Painting with Paintings

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Abstract

This work introduces an innovative *'painting-with-paintings'* artform, in which each brushstroke contains fragments of historical artworks. The method allows existing paintings to be reimagined as fluid mosaics, preserving the essence of past masterpieces while forming a new visual narrative. By embedding humanity's artistic heritage into every stroke, the approach connects past and present, links diverse artistic traditions, and transforms art collections into a living medium for contemporary creation.

1 Introduction

Art is a continuum - each generation building upon the visual legacies of those before it. In the digital era, artificial intelligence (AI) and machine learning (ML) offer unprecedented tools for engaging with this continuum. This paper introduces *painting-with-paintings*, an AI-powered method in which the brush itself carries fragments of historical artworks, allowing the creation of images that are at once new and deeply rooted in the past.

2 Description of the Work and the Roles of AI and ML

The *painting-with-paintings* method draws upon two of our previous research directions:

- **Stroke-by-Stroke Development of Artworks**, in which we reconstruct the developmental process of an existing painting in terms of individual brushstrokes and their sequence. This work has been presented in the AI for Visual Arts Workshop at ECCV 2024 Prudviraj and Jamwal [2024] and the AI for Content Creation Workshop at CVPR 2025 Prudviraj and Jamwal [2025].
- **Composite Reflection**, a technique for artwork creation in which a painting is reimagined as being composed of other constituent artworks that bear an intimate relation to the main subject. The resulting artworks and research have been presented at the CVPR AI Art Gallery 2025 Jamwal et al. [2025] and the AI for Visual Arts Workshop at ICCV 2025 Dangeti et al. [2025], respectively.

By carefully merging these two approaches, we developed a method that no longer depends on the rigid rectangular grid compositions typical of mosaic generation, overcoming a major limitation of previous methods di Blasi and Petralia [2005], Lee [2017], Xu et al. [2019]. An overview of the process is shown in Figure 1.

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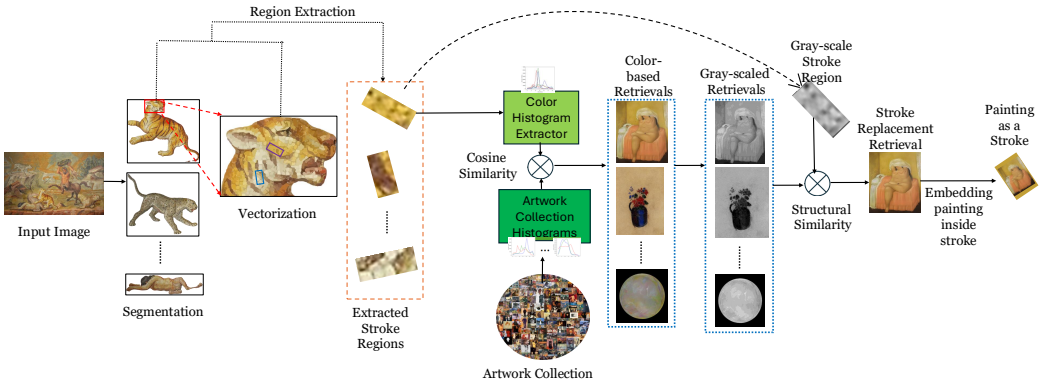

Figure 1: Overview of the *painting-with-paintings* pipeline. The input artwork is segmented into regions, which are vectorized to obtain individual stroke regions. Each stroke region is extracted and analyzed for its color histogram, which is used to retrieve visually similar artworks from the collection. Retrieved candidates are converted to grayscale and compared with the stroke region for structural similarity. The closest structural match is then embedded into the stroke region. This process is repeated for all stroke regions to produce the final composition.

The workflow can be described as follows:

1. A curated repository of high-resolution digital reproductions of contemporary and historical paintings is assembled. These are analyzed for color and structural distribution, then vectorized accordingly.
2. Stroke-based methods, as described above, are used to generate the brushstrokes for the target artwork.
3. Retrieval techniques from *Composite Reflection* are adapted for stroke size and orientation, enabling relevant artworks from the curated repository to be transformed into rendered brushstrokes.

