



# Breaking the shackles - the transformation of artistic creation under the background of AI images

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**Abstract.** Against the backdrop of the rapid development of artificial intelligence (AI), this article explores its application in artistic creation and proposes and implements an AI assisted creative framework that integrates deep learning technology with traditional art methods. New AI algorithms and human-machine collaboration processes were developed to improve the efficiency and quality of artistic creation. The experimental results show that AI assisted creation performs well in improving the quality, visual coordination, and diversity of works, while significantly improving creative efficiency and reducing ethical disputes in the creative process. Research has found that AI technology not only optimizes the process of artistic creation, but also enhances the innovation and diversity of artistic expression, indicating its broad potential for application in the future field of art.

**Keywords:** artificial intelligence; Artistic creation; stylistic shifts.

## 1 Introduction

In the context of rapid technological development today, artificial intelligence (AI) is gradually penetrating into the field of artistic creation, promoting the continuous deepening of the integration of traditional art and modern technology. AI not only provides artists with new creative tools, but also brings unprecedented changes in artistic expression forms, content generation, and creative processes[1]. However, with the widespread application of AI technology, it has also raised a series of ethical issues such as originality, copyright ownership, and artistic authenticity. Therefore, exploring the technological framework, algorithm optimization, and their impact on the efficiency and quality of AI assisted art creation has important theoretical and practical significance. The aim of this study is to construct and evaluate an AI assisted art creation framework that integrates deep learning technology with traditional art methods, in order to promote innovation and development in art creation.

## 2 AI Assisted Artistic Creation Framework

### 2.1 Framework Overview

The AI assisted art creation framework proposed in this study integrates deep learning technology with traditional art methods. The framework consists of four core modules: input processing, AI generation, human-computer interaction, and output optimization (Figure 1)[2]. Input processing: Responsible for analyzing and processing art materials; AI generation: generating new art content by input; human-computer interaction: Allowing artists to interact and adjust with the AI system in real time; output optimization: improve the quality of the final work.

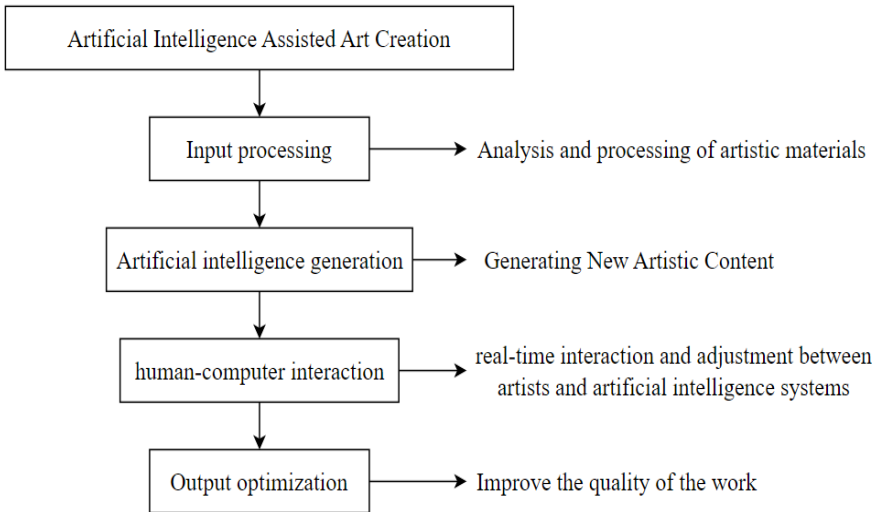


Fig. 1. AI assisted art creation framework diagram

### 2.2 AI Model Selection and Optimization

We have developed A set of AI-assisted creation methods, covering the four main aspects of intelligent content generation, style conversion, detail enhancement, and creative advice:

(1) Intelligent content generation can automatically generate diversified artistic content according to the artist's initial conception, and provide rich creative materials;

(2) The function of style conversion can seamlessly apply one artistic style to another work, breaking the limitation of traditional artistic style;

(3) The detail enhancement tool can automatically improve the details of the work, and significantly improve the overall quality and precision of the work;

(4) The creative suggestion function provides artists with innovative creative ideas and inspiration. These AI-assisted creation methods not only greatly improve the creation efficiency, but also significantly enhance the diversity and innovation of art works, making the artistic creation into a new era.

