

AI-assisted Curatorial Research

-- New Perspectives from Photography to Exhibitions

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ABSTRACT

This thesis explores the application of Artificial Intelligence (AI) in curation, especially from the screening of photographic works to a new perspective of exhibition design and audience experience. With the rapid development of AI technology, the field of curation is undergoing profound changes. AI improves the efficiency and accuracy of work screening through image recognition and automated processing in photography; in exhibition design, it provides innovative tools for exhibition layout and optimisation by using Virtual Reality (VR) and Augmented Reality (AR) technology; and in terms of audience experience, AI enhances interaction and engagement through intelligent guides and personalised recommendations. interactivity and engagement. However, the application of AI also faces challenges, including data privacy, creative constraints, costs and technical thresholds. Future research will focus on the integration of AI with artistic creation, the enhancement of personalised experiences, privacy protection, and the integration of cross-domain technologies. By addressing these challenges, AI is expected to drive continued innovation and development in the curatorial industry, providing smarter and more efficient solutions for art presentation and audience experience.

KEYWORDS

Artificial Intelligence; Curation; Virtual Reality; Personalised Experience.

1. INTRODUCTION

In today's digital age, Artificial Intelligence (AI) technology is transforming industries at an unprecedented rate. Photography and curation, as an important part of the arts and culture sector, have also been profoundly affected by AI technology. Photography is not just the art of capturing moments, but also a way of telling stories through visuals. Curating is a bridge to present these stories to the audience, with the function of organising, presenting and interpreting artworks. The application of AI technology in photography and curating has injected new vitality and possibilities into these traditional fields.

This study aims to explore the specific application of AI technology in photography and curation and the impact it brings. Starting from the basic concepts of photography, it analyses how AI assists photographers to create better quality works; then it explores the role of AI in the curatorial process, including the screening of works, the design of exhibitions and the optimization of audience experience. Through a comprehensive analysis of the AI-assisted process, it reveals its advantages in improving efficiency and enhancing the audience's interactive experience, while not ignoring the challenges and limitations it brings[1]. Finally, it looks forward to the future development trend and research direction of AI technology in the field of photography and curation, providing valuable references and insights for practitioners and researchers in related fields.

2. APPLICATION OF AI TECHNOLOGY IN PHOTOGRAPHY

2.1. Basic Concepts of Photography

Photography is an art and technology that uses the principle of optical imaging to record images through light-sensitive materials or electronic light-sensitive devices. It originated with inventions in the early 19th century and has continued to evolve with advances in technology. The core of photography lies in capturing light, which involves the adjustment of exposure time, aperture, shutter speed, focal length and other technical parameters to achieve the desired visual effect[2]. Photography is not only a means to record reality, but also an art form to express thoughts and convey emotions. In terms of types, photography can be divided into a variety of categories, including landscape photography, portrait photography, documentary photography, art photography and so on. Each type has its own unique techniques and expressions. For example, landscape photography focuses on capturing natural beauty, paying attention to composition and the use of light; portrait photography focuses on expressing the personality and emotions of the characters, highlighting the subject through elements such as light, posture and background. With the development of digital technology, photography has moved from the traditional film era into the digital era. Digital photography not only improves the convenience and efficiency of photography, but also provides more possibilities for post-processing and image editing. Nowadays, photography has become an important part of popular culture, and both professional photographers and ordinary enthusiasts can record and share the beautiful moments in life through photography.