During the creative process, the artist directs the composition by defining subject matter, mood, and overall form. They also choose which part of art history they wish to "soak their brushes" in. While the selection of historical sources is left to the artist, the AI-powered brush embeds appropriate fragments into each stroke, matching color, scale, and style to the evolving image. The result is a composition in which each brushstroke carries its own micro-history while contributing to a unified whole.

Unlike conventional mosaic approaches that rely on fixed grids, this technique preserves the painterly qualities of each embedded fragment, producing a composition where every stroke functions as a micro-painting in its own right. The result is a creative workflow in which the artist directs the vision, while AI and ML operate as collaborative tools, uniting centuries of visual heritage into a living, contemporary artwork.

3 Addressing the Theme of Humanity

At its core, painting-with-paintings explores humanity's creative interconnectedness by transforming complete artworks into individual brushstrokes for new compositions.

Artworks as Living Creative Material

This approach treats existing artworks - whether historical or contemporary - as living, generative material. By embedding complete paintings within individual brushstrokes, the method transforms static works into active building blocks for new creation. Each stroke carries the cultural and emotional imprint of its source, enabling a participatory dialogue where existing art contributes directly to evolving visual narratives.

Human-AI Collaboration as Creative Bridge.

AI serves as a bridge between the artist's vision and vast collections of artistic expression. The artist defines subject, composition, and source material, while AI retrieves and adapts relevant works into responsive brushstrokes. This partnership enables creative conversation across artistic voices, allowing human vision to draw upon a collective visual vocabulary with unprecedented fluidity.

By embedding artistic memory into new works, painting-with-paintings demonstrates that creativity is fundamentally collaborative and interconnected - technology deepening our connection to what makes us human: the drive to create, communicate, and build upon the creative expressions of others.

4 Conclusion

Painting-with-paintings leverages AI and ML not to replace the artist's vision, but to expand the possibilities of what a brushstroke can contain. It reimagines painting as an act of cultural synthesis, where each mark is simultaneously a gesture of the present and a vessel of the past. By embedding the memory of art into new works, the technique offers a model for how technology can deepen our engagement with humanity's creative heritage.

5 Author Biographies

5.1 Vikram Jamwal

Dr. Vikram Jamwal is a Principal Scientist at TCS Research, where he spearheads innovative efforts in Computational Creativity. He holds a Ph.D. in Computer Science from IIT Bombay, India, and brings a wealth of experience from his prior roles as a Design Executive at Crompton and Greaves Ltd. and as a Scientist at the National Center for Software Technology, Mumbai. Dr. Jamwal's research is driven by a profound question: *Can machines exhibit creative expression, and if so, how can we enable it?* His work explores this intersection of artificial intelligence and creativity, with a focus on developing novel frameworks for machine-driven artistic innovation. Beyond his technical expertise, Dr. Jamwal is an avid practitioner of creative arts, including dramatics, poetry, music, fine art, dance, and photography. These pursuits enrich his perspective, informing his mission to advance computational creativity and its applications in computer vision and neural networks.

5.2 Jeripothula Prudviraj

Dr. Jeripothula Prudviraj is a postdoctoral researcher with the Computational Creativity team at TCS Research. His work lies at the intersection of AI and art, bridging computer vision, machine learning, and digital creativity to advance art understanding and co-creation applications. He explores the integration of AI with art education, virtual museums, and creative collaboration tools, aiming to open new avenues for studying, preserving, and reimagining artistic processes. Through his research, he seeks to combine technological innovation with artistic expression, enabling richer interactions between humans and machines in the creative space.

