Creating the "Everywhen" Urban Experience in Singapore: An Artist-Driven Interweaving of Time and Space Using AI-Powered Projection Mapping and Screen Installations

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Abstract

The concept of "Everywhen" invites us to traverse the boundaries of time, seamlessly uniting the past with the present and future. At the forefront of this exploration are artists using AI-powered tools to reshape our perception of urban landscapes. This paper examines the conceptualization and technical execution of three artist-led urban media art projects in Singapore: the projection mapping of "(RE)ROOTING in Progress" at the 2021 Light to Night Festival, "Classic of Mountains and Seas", and "AI Meets Wu Guanzhong" displayed on the urban screen at Nanyang Technological University in 2022. Focusing on the roles of artists and AI in the creative process, the study reveals that urban settings not only infuse AI with meanings but serve as rich sources of datasets. Artists use AI as a tool while retaining control over the final output. While AI-enhanced installations possess the capacity to weave the fabric of time and space into artistic expressions, they also present challenges related to data concerns. In this melding of art, technology, and urban spaces, it is the artists who are pivotal in guiding AI to establish a temporal cultural thread, reshaping our connection to history, and curating an "Everywhen" ambiance within the city.

Keywords

Practice-based Research, Urban Media Art, Artificial Intelligence, Cultural Memory, Everywhen Urban Experience

Introduction

The presence of urban screens is ubiquitous, and cities are progressively transforming into media-centric urban landscapes. [1] Regrettably, within today's highly commercialized urban centers, contemporary urban advertising predominantly employs media screens as mere billboards for the exclusive promotion of products. [2] This pervasive onslaught of superficial content leaves individuals inundated with an overwhelming sense of emptiness. [3] However, the realm of urban media art emerges as a vibrant and evolving sphere, poised to redefine our comprehension of the intricate interplay between technology, culture, and urban environments. It refers to various forms of media-aesthetic, artistic initiatives in urban environments in which artists create and make use of innovations in software and technology to craft artworks for visible and invisible implementation. [4] Within these already bustling and exploited urban settings, urban media art unfolds as a dynamic force with the potential to instigate transformative change.

As highlighted by Tanya Toft, urban media art has played a transformative role in deconstructing and enhancing architectural and urban structures. It serves as a powerful conduit for global awareness, unraveling the intricacies of local places and events, while also reshaping our cultural and collective memory through the meticulous reconfiguration of our historical narratives. [4] In addition, urban media art possesses the ability to circumvent conventional filters in spaces like art galleries, empowering it to engage audiences who might otherwise never venture within the confines of traditional art institutions. Its role therefore goes beyond a belated response to an existing social world, but an integral component in constructing social relationships within contemporary media city.[5] In this sense, the concept of "Everywhen" is not a mere abstract philosophical concept. Rather, it emerges as a force illuminating the potential of urban media art as a powerful instrument in nurturing cultural continuums. This notion encourages us to contemplate the inherent duality within urban environments, where history coexists with the cutting edge, and tradition harmonizes with innovation. In the context of Singapore, the swift tempo of urban development, along with the necessity of promoting cultural diversity in a globalized era, underscores the importance of establishing spaces capable of facilitating constructive social interactions and functioning as pillars of distinctive cultural identity and community cohesion. [6][7] Within the intricate setting, urban media art has gained prominence and increased opportunities in the city. It functions as a valuable medium for conveying shared histories and traditions, while also serving to foster a sense of collective belonging rooted in Singaporean values and identity.

On the other hand, the 1990s witnessed the integration of neural networks and machine learning techniques into the realm of art creation. Artists during this period harnessed neural networks to generate and manipulate images, marking a significant fusion of AI and artistic expression. [8] In the early 2000s, the exploration of the intersection between AI and art in urban settings commenced. These experiments often featured simple interactive installations and projections in urban spaces, using basic AI algorithms to create responsive experiences. [9] The rise of deep learning and GANs in the 2010s significantly impacted AI's role in the urban media art field. [10] This era saw the emergence of AI-generated artworks that could be both visually striking

