Article

Using ChatGPT and Midjourney to Generate Chinese Landscape Painting of Tang Poem 'The Difficult Road to Shu'

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Abstract: Using artificial intelligence (AI)-generated image technology, we explore the landscape paintings of the Tang poet. Two powerful tools, ChatGPT and Midjourney, are used to create high-quality paintings that capture the essence of the traditional Chinese landscape and incorporate modern AI-generated content technology (AIGC). We compare three versions of the poem Difficult Road to Shu. These results are calculated by providing different prompts for creating Midjourney images. By highlighting the similarities and differences between the three versions of poetry in terms of landscape scenery description and aesthetic style, the research result shows how AI-generated content creates various creative outputs of different styles, allowing artists and content creators to experiment with new forms of expression. Furthermore, it is highlighted how AI-generated content technologies improves students' understanding of traditional cultural elements while promoting creativity through modern tools.

Keywords: Midjourney, ChatGPT, AI-generated content (AIGC), Chinese landscape painting, Prompt engineering

1. Introduction

Artificial intelligence (AI) has become an increasingly popular tool in the education of art and literature because it facilitates the creative process and improves the understanding of the domain knowledge. In the context of art education, AI technologies such as generative adversarial networks (GANs) and neural style transfer algorithms have been used to create new and unique art pieces. In 2018, a French art collective called Obvious used GANs to generate a unique portrait of a fictional aristocrat named Edmond de Belamy (Alleyne, 2018). The algorithm was trained on a dataset of 15,000 portraits from the 14th to the 19th century. It generated a new image that was then printed on canvas and framed. In 2015, Google released a tool called DeepDream, which used neural style transfer algorithms to generate surreal and psychedelic images (Mordvintsev et al., 2015; Chen and Kao, 2022). The tool allowed users to input an image and then apply a specific style, resulting in a hybrid image that combined both elements. Maerten and Soydaner (2023) reviewed deep neural networks in AI-generated art and explored various architectures and models used in their creation such as classic convolutional networks and cutting-edge diffusion models. They discussed the networks' application in art tasks such as style transfer, image generation, and manipulation. They also provided an overview of datasets and evaluation metrics in AI-generated art research.

In literature education, AI-powered chatbots and natural language processing (NLP) techniques have been used to analyze, interpret, and generate texts (Okonkwo and Ade-Ibijola, 2021; Kuhail et al., 2022). These technologies help learners develop their creativity and critical thinking skills by providing new ways to explore and understand the literature. ChatGPT, a revolutionary breakthrough AI chatbot recently developed by OpenAI (ChatGPT, 2023), is trained on large amounts of text data to produce professional human-like responses to user queries. The chatbot answers many questions from simple factual queries to more complex and abstract ones. ChatGPT can be used in literature education to analyze and explain the meaning of poems, novels, or other literary works. It also generates writing prompts or creative inspiration for students, stimulates their imaginations, and encourages the development of their creative ideas. In art education (Ofgang, 2023; Metzler and ChatGPT, 2022), ChatGPT can generate descriptions of art, explaining artists' techniques, styles, and themes. It can also guide the creation of new artworks, generating prompts for AI-generated art platforms such as Dall·E 2 (OpenAI, 2022) or Midjourney (Midjourney, 2022) and suggestions based on the preferences and interests of students.

Midjourney is an AI image generation tool that takes text inputs from a human and uses a machine learning algorithm trained on a massive amount of image data to produce unique images (Parsons, 2022). It is designed to create images with its unique style, making it an ideal tool for artists and creatives to express themselves through their work (Varun, 2023). Midjourney can take inspiration from various art mediums, styles, and historical artists (Parsons, 2022) such as painting, illustration, analog sketches,

digital art, and 3D visual art (Parsons, 2022; Sarikas, 2023). It can also simulate different materials such as wood, metal, fabric, and stone. MidJourney differs from other AI art generators in its ability to produce images indistinguishable from those created by human artists (Jelli, 2023). It uses cutting-edge technology to create images with a unique artistic style (Yalalov, 2022; Ortiz, 2023). In addition, it can produce stunning visuals using complimentary colors, artistic use of light and shadow, sharp details, and other features (Chase, 2023).