2.2. Application of AI in Photography

The application of AI technology in photography has greatly expanded the possibilities and creative space of photography. AI-assisted autofocus and exposure adjustments enable photographic equipment to automatically optimise shooting parameters according to the scene and lighting conditions, improving the quality of the shot. Modern smartphone cameras make extensive use of these technologies, enabling users to take high-quality photos without specialist knowledge. AI excels in image recognition and processing. Through deep learning algorithms, AI is able to recognise people, objects and scenes in photos, enabling intelligent classification and labelling[3]. This brings great convenience in photo management and retrieval, allowing users to find the images they need more quickly. In addition, AI is able to perform advanced image processing, such as noise reduction, detail enhancement and colour correction, making photos clearer and more vivid. AI technology has also driven the development of creative photography. For example, AI Art creates artworks with unique styles through algorithms that push the boundaries of traditional photography. Filters and special effects apps use AI to process images in real time, providing users with a variety of creative options, allowing each photo to display a different artistic style. AI also plays an important role in retouching and editing. With automated image restoration and editing tools, photographers can complete tedious post-processing work more quickly and increase work efficiency. At the same time, AI can help identify and remove unwanted elements to make photos more perfect.

3. APPLICATION OF AI TECHNOLOGY IN CURATION

3.1. Basic Concepts of Curating

Curating is a professional practice of organising, presenting and interpreting works of art or cultural materials with the aim of communicating specific themes and narratives through the design and layout of an exhibition. The role of the curator includes selecting and collecting exhibits, designing the exhibition space, planning the content of the exhibition, organising exhibition activities, and interacting and communicating with the audience. Curating is not just about presenting works of art, it is about creating an engaging viewing experience through careful planning and design. The basic

process of curating an exhibition usually includes several key steps: the first is to determine the theme of the exhibition, which can be based on a specific art genre, historical event, cultural phenomenon or social issue. The next step is the selection and collection of works. The curator needs to select from a large number of works those that best represent the theme, and consider the relevance and interaction between these works. In the exhibition design stage, curators need to consider factors such as the layout of the exhibits, lighting, colours, spatial movement, etc., to ensure that the audience can have the best visual and emotional experience during their visit. In addition, curators need to prepare exhibition descriptions, guidebooks and related promotional materials to help visitors better understand and appreciate the content of the exhibition. Finally, curators need to organise and coordinate activities such as exhibition opening, lectures, workshops, etc. to attract audience participation, and publicise and promote the exhibition through various channels to expand its influence and coverage.

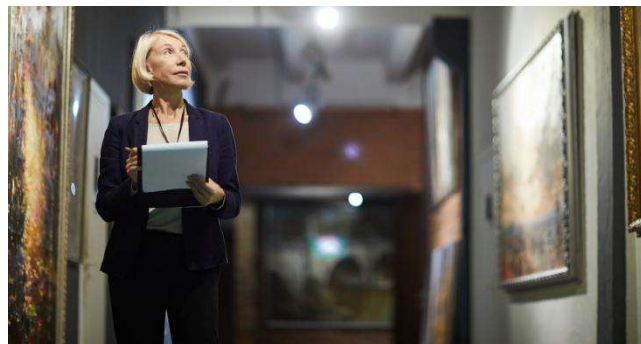


Figure 1. Basic Concepts of Curating

3.2. Application of AI in Curation

The application of AI technology in curation is revolutionising the traditional curatorial approach and viewing experience. AI assists curators in work selection and theme planning. Through image recognition and analysis technology, AI can quickly screen out works that match the theme from a large number of artworks and make intelligent recommendations based on factors such as style, content and artistic value, greatly improving curatorial efficiency and accuracy. AI plays an important role in exhibition design. Using virtual reality (VR) and augmented reality (AR) technologies, curators can simulate and optimise the exhibition layout in a virtual environment, preview the exhibition effect in advance and make adjustments. This not only saves time and costs, but also improves the flexibility and creativity of exhibition design. AI can also optimise the exhibition line and display mode based on audience behaviour and feedback data, enhancing the audience's viewing experience. AI also has significant applications in audience interaction and experience[4]. Using natural language processing (NLP) technology, the intelligent guide system can answer visitors' questions in real time and provide personalised guide services. Through image recognition and positioning technologies, visitors can use their mobile phones or other devices to access detailed information and multimedia content about exhibits, enhancing interactivity and engagement. AI is also able to understand visitors' interests and preferences through big data analysis, providing curators with data support to help them better plan future exhibitions. AI algorithms on social media and online platforms can also automatically generate and push personalised exhibition recommendations to attract more potential visitors.