and conceptually engaging. Renowned artists and studios like Refik Anadol and Ouchhh Studio gained acclaim for their innovative installations utilizing GANs. [11] Through data analysis and computational creativity, AI contributes to the creation of art that responds dynamically to its urban context, transcending static boundaries, and introducing new facets to public engagement with art. [12] In exploring the cultural and historical dimensions of urban environments, their potential is particularly outstanding. This is exemplified in works like Refik Anadol's "Machine Hallucination," which employs AI to generate immersive visual experiences by processing a massive amount of historical architectural data in New York City. [13] Such projects have been featured in major urban art festivals and exhibitions, gaining more recognition in the art world. They not only constantly shape the way art is created, presented, and experienced in urban environments but also build connections that transcend temporal and spatial limitations, serving as avenues for cultural dialogue and exploration. Nonetheless, despite the growing prevalence of AI applications in the art within urban settings, there has been a notable paucity of academic scrutiny directed toward discussing their intricate technical processes and discerning their role in the creative processes that underpin the revitalization of the cultural heritage inherent to these dynamic urban environments.

Therefore, this paper revolves around how artists incorporate AI technologies into their creative processes when developing urban media art installations that aim to evoke an "everywhen" experience. Three projects carried out within the context of Singapore, a city highly dedicated to the cultivation of cultural memory as a means of reinforcing its identity, are examined. These projects, namely "(RE)ROOTING in Progress," "AI Meets Wu Guanzhong," and "Classic of Mountains and Seas," serve as empirical case studies exploring the practical facets of AI integration, artistic decision-making, and ethical considerations in their creative journey. In this examination, a dual purpose is pursued. Firstly, it invites the consideration of how artists collaborate with AI to create context-aware installations integrated into the urban fabric, revealing both the role of artists and the possibilities introduced by AI to urban media art. Secondly, the research is oriented towards an exploration of the complex interaction between technology and culture. A central focus lies in comprehending how AI-mediated art can evolve into a temporal cultural continuum, forging connections between the rich heritage of the urban environment and contemporary expressions, thus fostering a deeper sense of attachment between the city and its inhabitants.

Representing Singapore's Historical Narratives through AI-powered Projection Mapping

Illuminating Light to Night Festival: Multimedia Projections on Iconic Building Facades

In Singapore, the early years of the twenty-first century marked a notable transition from an exclusive focus on cultural infrastructure to a more robust embrace of the social and communal dimensions of the arts and culture. [14] This shift was underpinned by a series of strategic "Renaissance City Plans," with the launch of the National Gallery Singapore falling under the purview of Plan III in 2015. [15] In commemoration of the National Gallery Singapore's first anniversary, the inaugural Light to Night Festival took place in 2016. This festival has gained renown for its capacity to invigorate the Civic District through multimedia projections on iconic structures, with the National Gallery Singapore standing as the foremost illuminating protagonist. [16]

As stated by Tan, the former director of Light to Night, the festival seeks to broaden this cultural focal point from historical landmarks to public spaces. The 2021 theme is "_____ in Progress", where the blank serves as an invitation for participants to reflect on their past years and envision future possibilities. In line with the theme, artist Jo Ho curated the installation "(RE)ROOTING in Progress" on the National Gallery's facade. This project's inception was influenced by her personal life experiences and realized through the application of machine learning.

The Concept of "(RE)ROOTING": A Personal Journey in Rebuilding Singaporean Identity

Upon returning to Singapore during the COVID-19 pandemic after years abroad since the age of nine, Jo grappled with a complex blend of emotions and displacement. Despite considering Singapore her home, a cultural disconnection emerged, setting her apart from a traditional Singaporean identity. This transformative period in Jo's life became the origin of (RE)ROOTING, embodying her effort to reintegrate into a community she had been physically distant from for an extended duration.