The potential of AI art and its impact on the art industry was also highlighted (Newton and Dhole, 2023; Raj et al., 2023). Newton and Dhole (2023) emphasized the transformative potential of AI Art which enables new artistic possibilities to access art creation. However, concerns regarding replacing human artists and the definition of true art are acknowledged. Raj *et al.* (2023) focused on the impact of AI disclosure on the evaluation of AI-generated art, highlighting the significant influence of disclosure on people's perceptions. Overall, these studies demonstrated the evolving landscape of AI Art and the importance of considering ethical, aesthetic, and evaluative aspects in its development and reception. Buckmaster (2023) explored the impact of AI-generated art on the art industry and the creative process. The author highlighted the transformative potential of AI in expanding creativity and redefining art while acknowledging the ethical considerations and challenges. He emphasized the need to consider human creativity and the broader societal implications of AI in the art industry.

We explore the combination of creative thinking spirals with AI text and image generation technologies for language and arts education, taking classic Tang poems as examples. The creative thinking spiral is used to expand imagination and literacy. In this study, it is demonstrated how ChatGPT can explore poems through human-computer interaction, explain their meaning more profoundly, and generate prompts for the AI painting tool Midjourney by creating images with the imaginative landscape world in Tang poems. We also highlight the potential of AI-driven education to support interdisciplinary teaching and learning, enrich the learning experience, and promote creative thinking.

2. Theoretical Backgrounds

2.1. Concept of Creative Thinking Spirls

Creative thinking spirals are a conceptual model proposed by Mitchel Resnick to view creative thinking as an integral component of all cognitive processing (Resnick, 2007). The spiral consists of a continuous loop of activities such as 'Imagine', 'Create', 'Play', 'Share', and 'Reflect' to frame the design thinking process (Su et al., 2022). This approach has been applied in educational settings to promote creative learning and problem-solving skills (Reich, 2017). The idea of creative thinking spirals has influenced education, particularly STEM education, to foster students' creativity, curiosity, and innovation. By encouraging students to take risks, experiment with new ideas, and learn from their mistakes, creative thinking spirals promote a growth mindset essential for success in the rapidly changing world (Chen and Lo, 2019). The principle of the creative thinking spiral is also applied to design virtual amphibious vehicles in the classroom using an open-source 3D world simulator, OpenSim (Chen, 2017). Teaching strategies are discussed to inspire creativity among students and improve their designs through recursive social interactions.

2.2. Brief Introduction to Tang Landscape Poetry

Tang poetry is a form of classical Chinese poetry that flourished during the Tang dynasty (618−907 AD). It is widely considered one of the high points of Chinese literature and is known for its rich language, vivid imagery, and profound philosophical insights (Zhang, 2019; Xu, 2021). It is a precious cultural heritage of China and occupies a significant place in Chinese and world literature. Landscape poetry is a prominent genre in Tang poetry which was in the golden age of Chinese poetry. Several characteristics of landscape poetry in Tang poetry are briefly introduced as follows.

(1) Focus on nature: Landscape poetry in Tang poetry focuses on the natural world, particularly mountains, rivers, and other natural features. Poems often celebrate the beauty and majesty of nature and the sense of awe and wonder that it inspires in the poet.

(2) Use of imagery: Tang landscape poems use vivid and evocative imagery to bring the natural world to life. The poets often use metaphor and allusion to convey nature's beauty and power and express their emotional response.

(3) Attention to detail: Tang landscape poets pay close attention to the details of the natural world, describing the colors, shapes, and textures of the landscape in intricate detail. This attention to detail creates a sense of realism and immediacy in the poems and helps to convey the poet's sense of wonder and awe.