4. AI-ASSISTED PROCESS FROM PHOTOGRAPHY TO EXHIBITION

4.1. AI-assisted Photography Selection

AI demonstrates powerful auxiliary functions in the screening of photographic works, and through image recognition and deep learning technology, it can quickly and efficiently screen works that meet specific criteria. AI is able to analyse a large number of photographs, identify the characters, objects, scenes and emotional expressions in them, and automatically label and classify each photograph. In this way, curators, when faced with a large amount of material, can search and filter by keywords to quickly find works that match the theme and style of the exhibition. AI can screen photos according to their technical quality and artistic value. By analysing the resolution, composition, colour, light and shadow of the image, AI is able to assess the quality of the photos and recommend the best works. This automated quality check not only saves curators a lot of time and effort, but also ensures the overall standard of the exhibits. AI technology is also able to further optimise the selection process by learning the aesthetic preferences and selection criteria of curators. Curators can train AI models to understand which types of photos are more compatible with the needs of a particular exhibition, thus improving the accuracy of the selection process. As the AI continues to learn and improve, its screening ability will become stronger and better able to meet the curator's individual needs. The AI can also analyse audience feedback and behavioural data to understand which works are more popular or have higher interactivity. These data provide valuable references for curators, helping them make more informed choices of works for future exhibitions.

4.2. AI-assisted Exhibition Design

AI is playing an increasingly important role in exhibition design, making it more efficient and creative through intelligent and data-driven approaches. AI can help curators carry out exhibition layouts and scenario simulations in virtual environments by using virtual reality (VR) and augmented reality (AR) technologies. Curators can try different design solutions in the virtual space, preview the exhibition effect in real time, and make adjustments and optimisation. This kind of virtual design not only saves time and cost, but also improves the flexibility and accuracy of the design. AI can analyse and predict the behaviour and movement of the audience. Through cameras and sensors, AI can collect the audience's action trajectory and stay time in the exhibition, and use these data to optimise the placement of exhibits and the exhibition dynamic line, to ensure that the audience can get the best viewing experience in the process of visiting the exhibition. AI can also dynamically adjust the exhibition content and display mode according to the interest and feedback of the audience, to enhance the audience's sense of participation and satisfaction. AI in the exhibition design can also provide intelligent recommendation and personalised service. By analysing the audience's historical data and preferences, AI can recommend personalised exhibition routes and exhibit information, so that each audience can enjoy a customised exhibition experience according to their interests. Intelligent guide system and interactive display screen can also make use of AI technology to provide real-time information query and multimedia display, enhancing interactivity and interest. AI technology can also assist curators in data analysis and decision support. Through in-depth mining and analysis of exhibition data, AI can identify potential problems and opportunities, provide curators with valuable insights and suggestions, and help them make smarter design decisions.

4.3. AI-assisted Audience Experience

AI technology has shown great potential to enhance the visitor experience, providing a more personalised and interactive viewing experience. Using natural language processing (NLP) and speech recognition technologies, the intelligent tour guide system can answer visitors' questions in real time and provide detailed information and background stories about the exhibits. Visitors only need to interact with the guide system through mobile phones or other devices to access rich

exhibition content, enhancing the depth and interest of the exhibition. AI provides visitors with an immersive and interactive experience through augmented reality (AR) technology. Visitors can use smart devices to scan exhibits and watch dynamic displays of virtual information superimposed on physical objects, such as animations, audio commentary and 3D models. This interactive approach not only increases the interest of the exhibition, but also helps the audience better understand and appreciate the exhibits. AI is also able to provide personalised exhibition recommendations and services based on the audience's behavioural data and preferences. By analysing the audience's visit records and interests, AI can recommend relevant exhibition routes, exhibits and activities, ensuring that each audience can enjoy a customised exhibition experience according to their interests. The intelligent recommendation system can also continuously optimise and update the recommended content based on visitors' feedback to enhance visitor satisfaction. AI also plays a bridging role in the visitor experience, allowing visitors to share their own experiences and insights, and participate in discussions and interactions through social media and online platforms. AI algorithms can analyse this feedback to help curators better understand the needs and preferences of the visitors, and to optimise future exhibition design and planning. AI can also analyse the feedback to help curators optimise future exhibition design and planning. AI can also analyse the feedback to help curators optimise future exhibition design and planning. AI can also help curators to conduct audience behaviour analysis, identify the audience's behavioural patterns and points of interest in the exhibition, and provide data support to help them make more targeted decisions. In these ways, AI not only enhances the audience's exhibition experience, but also provides curators with valuable insights and tools.



