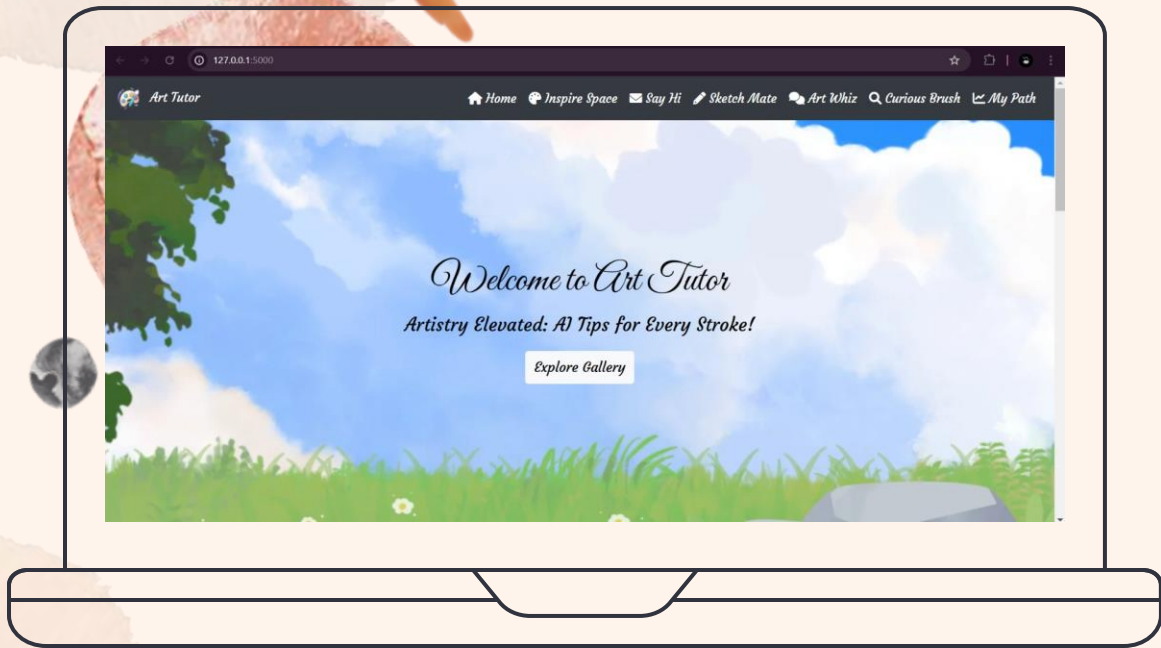




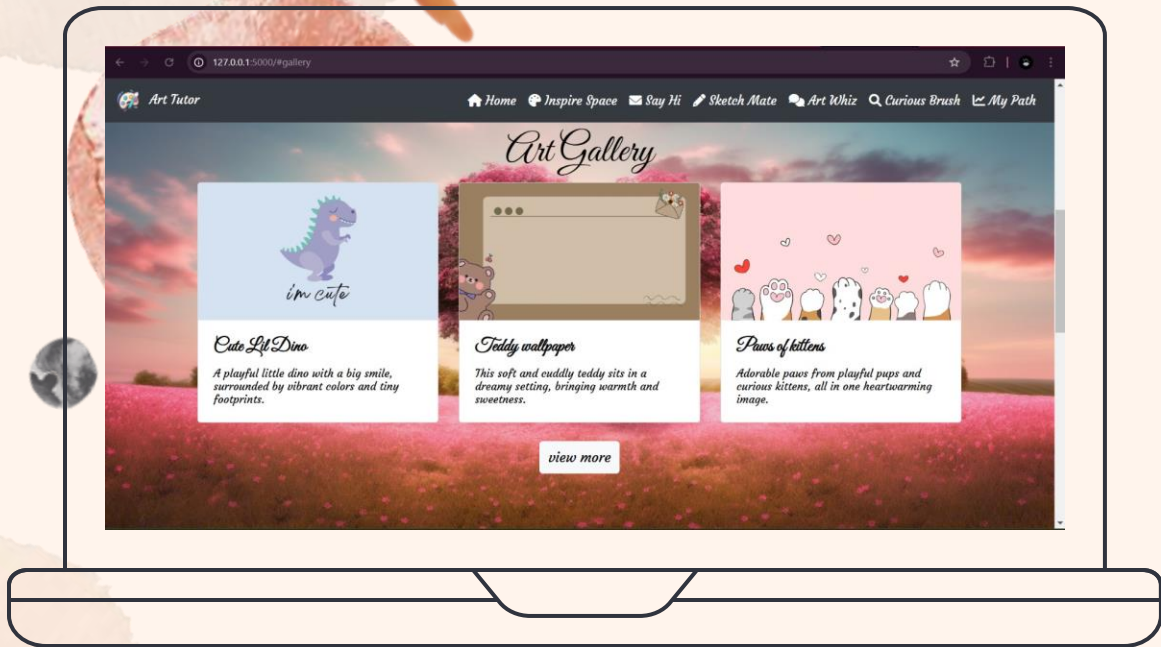
The background is a complex watercolor composition. It features large, soft-edged washes of coral, peach, and light pink. Interspersed are darker, more saturated areas of navy blue, charcoal grey, and mustard yellow. The textures vary, with some areas showing fine, stippled dots and others having a more blended, painterly quality. The overall effect is artistic and layered.