(4) Use of traditional forms: Many Tang landscape poems are written in traditional forms such as shi or fu with strict rules and conventions for structure and rhyme. This use of traditional forms reflects the influence of classical Chinese literature on Tang poetry.

Essential landscape poets from the Tang Dynasty include Li Bai (李白), Du Fu (杜甫), Wang Wei (王維), and Bai Juyi (白居易). These poets are known for their ornate and flowery style in early Tang poetry and their clear style in late Tang poetry that reflects the nature of their contemporary moment (Zhang, 2019; Xu, 2021).

2.3. Brief Introduction to Chinese Landscape Painting

Traditional Chinese landscape painting is a form of art that emerged in China during the Tang Dynasty (618−907 AD) and has been practiced for over a millennium (Soper, 1941; Barnhart et al., 1997). It is a genre of Chinese painting that focuses on depicting the beauty and grandeur of the natural world, particularly the mountains, rivers, and forests. The characteristics of traditional Chinese landscape painting include (Law, 2011; Yu, 1987; Leung, 2021).

(1) Emphasis on nature: The natural world is the main subject of Chinese landscape painting and the artist aims to capture its beauty, majesty, and spiritual essence;
(2) Use of symbolism: The landscape often includes symbolic elements, such as rocks, trees, and animals, which have specific meanings in Chinese culture and philosophy;
(3) Use of ink and brushwork: The artist uses black ink and a brush to create lines, shades, and textures, highlighting the importance of brushwork in conveying the mood and emotions of the landscape;
(4) Use of perspective: Traditional Chinese landscape painting uses a vertical perspective with the viewer looking down on the landscape from a high vantage point, emphasizing the scale and grandeur of the natural world;
(5) Balance and Harmony: The Chinese landscape painting emphasizes balance and harmony with the elements of the landscape carefully arranged to create a sense of unity and order.

There is a strong connection between Tang poetry and Chinese landscape painting as both forms of art share a deep appreciation for the beauty and majesty of the natural world (Yu, 1987; Zhang, 2019). During the Tang Dynasty considered a golden age of Chinese culture, poets and painters were inspired by the natural world, and their works often reflected a shared aesthetic sensibility. Tang poetry, in particular, celebrates the beauty of the landscape and many poems described China's mountains, rivers, and forests with vivid and evocative language. We explore the connection between Tang poetry and landscape painting through the interplay of finely tuned prompts and generated images. The results significantly uncover the hidden landscape world in the Tang poems.

2.4. Brief Review of Prompt Engineering

Prompt engineering is an innovative natural language generation technology that generates high-quality and natural-sounding text. It uses large language models (LLM) to predict the next word or sentence and generate text based on the input prompt. Prompt engineering has wide applications in natural language processing, text generation, and dialogue systems (Cuofano, 2023; Eliaçık, 2023; Hardesty, 2022). The most important applications include intelligent customer service, automatic summarization, text translation, search engine optimization, and automatic writing. In these areas, prompt engineering can improve text generation speed and quality, reduce costs, and increase efficiency, making AI applications more accessible and convenient. Prompt engineering also improves automatic writing by generating high-quality and natural-sounding text based on a given input prompt. For example, a content creator or marketer can use prompt engineering to generate a blog post or a social media post by entering a brief prompt such as "Write a blog post about the benefits of sports." The prompt engineering system uses its language model to generate a coherent and well-written article on sports. This can save time and effort for content creators and marketers while also ensuring that the generated content is of high quality and meets the desired tone and style. Prompt engineering improves prompt writing for AI Art platforms such as Midjourney or Stable Diffusion by providing a structured approach to generating prompts and producing the desired output. This involves breaking down the prompt into specific components such as subjects, art forms, style/artists, and quality boosters (Taylor, 2023; Raj, 2022; Monigatti, 2022). By carefully selecting and combining these components, prompt engineers create prompts to generate high-quality images or other forms of AI-generated art. For example, the platform uses a prompt engineering system to generate a prompt such as "Create an abstract portrait of a person using vivid colors and bold brushstrokes." This provides more specific guidance for the artist than a generic prompt like "Create an abstract painting." Additionally, prompt engineering is used to generate multiple prompts and allow the artist to choose the one that inspires them the most, leading to more personalized and creative artwork. This improves AI-generated art's overall quality and creativity and provides a better experience for artists and the audience.