5.2.1 Abhishek Dangeti

Abhishek Dangeti is a researcher with the Computational Creativity team at TCS Research. His research centers on the intersection of Computer Vision and Creative AI, where he leverages neural networks to explore and generate artistic content. Holding a Bachelor of Technology in Computer Science, he is particularly passionate about applying AI to historical visual artworks, investigating diverse art styles and the artistic legacies of renowned artists. He has developed innovative AI-driven technologies, such as Composite Reflections, a method that reconstructs an input artwork by assembling segments from a thematically related set of artworks (e.g., recreating Vincent van Gogh's portrait using his own paintings). Additionally, Abhishek Dangeti has worked on developing benchmarks for style-based clustering of artworks, evaluating various style-based representations from deep learning history. This evaluation of neural representations, which accounts for the subjective nature of artistic style, contributes to advancements in computational creativity.

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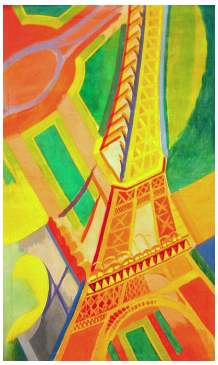
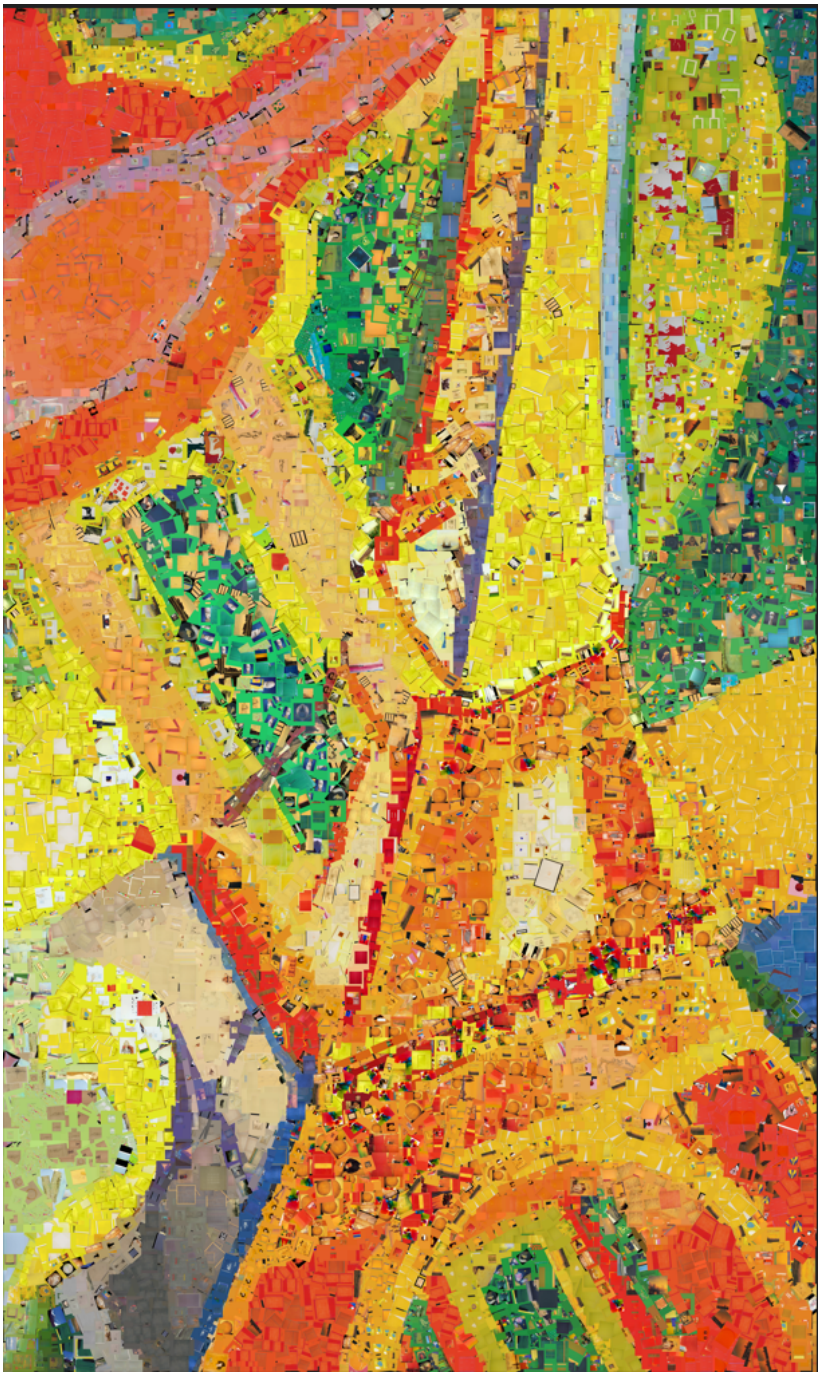
A Appendix: Example Artworks