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Detailed Design

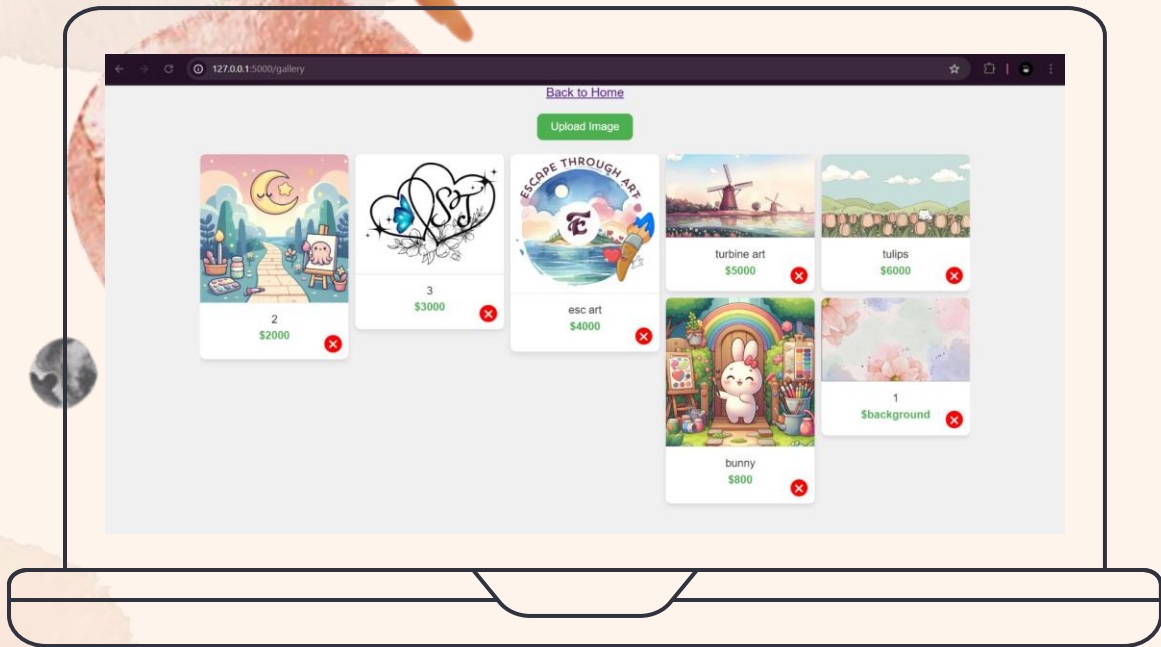


# HOME PAGE

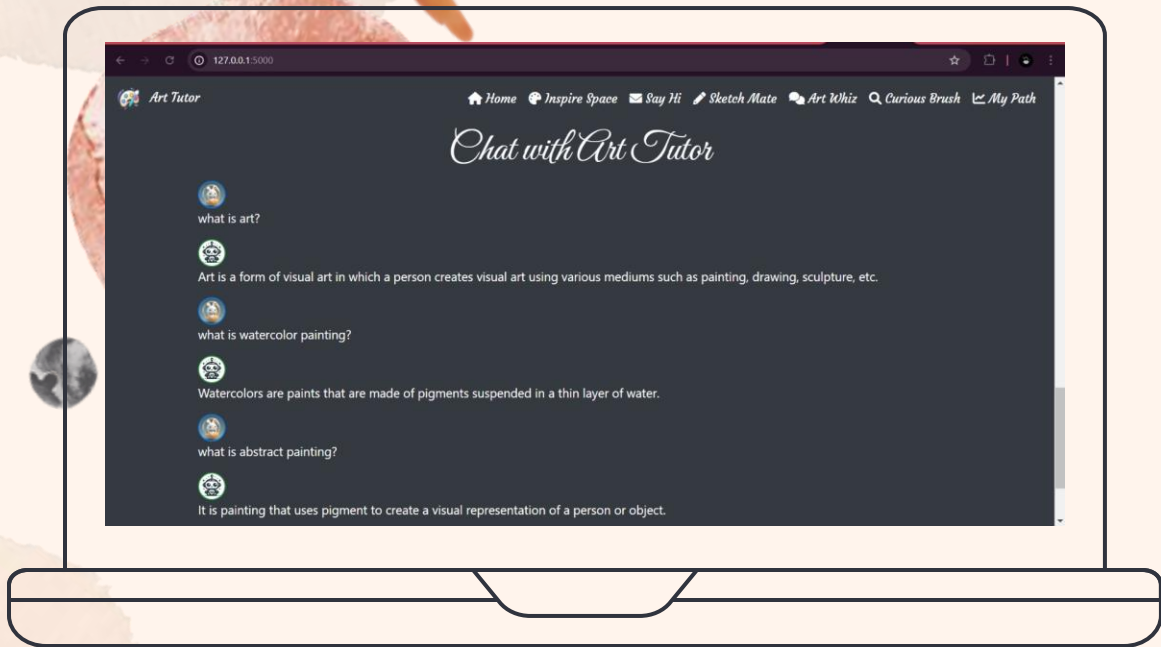


# ART GALLERY

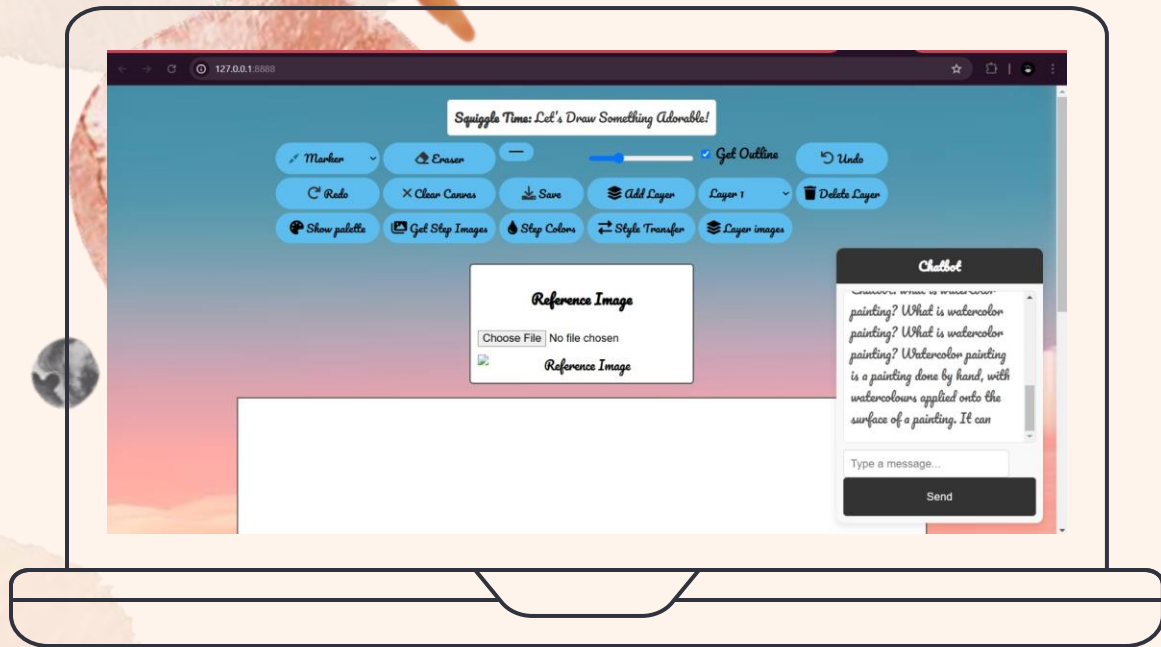




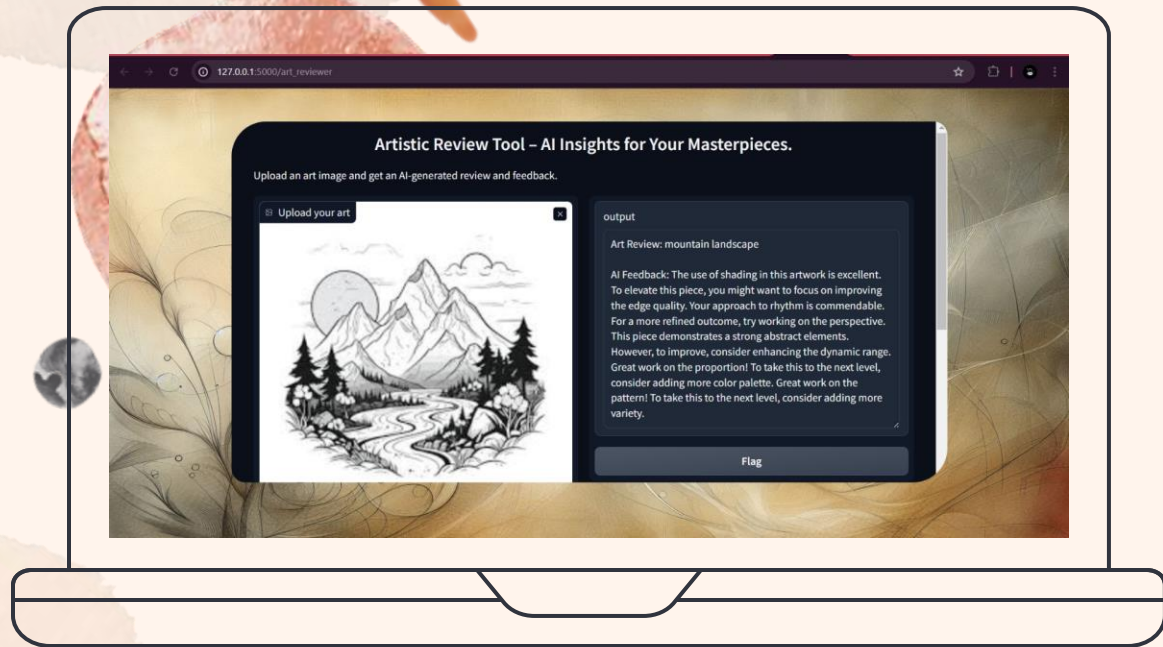