Recently, an automatic prompt editing pipeline, RePrompt, has been proposed to refine AI-generative art toward precise expressions (Wang et al., 2023). They curate intuitive text features and develop a proxy model to analyze the feature effects on the AI-generated image with a large dataset. Applying model explanations, they curate a rubric to allow automatic prompt editing. We improve the emotional expressiveness of AI-generated images and develop an automated method to refine text prompts toward the

precise expression of the generated images. The proposed method potentially benefits creativity in visual art creation and self-expression.

3. AI-Generated Chinese Landscape Painting from Tang Poem "The Difficult Road to Shu"

3.1. Introduction to Poet Li Bai and "The Difficult Road to Shu"

Li Bai (also known as Li Po) was a famous Chinese poet who lived during the Tang Dynasty (618−907 AD). He is widely regarded as one of the greatest poets in Chinese history. He is known for his romantic and adventurous spirit and his ability to capture the beauty and grandeur of nature in his poetry. Li Bai's poetry is known for its vivid imagery, emotional depth, and musicality. He wrote about various subjects, including nature, love, friendship, and politics, and his works often expressed his personal feelings and experiences. "The Difficult Road to Shu" is one of Li Bai's most famous and celebrated poems. It recounts his journey on the "Road to Shu," a treacherous mountain road that leads to the Sichuan region in southwestern China. The poem begins with Li Bai setting out on his journey, accompanied by his friend, the poet Du Fu. As they travel, they encounter cliffs, treacherous rapids, and dangerous precipices, and Li Bai marvels at the beauty and grandeur of the natural world around him. The poem is notable for its vivid and evocative descriptions of the landscape, infused with awe and wonder. Li Bai portrays Sichuan's mountains, rivers, and forests as almost otherworldly in their beauty and majesty, and his language is rich with metaphor and symbolism.

In this research, we extract a vivid description of the natural landscape on the Shu Road from this poem and use the translation of the famous translator Professor Xu Yuanchong as the prompt of Midjourney (Xu, 2021). The poem is as follows.

Between the sky and peaks them is not a foot's space.
And ancient pines hang, head down, from the cliff's surface.
And cataracts and torrents dash on boulders under,
Roaring like thousands of echoes of thunder.

3.2. AI Painting of "The Difficult Road to Shu" by Midjourney

Fig. 1 shows landscape paintings of the above four verses painted by Midjourney. Fig. 1(a) shows a landscape painting created from the first two verses of the poem. The landscape is a perfect illustration of the interplay of mountains and trees. Fig. 1(b) shows a landscape painting created from the poem's last two lines. In the lower half of the painting, the waterfall and the torrent can be seen crashing vigorously against the boulders. Fig. 1(c) shows a landscape painting created from four lines of poetry. Several vital elements include old pine trees, steep peaks, and waterfalls. It is worth noting that the style of Chinese landscape painting in this study is a mixture of Traditional Chinese landscape painting style and Impressionism style to present the sense of ethereality created by the air perspective in the painting.
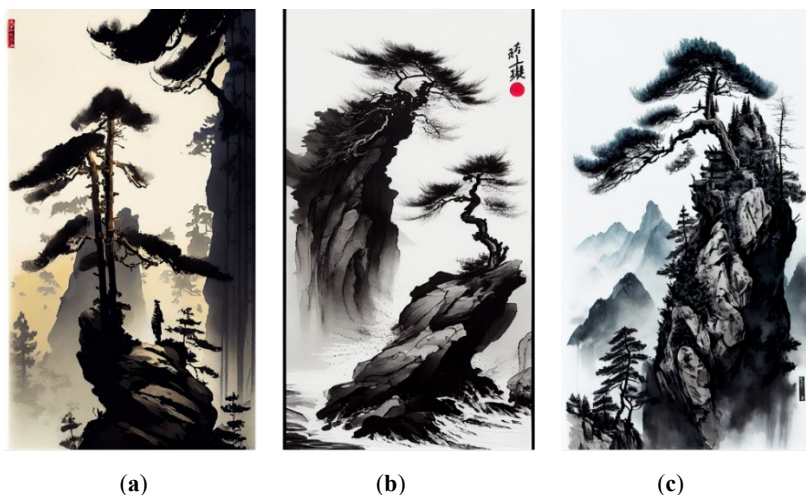