Before employing GANs for image generation, Jo had established herself in architecture, where she explored the potential of screens as instruments for reshaping physical spaces. While adeptly utilizing AI to assemble raw spaces and craft visuals, Jo consistently questioned the essence of generating artwork through machine learning. (RE)ROOTING marked a turning point, offering her a profound sense of purpose and meaning within AI exploration. Datasets were selected from the extensive reservoir of artworks within the National Gallery's permanent collection and contemporary images of Singapore. The outcomes produced by machine learning exhibit qualities that were nonlinear and entirely novel but carried a sense of familiarity. They paralleled the way individuals recalled past events through archived media and reinterpreted them through the prism of their own experiences and creative imagination. In essence, Jo's personal memories of Singapore mirrored the procedures of creating this piece with machine learning: a process of assimilating archived memories within the artworks of other Southeastern Asian artists, uncovering patterns in past fragments, and applying them to her unique perception of the place of her birth. [17]

Technical Process: Recalling and Reforming Memories Through Machine Learning

In contrast to conventional projection mapping techniques, which often addressed intricate interactions with architectural elements, Jo's approach was to deconstruct the facade, unveiling its inner components while simultaneously introducing innovative elements. These new elements were drawn from the permanent collection of the National Gallery, representing the history of the place. Following the acquisition of permissions to employ the datasets, they were integrated into the Runway ML platform (See Figure 1). Through Runway ML, a series of videos were generated. These videos underwent further processing in TouchDesigner, a versatile platform for creative digital manipulation. In this phase, the imagery was disassembled into its constituent pixels. This deconstruction process was achieved using a technique known as "instancing", which helped to create the extraction of pixel information from the video and its subsequent effect of transforming the image into three-dimensional cubes. The cubes took on a new spatial dimension, evolving into a complex, multidimensional structure. It enabled the artist to manipulate a camera within this intricate pixel landscape, offering an immersive and dynamic perspective of image-viewing to the audience.

Figure 1 Left: Raw data. Right: ML -generated images. © Jo Ho.

The architectural structure exhibited a dual process of dematerialization and materialization, aiming at rendering it more pliable and less rigid, striving to achieve a dissolution of its physicality. The intention was to guide observers away from a superficial perception of the façade devoid of columns and windows to focus on the concealed elements behind the museum (See Figure 2a). The idea of dissolving the facade of this neo-classic building was further extended to comment on Singapore's colonial past. The inquiry explored the building's role as a reflection of Singapore's contemporary identity. It interwove connections between the building's historical origins, its relevance in the present, and its potential for evolution beyond the constraints of its colonial legacy. The architectural transformation thus became a canvas for a nuanced dialogue, encompassing the past, the present, and the promising future of Singapore as it transcended its colonial heritage. For the majority of the project, it attempted to create a continuous surface (See Figure 2b). To achieve this, extensive images of present Singapore were searched on Google and integrated into the Runway ML platform as well. Additional post-processing was carried out in Adobe After Effects, involving tasks such as stitching specific segments together, as well as overall image composition and color correction.
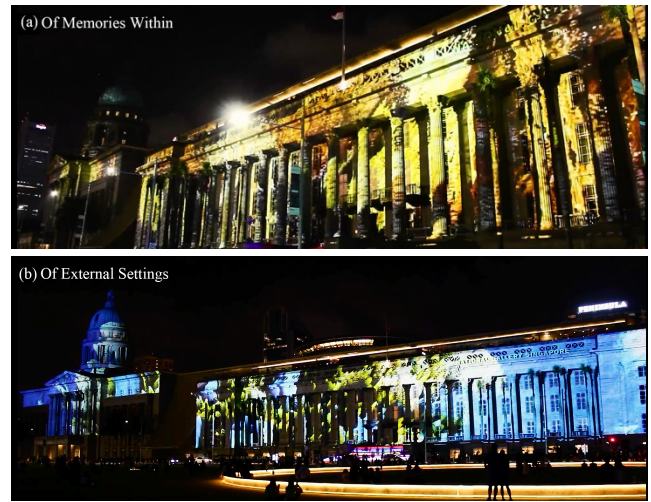

Figure 2 Various episodes of the (RE)ROOTING project. © Jo Ho.

According to those who have seen the Light to Night projection mapped projects in the previous years, the pace of "(RE)ROOTING" was slower than usual festival mappings, resulting in people spending more time being immersed in the work. Seamlessly blending into the environment, it created a contemplative and unhurried atmosphere, in contrast to the high-speed, flashy, and attention-grabbing performances commonly seen in mapping projects on facades.

Traditional Storytelling and Classic Styles of Chinese Painting are Reimagined through AI

The above case showcases the use of machine learning to generate visual patterns from selected datasets. However, as AI technology continues its rapid evolution, innovative text-to-image tools like Disco Diffusion, Midjourney, and DALL-E have emerged, significantly lowering entry barriers for artists and transforming their roles in the creative process. Subsequent projects explore these tools, accompanied by a shift from historical architectural canvases to urban screens. Despite these changes, a unifying theme persists: creating urban experiences beyond temporal limitations.