Figure 2. AI-assisted audience experience

5. ADVANTAGES AND CHALLENGES OF AI TECHNOLOGY IN CURATION

5.1. Strengths

The application of AI technology in curation has many advantages, which significantly improves curatorial efficiency and viewing experience. AI's automation and intelligent processing ability greatly improves curatorial efficiency. Through image recognition, natural language processing and data analysis, AI is able to quickly screen and classify a large number of artworks, reducing the cumbersome initial screening work of curators and allowing them to focus more on creativity and design. AI is able to provide personalised services and experiences. By analysing visitors' behavioural data and interest preferences, AI can provide customised exhibition routes and information recommendations for each visitor, enhancing the interactivity and engagement of the exhibition. Personalised guided tours and intelligent recommendation systems enable visitors to better enjoy the exhibition according to their interests, enhancing satisfaction and loyalty[5]. AI technology also shows great potential in exhibition design and optimisation. Using virtual reality (VR) and augmented reality (AR) technology, curators can preview the exhibition layout and effect in a virtual environment, and make real-time adjustments and optimisation. This not only saves time and costs, but also

improves design flexibility and creativity. AI can provide curators with decision support through data analysis and prediction. Through deep mining of audience behaviour, feedback and social media data, AI is able to identify potential trends and issues, providing valuable insights and suggestions for future exhibition planning.

5.2. Challenges

Despite the many advantages that AI technology brings to curation, its application faces a number of challenges. Data privacy and security issues are an important challenge. When using AI for audience data analysis and personalised recommendations, a large amount of personal information and behavioural data needs to be processed, which can lead to privacy breaches and data misuse. Therefore, ensuring data security and privacy protection becomes a must. The dependency of AI technology may lead to a lack of creativity and artistry in curation. While AI can efficiently process data and optimise designs, it is largely based on pre-existing data and algorithms, and may show limitations for artistic decisions that are more creative and subjective. The unique perspective and in-depth thinking of curation still requires the participation and control of human curators. The high cost and technical threshold of AI technology is also a challenge. Deploying and maintaining advanced AI systems requires high costs and technical support, which may make it unaffordable for some smaller museums and arts organisations. These organisations may not be able to fully utilise AI technology due to limited resources, which may affect the quality and impact of their exhibitions. What's more, the accuracy and reliability of the AI system may also become an issue. The algorithms and models of AI may be misjudged or biased, affecting the selection of works and the design of exhibitions. Therefore, while relying on AI, human supervision and review are still needed to ensure the accuracy and quality of the final results. The rapid development and upgrading of AI technology has also brought challenges to curatorial work. As technology continues to advance, curators need to constantly update and learn new tools and methods in order to stay at the forefront of technology, which puts higher demands on curators' professionalism and adaptability.