(a) (b) (c)

Fig. 1. Chinese Landscape paintings of the selected verses in the Tang poem "The Difficult Road to Shu" generated by Midjourney using (**a**) the first two verses, (**b**) the last two verses, and (**c**) the entire four verses.

To explain how these paintings are generated, the prompt that generated Fig. 1(c) is shown as follows.

"Between the sky and peaks them is not a foot's space. And ancient pines hang, head down, from the cliff's surface. And cataracts and torrents dash on boulders under, Roaring like thousands of echoes of thunder.", soft illumination,

Impressionism, Traditional Chinese Ink painting, trending in Artstation, --no watermark, intricate details --ar 9:16 --q 2 --chaos 30 --upbeta --v 4

This Midjourney prompt includes a description of a landscape that represents the natural world. The first sentence, "Between the sky and peaks them is not a foot's space," describes the vastness of the landscape and the difficulty of traversing it. The second sentence, "And ancient pines hang, head down, from the cliff's surface," adds a sense of mystery and wonder by describing the ancient trees that cling to the cliffs. The third sentence, "And cataracts and torrents dash on boulders under, Roaring like thousands of echoes of thunder," emphasizes the power and intensity of the natural world, with the waterfalls and rapids crashing against the boulders. The prompt also mentions "soft illumination," which suggests a softer and more diffuse light source, creating a dreamlike atmosphere. The mention of Impressionism and Traditional Chinese Ink Painting indicates a style of art focused on capturing the essence of the landscape rather than its realistic details. The reference to Artstation suggests a platform for sharing and showcasing artwork. The mention of "no watermark" suggests that the artwork is high-quality and original. At the same time, the technical specifications, such as "ar 9:16 --q 2 --chaos 30 --upbeta --v 4", describe the settings for creating the artwork, such as aspect ratio (--ar), quality (--q) and chaos (--chaos) level.

3.3. Importance of Combining Artistic Styles

Fig. 2 shows landscape paintings with prompts similar to those in Fig. 1, except with a different aspect ratio of 16:9. The painting results show an aesthetic taste similar to that of Chinese landscape painting in many details of the painting. This result, in terms of the structure of the prompts, is mainly due to the combination of two artistic styles, Impressionism and Traditional Chinese Ink Painting, which are explained below.

(a)   **(b)**

Fig. 2. Chinese landscape paintings of the selected verses in the Tang poem 'The Difficult Road to Shu' generated by Midjourney in a 16:9 aspect ratio using the four verses with different chaos of (**a**) 30 and (**b**) 50.

Impressionism and traditional Chinese ink painting are crucial styles in art history as they have profoundly influenced how artists think about and represent the natural world. Impressionism emerged in France in the late nineteenth century. It is characterized by a preoccupation with capturing the 'impression' or feeling of a moment or scene rather than its realistic details. Loose brush strokes, bright colors, and a sense of movement and atmosphere often characterize impressionist paintings. As briefly described in Section 2.2, traditional Chinese ink painting has a long history, dating back to ancient China. The style emphasizes the beauty of simplicity and minimalism, focusing on capturing the essence of a scene rather than the details of reality. This characteristic echoes how Impressionism challenged the traditional Western notion of art as a realistic representation of the world. Interestingly, such a viewpoint is similar to the emphasis of the Tang Dynasty landscape poets on using imagery in their creative conceptions.