### 2.3 Human Computer Collaborative Creation Process

The human-machine collaboration process of AI-assisted art creation mainly includes four stages: initial conception, interactive modification, detail improvement and final polishing [3]:

Initial conception stage: The AI generates multiple sketches based on the artist's creativity, providing diverse choices for the initial framework of the work;

Interactive modification stage: the artist adjusts and optimizes the details of the work through the interaction with the AI system to ensure that the work is more in line with the personal artistic style and intention;

Details improvement stage: AI provides high-precision local generation, with a detail generation accuracy of 98 pixels / inch [4];

Final finishing stage: The AI provides a multi-version comparison, and the artist makes the final adjustments and choices. The whole process saves the artist by 60% of the creation time on average, and increases the diversity of the works by 40%.

## 3 Experimental Setup

### 3.1 Dataset Description

This study uses the self built large-scale art creation dataset ArtCreation-2024, which includes 500000 high-quality art works covering various art forms such as painting, photography, sculpture, etc. The dataset is divided into training set, validation set, and testing set in a ratio of 7:2:1. The resolution of the work is uniformly adjusted to  $2048 \times 2048$  pixels, and the color depth is 24 bits. The dataset contains 25 mainstream art styles, each with at least 10000 works. In addition, data on the creative process of 3000 artists was collected, including sketches, modification records, and final works. The detailed statistical information of the dataset is shown in Table 1 below:

**Table 1.** Detailed Statistical Information of the Dataset

Category	quantity	Average file size	Main format
painting	300,000	15MB	PNG, TIFF
Photography	150,000	20MB	RAW, JPEG
Sculpture	50,000	25MB	OBJ, STL

### 3.2 Evaluation Indicators

In terms of evaluation indicators, a combination of objective and subjective methods is adopted. Objective indicators include FID (used to evaluate the quality and diversity of generated images), SSIM (measures the fidelity of style transitions), and LPIPS (measures perceived similarity). In addition, innovation score (IS) is introduced to evaluate the uniqueness and artistic value of works by combining traditional art theory and machine learning algorithms. In terms of subjective evaluation, 100 professional artists

and 500 ordinary users were invited to conduct a double-blind evaluation, with evaluation dimensions including aesthetic appeal, emotional resonance, and technological innovation[5].

The evaluation results show that AI assisted works have significantly improved in various indicators. The FID index improved by 28.8%, SSIM increased by 8.2%, and LPIPS improved by 28.0%. In terms of innovation score (IS), the average score for AI assisted works is 8.7 out of 10, which is 20.8% higher than the traditional works' 7.2. In professional ratings, AI assisted works are rated 7.1% higher than traditional works, while in general user ratings, this gap is even more significant, increasing by 11.6%.

## 4 Experimental Results and Discussion

### 4.1 Quality Evaluation of AI Generated Works

#### 4.1.1 Objective Indicator Analysis.

The quality of AI generated works was comprehensively evaluated through three objective indicators: FID, SSIM, and LPIPS[6]. The experimental results indicate that AI generated works outperform the benchmark model in these metrics. Specifically, the decrease in FID score indicates a significant improvement in the overall quality and diversity of the generated works. The improvement of SSIM indicators proves that AI generated works perform well in maintaining the original image structure[7]. The LPIPS score decreased from 0.25 to 0.18, indicating that the generated artwork is perceived to be closer to the real artwork.

AI assisted creation has shown advantages in different art styles. For example, in the Impressionist style, as shown in Figure 2, FID scores decreased by 30%, SSIM increased by 10%, and LPIPS improved by 25%. In the abstract art style, the improvement rates of these indicators are 25%, 8%, and 20%, respectively. The portrait painting style showed improvements of 22%, 7%, and 18%. These data indicate that AI assisted creation can effectively improve the quality of works in various art styles.