# GALLERY IMAGES



# Chat with Art Tutor

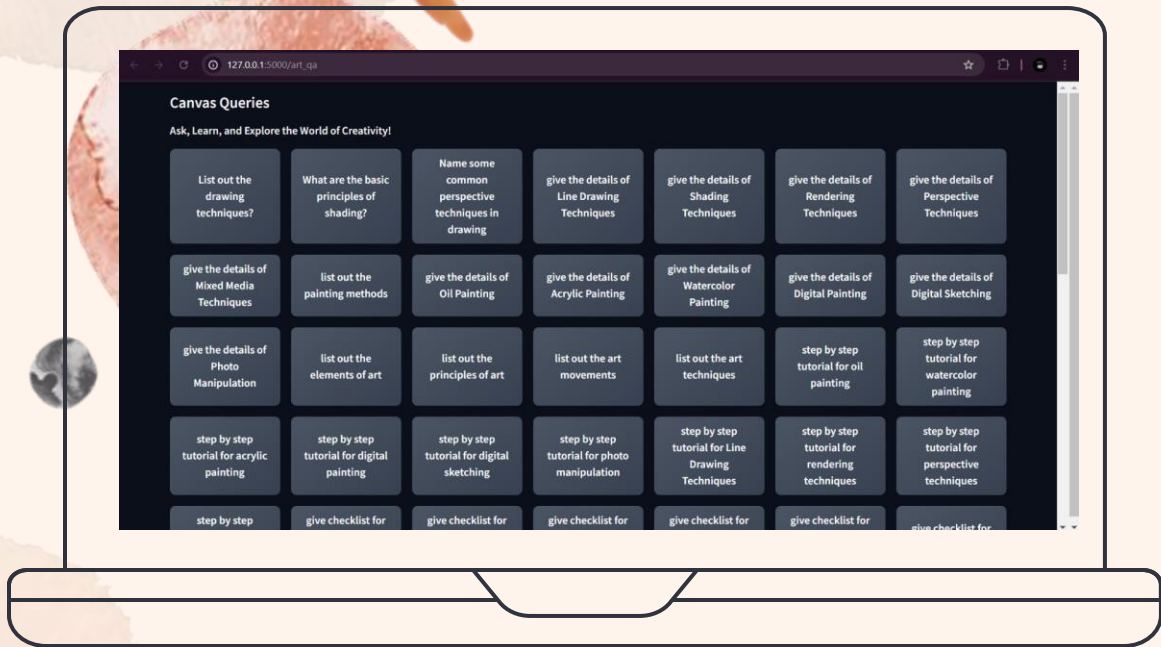


# Canvas & Art Tutor

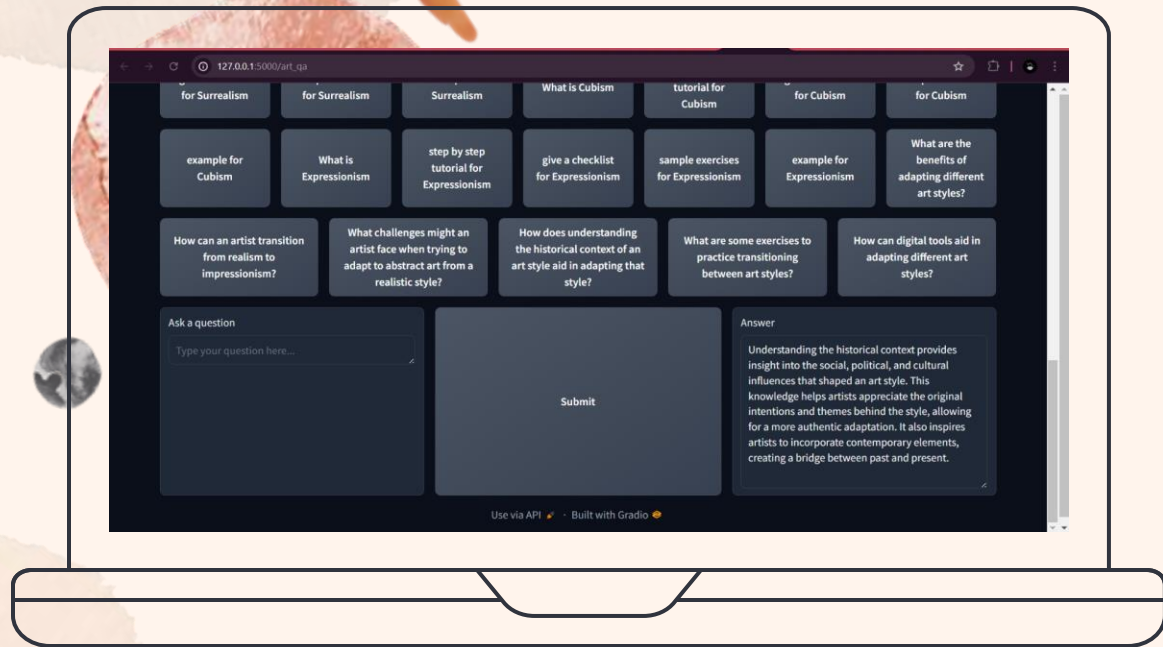


# ART REVIEWER

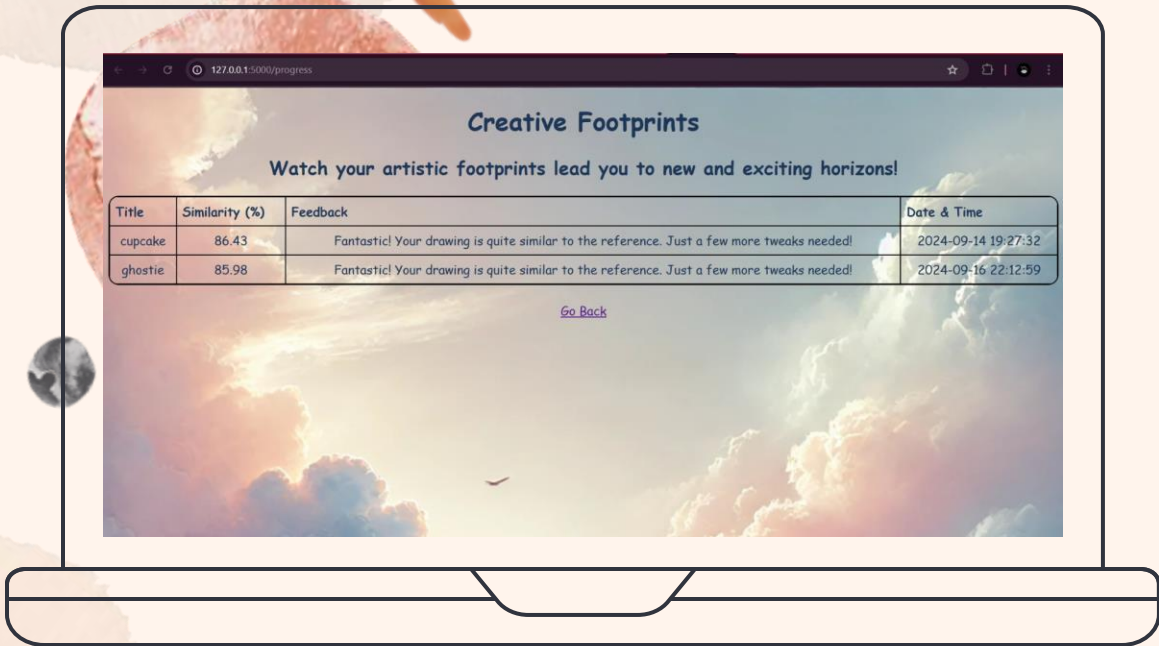




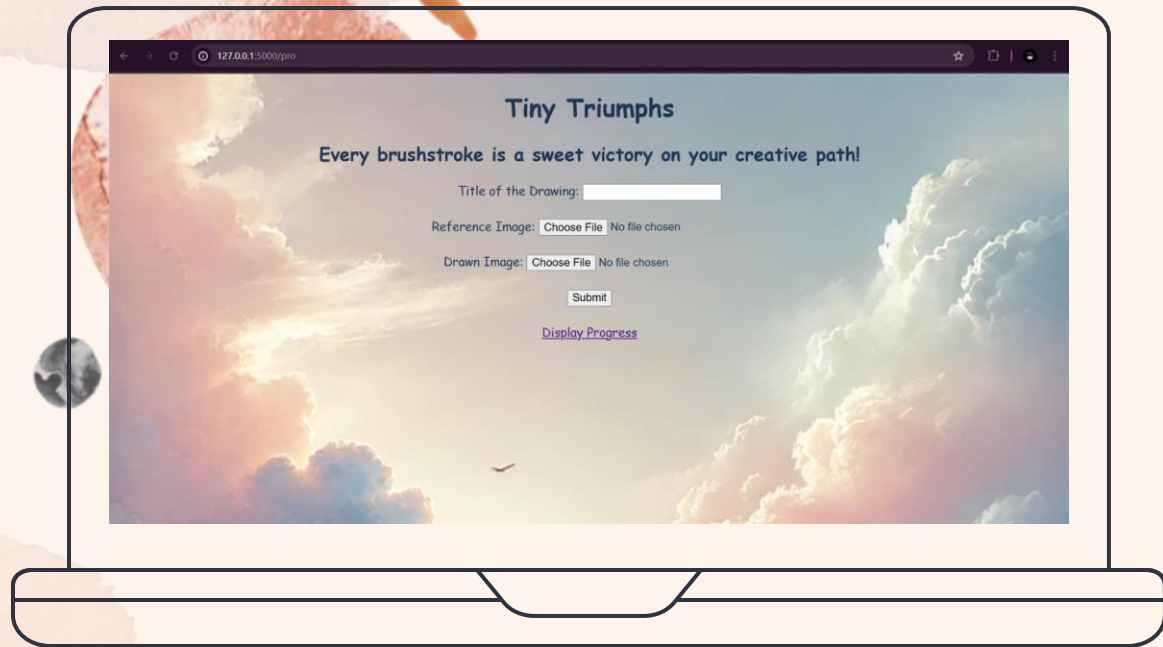
Q & A



Q & A

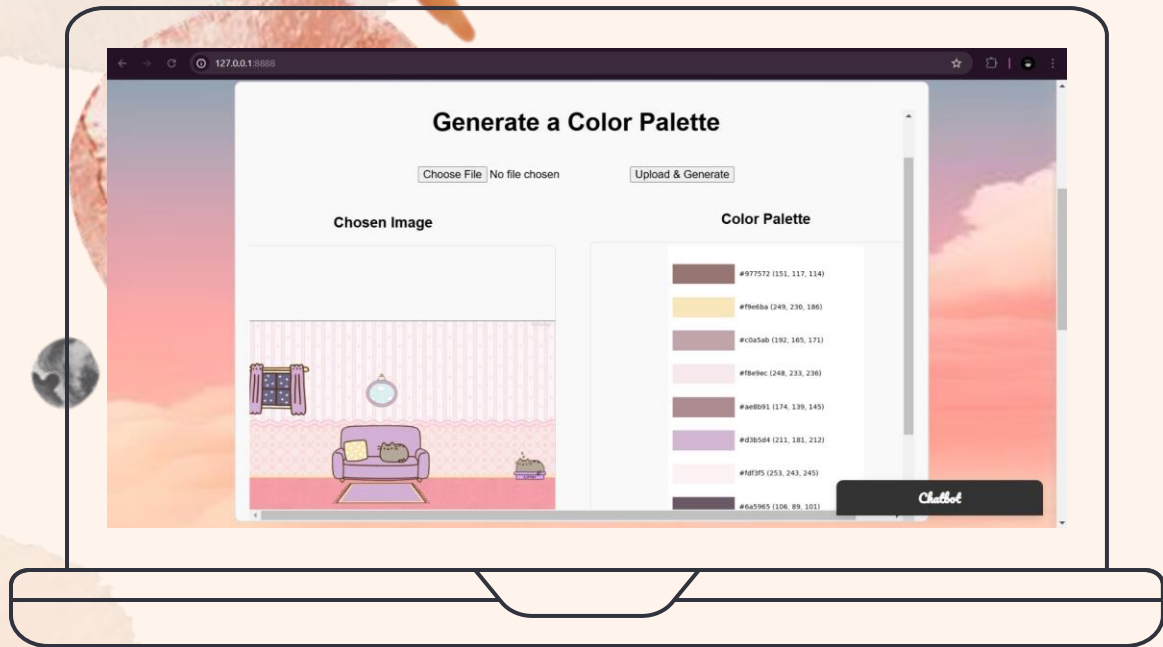