In this study, we attempt to merge Impressionist and traditional Chinese ink painting into one, and the painting results in a unique and exciting style that blends the best of both worlds. The brushstrokes of such a painting are likely to be loose and expressive (as in the ethereal and imposing mountains in the background of Fig. 2), focusing on capturing the mood and atmosphere of the scene rather than its realistic details. The use of color is necessary to create a sense of vibrancy and energy (as shown by the oddly shaped rocks and cliffs in the foreground of Fig. 2), while black ink and water will be used to create a sense of depth and contrast. To achieve this style, an artist might use loose brushstrokes and bold colors to create the impressionistic elements of the painting while also incorporating the minimalistic and expressive qualities of the traditional Chinese ink painting style. The use of negative space and the emphasis on capturing the scene's essence rather than its realistic details is critical in this style. In general, the brushwork of such a painting is expressive, bold, and full of energy, capturing the beauty and essence of the natural world uniquely and innovatively.

4. Using ChatGPT to Generate Prompts for Transferring Styles in AI Painting

4.1. Reimagining Poem Using Chinese Ink and Wash Brush Strokes

In this section, we use ChatGPT to reimagine the poem using Chinese ink and wash brush strokes. ChatGPT gives an exciting version of the poem as a modified prompt for Midjourney as shown in Fig. 3.

Sky and peaks blend, no space for foot to tread,
Ancient pines hang, head bowed low, wispy threads.
Cataracts and torrents rush and crash on boulders below,
Roaring like a thousand thunderclaps, nature's symphony aglows.

As shown in Fig. 3, the brushstrokes are bold and free, capturing the essence of the landscape in a minimalist way. The use of black ink and grey washes creates a sense of depth and contrast, while the sparse use of color evokes a sense of the sublime. The brushwork is fluid and dynamic, evoking the energy and movement of the natural world. Using Chinese ink and wash brush strokes in this rewritten version of the poem creates a sense of simplicity and elegance, allowing the landscape's natural beauty to shine. The minimalist approach to brushwork and color evokes a sense of serenity and tranquility as if the reader is standing amid the landscape, taking in its majesty and wonder. More significantly, using black ink and grey washes creates a sense of depth and contrast, emphasizing the interplay between light and shadow in the landscape. The sparse use of color allows the reader to focus on the essential elements of the scene such as the ancient pines and rushing cataracts and torrents. Overall, the Chinese ink and wash brush strokes used in this rewritten version of the poem by Li Bai create a vivid and immersive image of the landscape, drawing attention to the essential elements of the scene. The use of sensory language and minimalistic brushwork helps create a sense of presence and immediacy, allowing the reader to experience the beauty and wonder of the natural world fully.
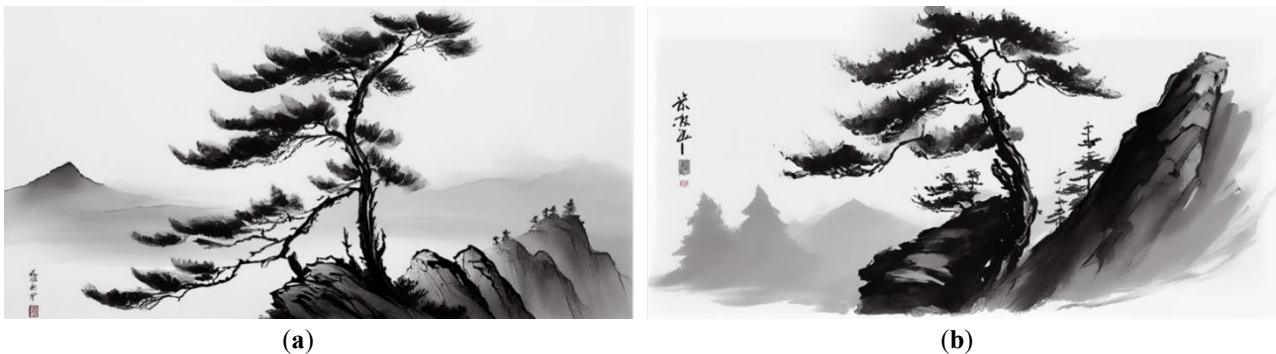

(a)   (b)

Fig. 3. Chinese landscape paintings of the Tang poem "The Difficult Road to Shu" generated using Chinese ink and wash brush strokes with a chaos level of 30 with the same prompt.