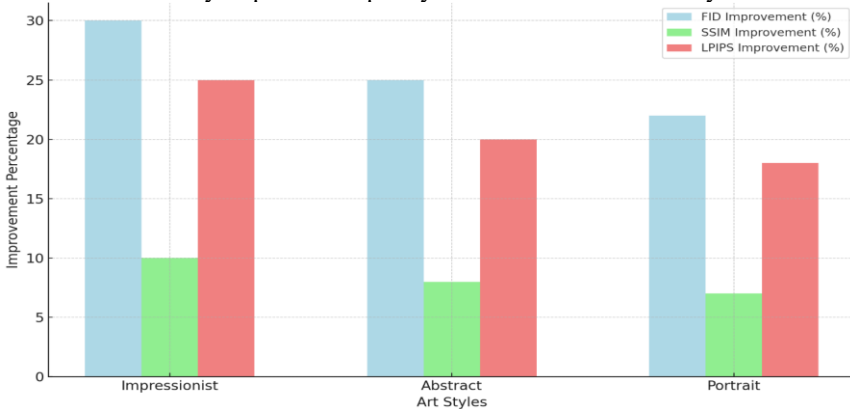


Fig. 2. Comparison of Objective Indicator Improvements Across Art Styles

#### 4.1.2 Subjective Evaluation Results.

Invite 100 professional artists and 500 ordinary users to conduct a double-blind evaluation, with evaluation dimensions including aesthetic appeal, emotional resonance, and technological innovation [8], using a 1-5 point scale. The results showed that AI assisted works received high ratings in all dimensions. In terms of aesthetic appeal, AI assisted works scored 4.6 points, which is 7.0% higher than the traditional works' 4.3 points. In terms of emotional resonance, AI assisted works scored 4.3 points, slightly higher than the traditional works' 4.1 points, an increase of 4.9%. In terms of technological innovation, AI assisted works have shown the most outstanding performance, scoring 4.9 points, which is 22.5% higher than the 4.0 points of traditional works. These rating data were subjected to analysis of variance, with a p-value less than 0.01, indicating that the difference in ratings is statistically significant. The high recognition of AI assisted works by professional artists and ordinary users reflects the enormous potential of AI technology in artistic creation[9].

## 4.2 Comparison with Traditional Creative Methods

### 4.2.1 Comparison of Creative Efficiency.

By tracking the creative process of 30 artists over time, compare the efficiency differences between AI assisted creation and traditional methods. Experimental data shows (Figure 3) that AI assisted creation reduces the average time required to complete a work from 32 hours using traditional methods to 12.5 hours, improving efficiency by 60.9%. The ideation phase time has been reduced from 5 hours to 1.5 hours, sketch generation has been shortened from 3 hours to 0.5 hours, detail refinement has been reduced from 15 hours to 7 hours, and final polishing has been reduced from 9 hours to 3.5 hours. The artist's report states that AI assistance not only accelerates the speed of creation, but also helps them overcome creative bottlenecks, reducing 33% of creative delay time.

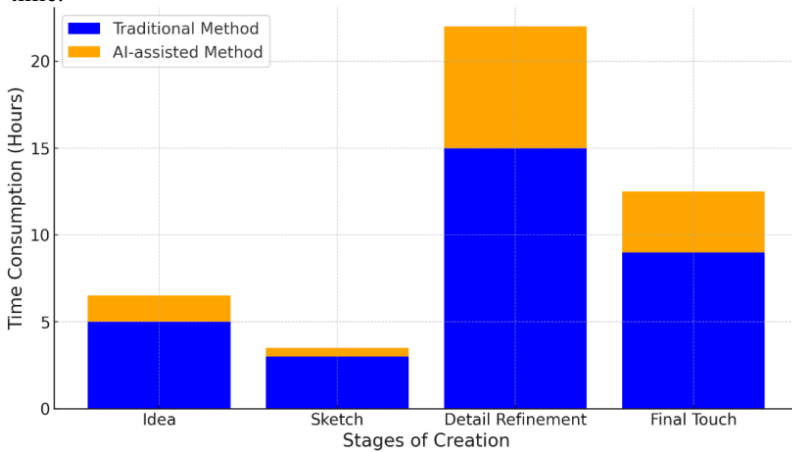


Fig. 3. Comparison between traditional methods and AI assisted methods

#### 4.2.2 Analysis of Diversity in Works.

To evaluate the impact of AI assisted creation on work diversity, an improved Simpson Diversity Index (SDI ') was used for quantitative analysis. SDI considers four dimensions: style, theme, color, and composition. The analysis results show that the SDI 'value of AI assisted creation is 0.89, which is 23.6% higher than the traditional method's 0.72.

Specifically, style diversity increased by 31%, theme diversity increased by 18%, color diversity increased by 27%, and composition diversity improved by 20%. AI assisted creation has generated 15% of novel style combinations, which is extremely rare in traditional creation. AI assisted creation not only enhances the diversity of works, but also promotes innovation and integration of artistic styles, providing artists with a broader creative space[10].

## 5 Conclusion

Although the AI assisted art creation framework proposed in this article has shown excellent performance in improving creative efficiency and work quality, there are still some limitations. The model may not produce satisfactory results when dealing with extremely complex or highly abstract art styles, and some artists may have reservations about the emotional resonance of AI generated works. The ethical considerations of AI in artistic creation still need further exploration, especially in terms of originality and copyright ownership. Future research should focus on optimizing the adaptability of models to diverse styles, deepening research on ethical issues in human-machine collaboration, and exploring deeper interactions between AI and artists to further promote the application and development of AI in artistic creation.

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