6. FUTURE DEVELOPMENT TRENDS AND RESEARCH DIRECTIONS

6.1. Technology Trends

As AI technology continues to advance, technology trends in curation are evolving. The application of deep learning and natural language processing (NLP) technologies will continue to expand. These technologies enable AI to perform image recognition, content analysis and text generation more accurately, improving the intelligence of exhibit screening and exhibition interpretation. In the future, AI systems will become more sophisticated, capable of handling more complex art data and providing more accurate exhibition recommendations. The application of virtual reality (VR) and augmented reality (AR) technologies will become more common. Through these technologies, curators will be able to design and optimise exhibitions in a virtual environment, and audiences will be able to experience enhanced exhibit information and interactive content through AR. These technologies will provide audiences with a more immersive and interactive viewing experience, as well as more creative space for exhibition design. The personalised recommendation system of artificial intelligence will become more intelligent and precise. Through big data analysis and machine learning, AI will be able to better understand audience preferences and provide more personalised exhibition recommendations and services. This precise recommendation not only improves audience satisfaction, but also increases the attractiveness and interactivity of the exhibition. Ethics and privacy protection technologies for AI will also continue to evolve. With the wide application of AI technology, data privacy and security issues have become an important concern. In the future, AI systems will pay more attention to following ethical norms and privacy protection standards to ensure data security and transparency.

The trend of cross-domain integration of AI technologies will be further strengthened. For example, the combination of AI with Internet of Things (IoT), blockchain and other technologies will bring new application scenarios and solutions for curation. The integration of these technologies will drive curation in a more efficient and intelligent direction, creating more innovative exhibition forms and experiences.

6.2. Research Directions

Future research in the field of AI-assisted curation will focus on several key directions. The deep integration of AI and art creation is an important research direction. Exploring the potential of AI in art creation, such as generating artworks and creative designs, will bring more innovative possibilities for curation. Studying how to use AI algorithms to generate works of artistic value and effectively integrate these works into exhibitions will be an area worthy of in-depth exploration. The enhancement of personalised exhibition experience is also an important research direction. Studying how to use AI to analyse visitors' behavioural data and interest preferences to further optimise the exhibition recommendation system and provide a more accurate and personalised viewing experience will significantly enhance visitor satisfaction and engagement. This includes improved intelligent tour guiding systems, augmented reality experiences, and personalised exhibition content recommendations. The resolution of data privacy and ethical issues is also an important direction for future research. With the wide application of AI technology, how to ensure the security and privacy protection of audience data has become an important issue. Research on how to efficiently utilise data and develop reasonable ethical norms while safeguarding privacy will be crucial to the application of AI in curation. The integration and application of cross-domain technologies is also a direction of interest. For example, the combination of AI with Internet of Things (IoT) and blockchain technologies can bring new solutions in exhibition management, work tracking, and audience interaction. Studying how these technologies are integrated and the potential advantages they bring will drive innovation in the curatorial industry. Interpretability and transparency of AI technologies are also future research priorities. Improving the interpretability of AI systems so that curators and audiences can understand the decision-making process and results of AI will help increase trust and acceptance.

7. CONCLUSION

The application of AI technology in curatorial field is profoundly changing the traditional curatorial practice, from work screening to exhibition design to audience experience, all of which show great potential and innovation opportunities. AI not only improves the efficiency and accuracy of curation, but also provides a more personalised and interactive exhibition experience for the audience. In the screening of photography works, AI helps curators quickly screen and classify a large number of works through image recognition and data analysis, ensuring the quality and consistency of exhibition content. In exhibition design, AI uses virtual reality and augmented reality technologies to provide curators with flexible design and optimisation tools, while also enhancing the creativity and visual effect of the exhibition. The application of AI has also brought about significant improvements in the audience experience, enhancing the sense of participation and satisfaction of the audience through intelligent guides, personalised recommendations and interactive displays. However, the application of AI also faces a number of challenges, including issues of data privacy and security, creative constraints, cost and technical thresholds. Future research and development needs to address these challenges to ensure that the application of AI technology in curation can continue to develop in a healthy manner.

Looking ahead, trends in AI technology in curation will include the further application of deep learning and natural language processing technologies, the spread of virtual and augmented reality technologies, the enhancement of personalised services, the resolution of data privacy and ethical

issues, and the integration of cross-domain technologies. These developments will drive innovation and progress in the curatorial industry, bringing more possibilities and opportunities for art presentation and audience experience.

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