4.2. Reimagining Poem as a Landscape Photographer

In this section, we use ChatGPT to reimagine the poem from the point of view of a landscape photographer. ChatGPT gives a fascinating version of the poem as a modified prompt for Midjourney as shown in Fig. 4.

The sky and peaks blend seamlessly, a grand vista of nature's majesty.
Ancient pines cling to the cliff's surface, their heads bowed low, creating a sense of drama and mystery.
The cataracts and torrents rush and crash against the boulders below,
Their roar is like a symphony of sound echoing through the landscape.

As shown in Fig. 4, in the context of the poem by Li Bai, a landscape photographer seeks to capture the essence of the natural world in a way that reflects its power and majesty. The use of dramatic and mysterious elements such as ancient pines and rushing cataracts and torrents, creates a sense of tension and awe, drawing the viewer into the world of the photograph. The grandeur and visual splendor of the natural world are always core themes in landscape photography. Photographers use techniques such as long exposures, composition, and manipulating light and shadow to create images that capture the essence in an artistic and inspiring way.

However, focusing on light and shadow, texture, and motion helps to create a sense of presence and immediacy, allowing the viewer to immerse themselves in the photograph's world fully. The resulting images are a tribute to the natural world and its beauty, capturing its power and intensity in a way that is both timeless and evocative. In short, landscape photography is a visual art form that seeks to capture the beauty and majesty of the natural world in an artistic and inspiring way. The use of various techniques and

elements such as light and shadow, texture, and motion helps to create both dramatic and evocative images, drawing the viewer into the world of the photograph and allowing them to experience the wonder and awe of the natural world.

Fig. 4. Chinese landscape paintings of the Tang poem 'The Difficult Road to Shu' were generated from the viewpoint of a landscape photographer with a chaos level of 30.

5. Discussions

5.1. Comparison of AI Painting by Scenery Description Perspectives

The three versions of the poem share a common theme of describing a scenic landscape but differ in their approach to this description. In the first version of the poem by Professor Xu Yuanchong, vivid language was used to describe the scene. He emphasized the narrow space between the sky and the peaks and the ancient pines that hang head down from the cliff's surface. Cataracts and torrents are described as roaring like thousands of echoes of thunder. The second version of the poem was written by ChatGPT with the perspective of Chinese ink and wash brush strokes. It also describes the narrow space between the sky and peaks but in a more poetic way. The ancient pines are described as hanging with their heads bowed low, creating wispy threads. Cataracts and torrents rush and crash on the boulders below, creating a symphony of nature that is both powerful and beautiful. ChatGPT wrote the third version of the poem by taking a viewing angle from a landscape photographer. It emphasizes the seamless blend between the sky and peaks, creating a grand vista of nature's majesty. The ancient pines are described as clinging to the cliff's surface, making sense of drama and mystery. Cataracts and torrents are related to roaring like a symphony of sounds echoing through the landscape. Each version of the poem has its style and approach to describing the landscape. The first version of the poem focuses on the power and intensity of nature, while the second version of the poem uses more poetic and ethereal language. The third version of the poem emphasizes the grandeur and drama of the landscape, creating a sense of awe and wonder.