# PROGRESS TRACKING

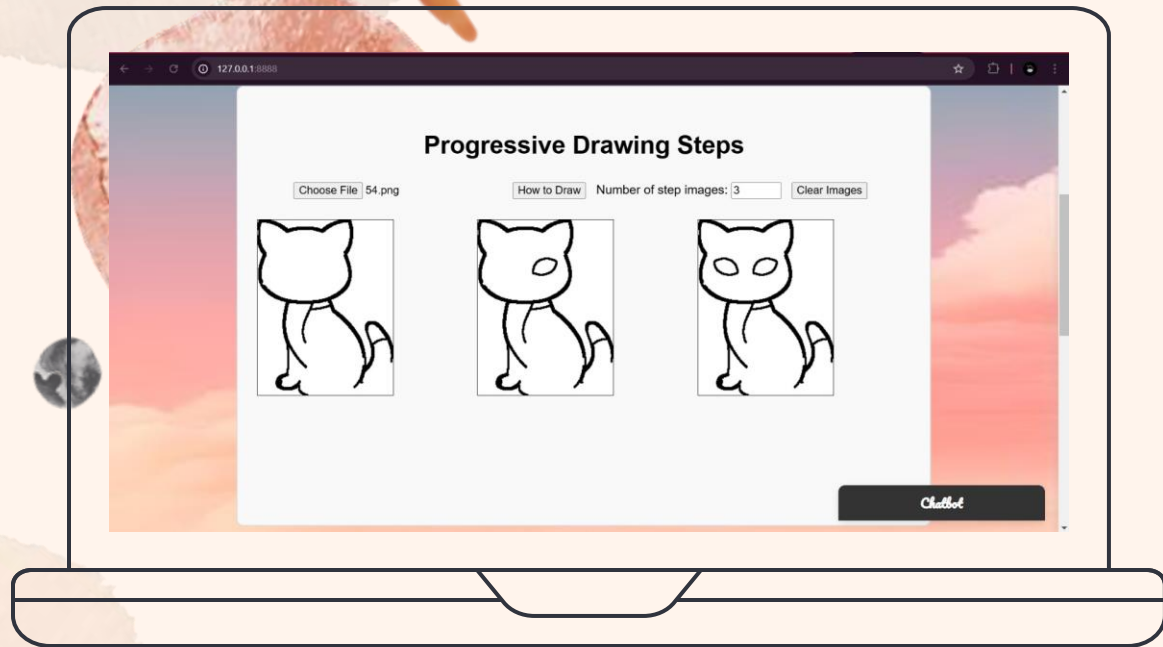


PROGRESS  
TRACKING

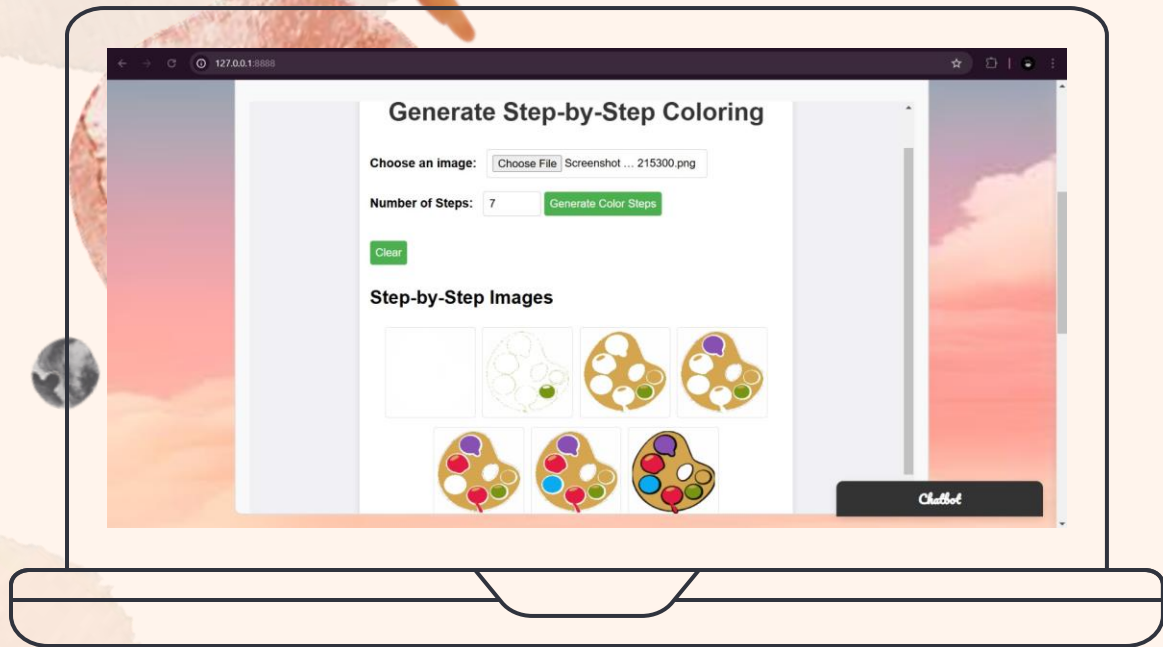




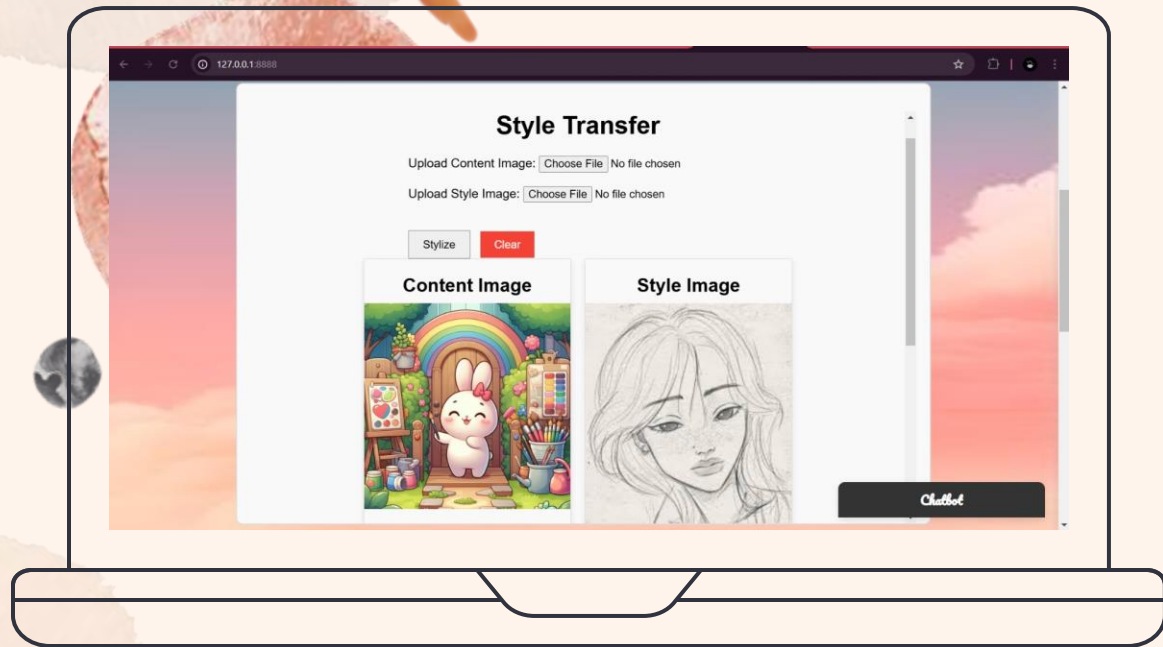
COLOR PALETTE



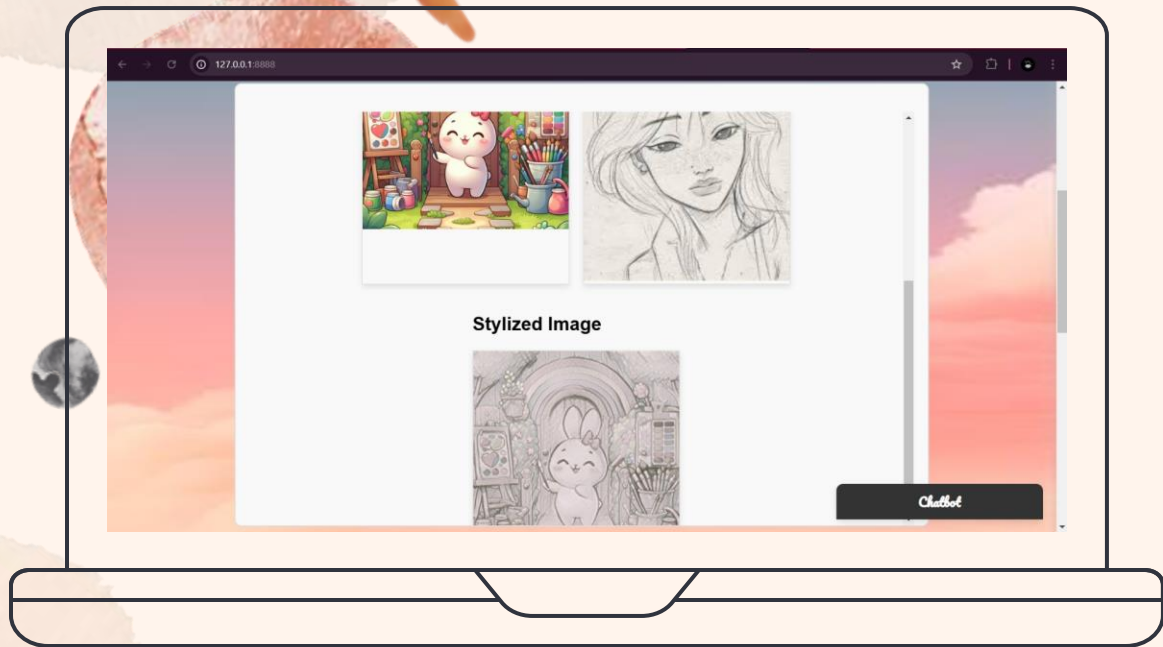
STEP IMAGE



# STEP BY STEP COLORING



# STYLE TRANSFERING



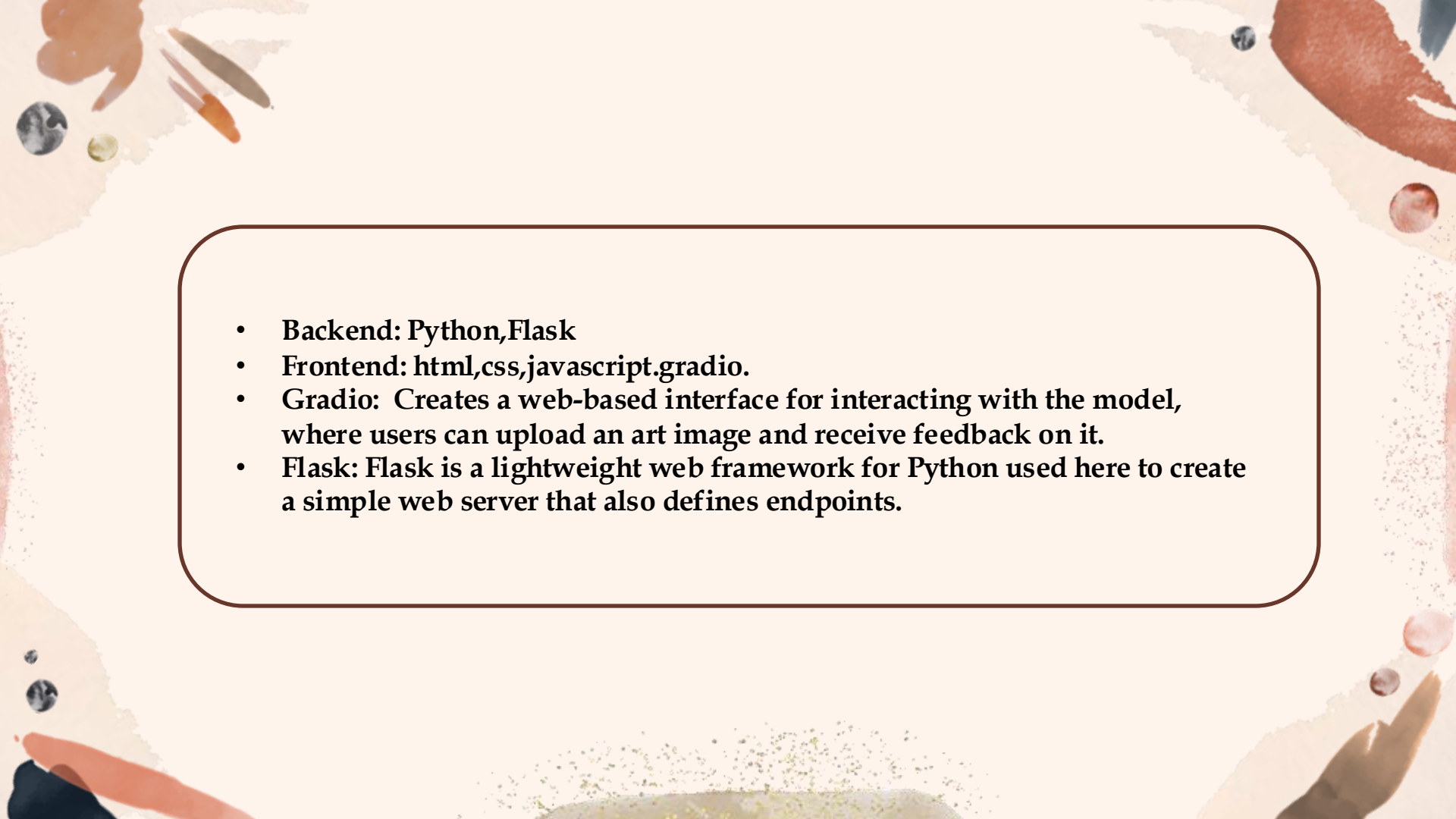
# STYLE TRANSFERING



The background is a soft, abstract watercolor composition. It features a large, textured, light pinkish-red circle in the upper center. To its left is a vertical, elongated, reddish-orange shape. Below this, on the left side, are dark blue and greyish-blue brushstrokes. In the bottom left, there's a yellowish-gold shape. On the right side, there's a large, textured, reddish-orange circle, a smaller greenish-yellow circle, and a dark blue shape at the top right. Various small, scattered dots and brushstrokes in different colors (red, blue, yellow, grey) are also visible.