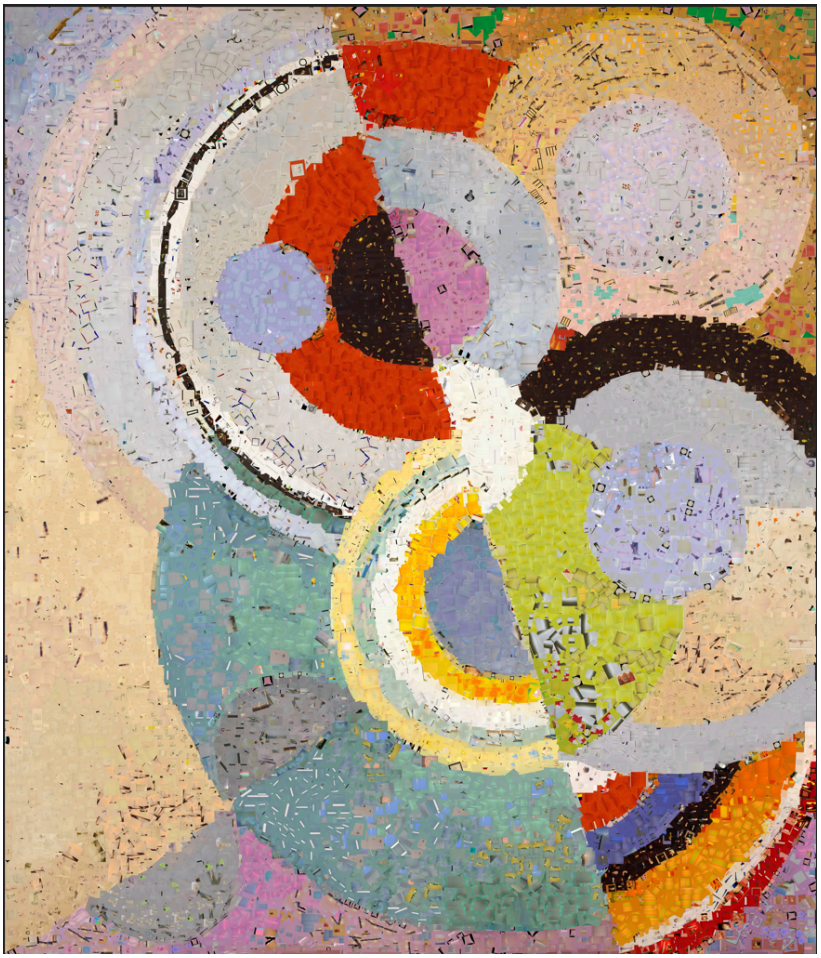
(a) Initial Artwork



(b) Painting-with-paintings

Figure 2: *La Tour Eiffel* by Robert Delaunay, 1926

(a) Initial Artwork



(b) Painting-with-paintings

Figure 3: Artwork by Sonia Delaunay

(a) Initial Artwork

(b) Painting-with-paintings

Figure 4: *Beach with Figures, Bellport* by William James Glackens, 1915

(a) Initial Artwork

(b) Painting-with-paintings

Figure 5: *Ariel on a Bat's Back* by Louis Rhead, 1917