5.2. Comparison of AI Painting by Aesthetic Style Perspectives

These three versions of the poem have common themes of depicting scenic landscapes but differ in their approach to the aesthetic style of images. Professor Xu Yuanchong wrote the first version of the poem. The power of nature is described in vivid and intense language. The image is vivid and powerful, with ancient pines hanging out and thunderous thundering like storms and waves. The aesthetic style is based on raw power and intensity. The second version of the poem, written by ChatGPT, uses Chinese ink and brush strokes. It uses more poetic and atmospheric language to describe the landscape. The images are softer, with ancient pine trees hanging low with their heads, cataracts, and torrents climbing and falling on the rocks below. The aesthetic style is a style of beauty and harmony. ChatGPT also wrote the third version of the poem from the perspective of a landscape photographer. It focuses on the size and drama of the landscape. These images are beautiful, the sky and peaks blend smoothly, and ancient pines are attached to the surface of the cliffs. Cataracts and torrents are described as a symphony of sound that echoes through the landscape. The aesthetic style is one of the great and the great. In general, each version of the poem has a unique aesthetic style. The first has a raw power and intensity aesthetic, the second a beauty and harmony aesthetic, and the third a splendor and grandeur aesthetic.

6. Conclusions and Future Works

We present preliminary results of exploring landscape painting in Tang poetry using AI-generated image techniques. We compare the effects of landscape painting using different versions of poems as a Midjourney prompt, highlighting the similarities and differences between the three versions from the point of view of landscape painting techniques and aesthetic styles. We demonstrate how AI-generated image techniques can be used to study traditional cultural elements such as Tang's poetry. Using ChatGPT and Midjourney, we create high-quality paintings that capture the essence of traditional Chinese landscape painting, including art styles, image lighting, and other creative elements provided by an AI-generated image software called Midjourney. It is demonstrated that technology could improve the understanding of traditional cultural elements by promoting creativity and influencing literature and artistic education. Secondly, we compare the results of three different versions of the poem "The Difficult Road to Shu" as a basis for generating images from Midjourney. The similarities and differences between these versions are analyzed from the point of view of landscape rendering techniques and aesthetic styles. It is noted that each version produced unique paintings with different styles and emphasized the potential of AI-generated content to produce a range of creative outputs. AI-generated image techniques significantly impact literature and artistic education. Using AIGC technology to explore traditional cultural elements such as Tang's poetry, students can better understand their cultural heritage and develop their creativity through modern tools. Furthermore, it is revealed how AI-generated content produces various creative outputs with different styles and allows artists and content creators to explore new forms of expression.

In the future, we plan to explore the possibilities of using AI-generated image techniques for creating landscape paintings and interpreting and analyzing existing Chinese landscape artworks. A promising feature of Midjourney is to describe prompts by importing artworks such as classical Chinese landscape paintings into AI models and utilizing them to provide insights into the stylistic features, composition, and cultural symbolism within the artworks. This helps art historians, scholars, and enthusiasts better understand the historical and cultural context of Chinese landscape painting. Another research trend is the potential for collaborative creation between human artists and AI models in Chinese landscape painting. How artists can integrate AI-generated suggestions and prompts into their artistic process needs an investigation to leverage the unique capabilities of AI and enhance creativity while maintaining the artist's creative control and individual style. This collaborative approach can foster new artistic expressions and push the boundaries of traditional Chinese landscape painting. By pursuing these future research directions, we will continue to advance the AI-generated Chinese landscape painting and Tang poetry field, deepen our understanding of traditional cultural elements, and explore new avenues for creative expression and cultural preservation.

Regarding the objective analysis comparison in this study, it is essential to recognize that analyzing artistic outputs, especially in AI-generated art, can be subjective to some extent. In comprehensively comparing different versions of the poem "The Difficult Road to Shu" from the perspective of landscape painting techniques and aesthetic styles, evaluating art often involves subjective interpretation and personal preference. To address this concern and enhance the objectivity of the related analysis, future studies need to consider incorporating additional evaluation methods such as involving expert panels or conducting user studies to gather a broader range of perspectives. We can better understand the artistic outputs and their impact by incorporating diverse viewpoints. Furthermore, quantitative metrics such as color composition analysis or style similarity measures provide more objective measurements to assess the generated paintings' similarities and differences.

Conflicts of Interest: The authors declare no conflict of interest.

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