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Tools & Technologies used

- 
- **Backend:** Python, Flask
  - **Frontend:** html, css, javascript, gradio.
  - **Gradio:** Creates a web-based interface for interacting with the model, where users can upload an art image and receive feedback on it.
  - **Flask:** Flask is a lightweight web framework for Python used here to create a simple web server that also defines endpoints.

### **Libraries:**

- **OpenCV (cv2):** A popular library for computer vision and image processing tasks.
- **NumPy:** This is a fundamental library for numerical and array operations in Python.
- **scikit-learn (KMeans):** The code uses KMeans clustering from scikit-learn, a widely used library for machine learning in Python. **Matplotlib:** This plotting library is used for visualizing each color clustering step. **Matplotlib:** This library is utilized to display images and the segmented layers. **TensorFlow:** The core library for deep learning operations, TensorFlow handles the execution of the style transfer model, image processing, and computation.
- **TensorFlow Hub:** TensorFlow Hub enables easy access to pre-trained models hosted by Google.
- **AutoModelForSeq2SeqLM and AutoTokenizer:** These classes from the transformers library load and manage a pre-trained model and tokenizer.
- **Pillow (PIL):** Used for image loading and basic processing. **Transformers (Hugging Face):** The transformers library. This library enables tokenization, model handling, and inference for state-of-the-art models.

- **Pretrained and Fine Tuned Models: KMeans Clustering:** KMeans is an unsupervised machine learning algorithm that clusters data points (in this case, pixel colors) into a specified number of clusters. Magenta Arbitrary Image
- **Stylization:** The style transfer model used here, available at the URL <https://tfhub.dev/google/magenta/arbitrary-image-stylization-v1-256/2>, is trained by Google Research's Magenta team.
- **GPT-Neo Model:** The GPTNeoForCausalLM class from the Transformers library represents a causal language model from the GPT-Neo family, which is similar to OpenAI's GPT models. Here, the fine-tuned model is loaded to generate text based on a provided prompt. The "facebook/blenderbot-400M-distill" model, a lightweight variant of BlenderBot optimized for conversational AI, is used here for generating responses.
- **VisionEncoderDecoderModel:** A pre-trained model for image captioning, based on a Vision Transformer (ViT) and GPT-2 architecture.  
**ViTImageProcessor:** Processes images for input into the Vision Transformer.
- **fine tuned using GPT-2 Tokenizer:** The GPT2TokenizerFast tokenizer encodes and decodes text data for the model, converting input text into tokens and generated tokens back into human-readable text.



**Technologies used:**

**Color Conversion and Resizing, Masking for Visualization.**

**Natural Language Processing (NLP) and Vision Tasks:**


- **Text-to-Image Similarity Matching.**
- **Neural Style Transfer: This technique combines the content from one image with the style of another by applying the model from TensorFlow Hub**



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08

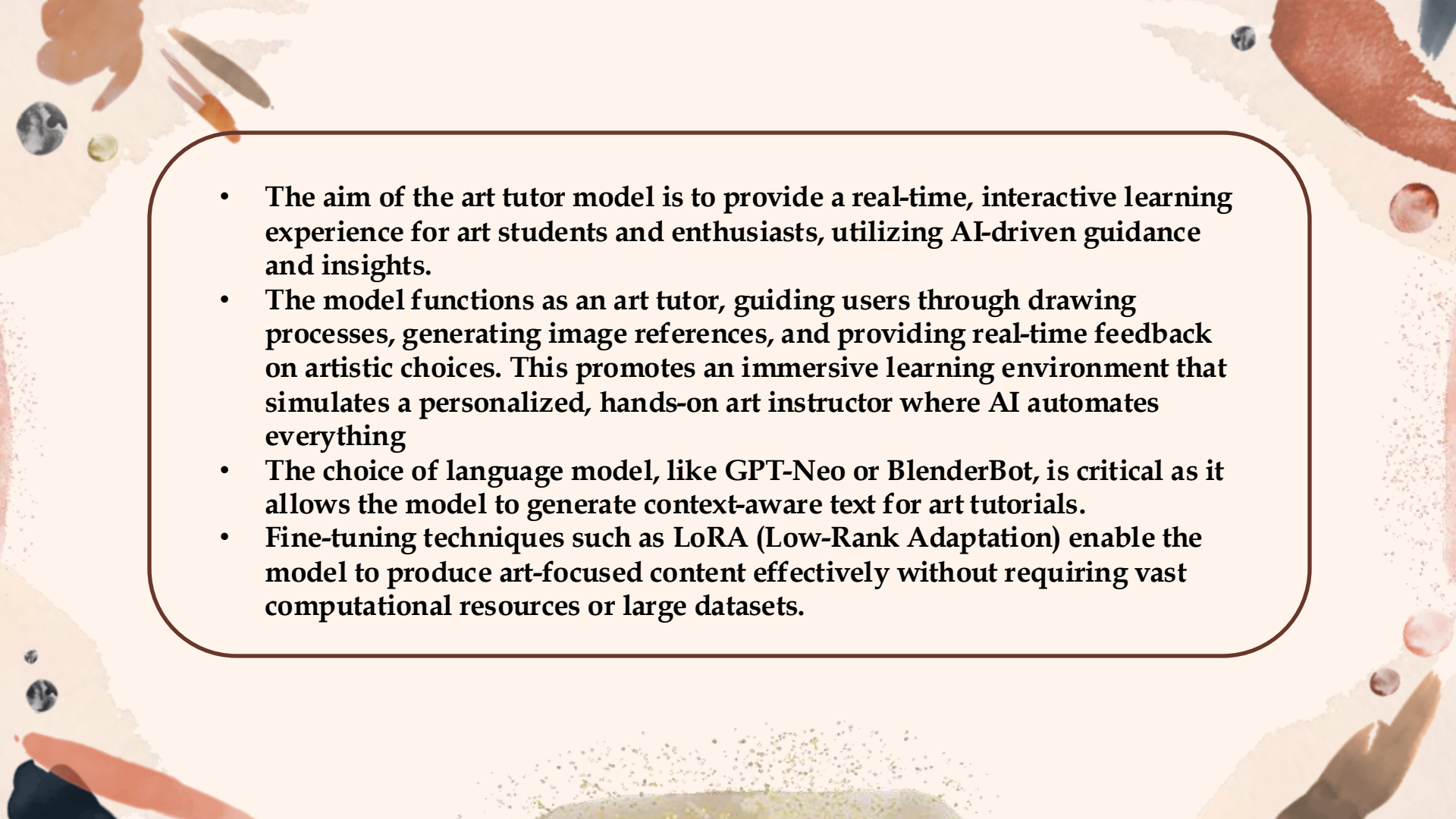
References

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- The background is a light cream color with abstract watercolor washes in shades of orange, red, and brown, primarily along the top and bottom edges. Scattered throughout are small, realistic depictions of celestial bodies: a blue and white Earth, a yellow sun, and various grey and brown planets or moons. Some of these are clustered together, while others are isolated. The overall style is artistic and ethereal.
- Edx
  - Hugging face

The background is a light cream color with abstract watercolor-style splatters and washes in various colors including red, orange, yellow, grey, and dark blue. A large, textured red circle is in the upper left, and a large, textured red circle is in the lower right. A small yellow circle is in the upper left, and a small red circle is in the lower left. A dark blue shape is in the upper right, and a dark blue shape is in the lower right. A yellow shape is in the lower left, and a yellow shape is in the lower right.

09

Discussions

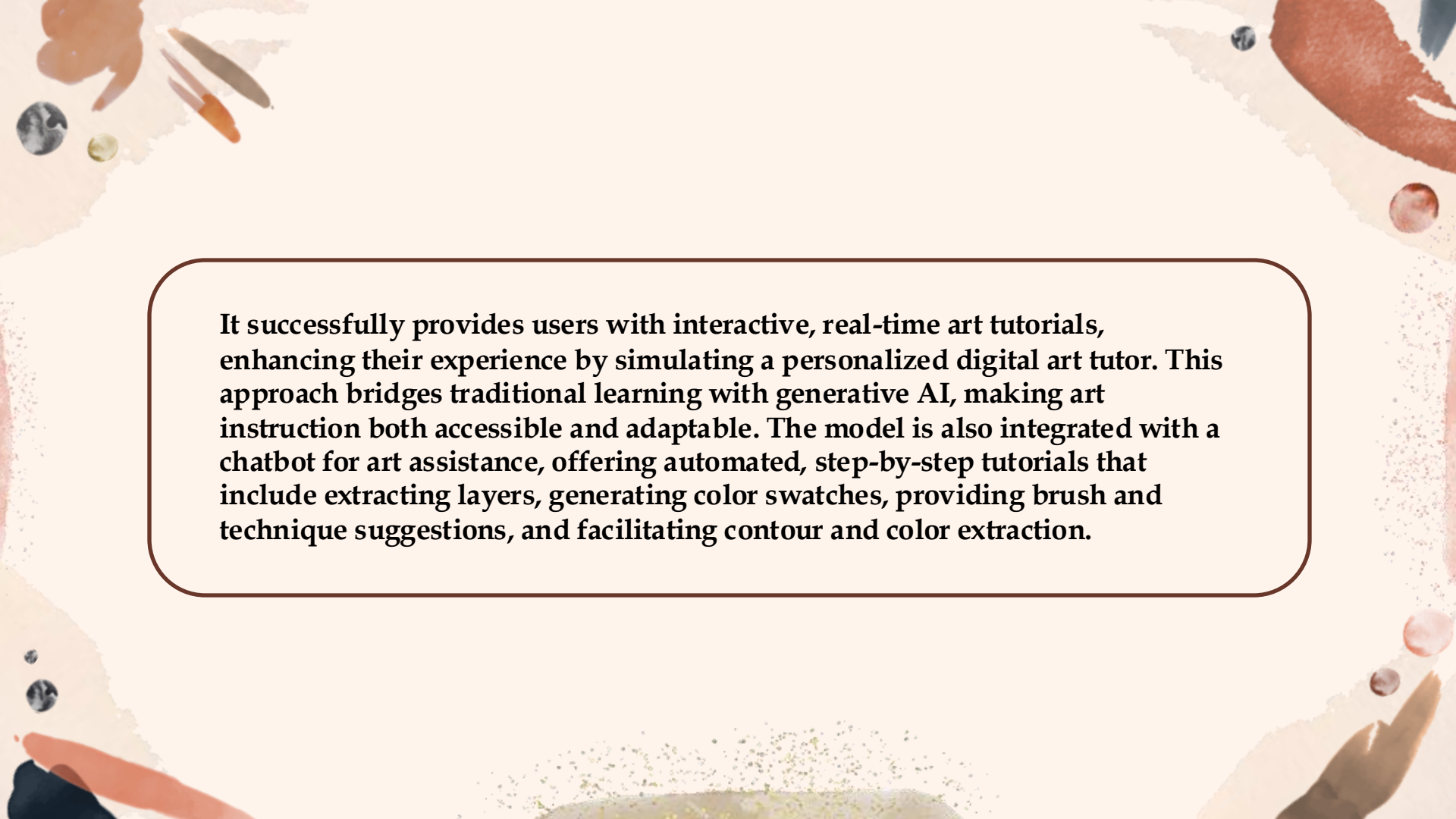
- 
- The aim of the art tutor model is to provide a real-time, interactive learning experience for art students and enthusiasts, utilizing AI-driven guidance and insights.
  - The model functions as an art tutor, guiding users through drawing processes, generating image references, and providing real-time feedback on artistic choices. This promotes an immersive learning environment that simulates a personalized, hands-on art instructor where AI automates everything
  - The choice of language model, like GPT-Neo or BlenderBot, is critical as it allows the model to generate context-aware text for art tutorials.
  - Fine-tuning techniques such as LoRA (Low-Rank Adaptation) enable the model to produce art-focused content effectively without requiring vast computational resources or large datasets.

The background is a soft, abstract watercolor composition. It features a large, textured, light pinkish-red circle in the center. To the left, there's a large, elongated, reddish-orange shape with a speckled texture. Below it, a dark blue, brush-stroke-like shape is visible. Further down, there's a greyish-blue shape and a yellowish-gold shape. To the right, there's a large, textured, reddish-orange shape with a white, torn-edge-like detail. Above it, a small, textured, yellowish-gold circle is partially covered by a dark blue shape. The overall palette is soft and painterly, with various textures and colors blending into each other.

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Result



The background of the slide is a light cream color, decorated with artistic watercolor splashes in shades of orange, red, and brown. There are also small, realistic illustrations of paintbrushes and a globe in the corners. A central text box with a dark red border and rounded corners contains the main text.

**It successfully provides users with interactive, real-time art tutorials, enhancing their experience by simulating a personalized digital art tutor. This approach bridges traditional learning with generative AI, making art instruction both accessible and adaptable. The model is also integrated with a chatbot for art assistance, offering automated, step-by-step tutorials that include extracting layers, generating color swatches, providing brush and technique suggestions, and facilitating contour and color extraction.**

THANK  
YOU!