Media Nexus: An Urban Screen and Pedagogical Tool for Media Art at NTU Campus

The Media Art Nexus (MAN) at Nanyang Technological University, Singapore, inaugurated in 2018 as part of the "Campus Art Trail" initiative, serves as an urban screen dedicated to curating and promoting media art from local and international artists. The facility features a sizable 15x2-meter media wall strategically placed in the North Spine passageway. [18] Seamlessly integrated into the curriculum of the School of Art, Design, and Media, MAN serves as a pedagogical instrument, applied both within and beyond the classroom setting. Mark Chavez, one of the founders, emphasized, "By harnessing modern multimedia technologies, we have established a platform that enables us to venture into uncharted territories, further elevating the realms of

digital interactive media and fine art expressions". [18] In these two cases, AI technology is employed to reimagine traditional Chinese classics, aligning with the central theme of "Everywhen" which seeks to rejuvenate ancient traditions through innovative techniques.

Concept: A Contemporary Interpretation of Chinese Epic Mythical Tales in the "Classic of Mountains and Seas"

Singapore's multicultural society, shaped by a substantial Chinese diaspora, has fused diverse cultural elements, incorporating rich traditions, customs, and practices from China into its cultural landscape. [19] In light of this, the artwork draws inspiration from the Chinese Epic mythical tales, collectively known as "Shan Hai Jing", or "Classic of Mountains and Seas." This ancient Chinese literary work stands as a comprehensive repository of geographical and mythological knowledge, providing a window into the worldview and creative imagination of ancient Chinese civilization. [20] Moreover, the "Classic of Mountains and Seas" has transcended its historical origins to become a lasting source of creative inspiration for writers, artists, and scholars throughout Chinese history. In this project, the narratives explore the very essence of reality itself, portraying a fantastical realm populated by otherworldly creatures and awe-inspiring tales. In essence, it provides a contemporary interpretation of the tangible world through the lens of this stylistic format. It bridges the realms of ancient mythology and modernity, weaving together elements from these seemingly disparate worlds to offer a fresh perspective on our lived experiences. Through this fusion of influences, the artwork prompts viewers to reconsider their understanding of reality, provoking thought and inviting contemplation on the ever-evolving nature of our perception (See Figure 3).
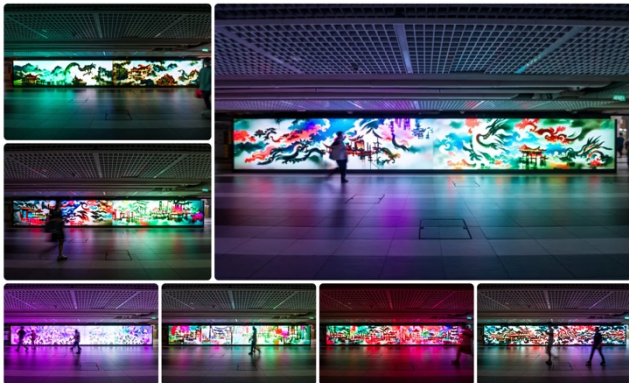

Figure 3 Campus screen is displaying Classic of Mountains and Seas. © Mark Chavez & Ina Conradi.

Technical Process: Bridging Ancient Mythology and Modernity through AI

The images were generated with a Google Collab notebook, which utilized Google Cloud computing that leveraged OpenAI's open-source Contrastive Language-Image Pre-training (CLIP), an advanced model introduced by OpenAI in February 2021. In this process, CLIP was applied to associate an image from a canonical ImageNet dataset with a provided textual description. The integration of these open-source models involved tapping into extensive libraries of visual data within a search engine, progressively reshaping the imagery into original compositions. [21] In this work, the value of the emerging toolsets was recognized. The focus was not primarily on the technical methodology but rather on regarding the research outcome as a tool for generating artwork. Inspired by Noah Purifoy's Duchampian approach to sculpture, which established him as a pioneering Southern California assemblage artist, word prompts that would bring Chinese epic mythic tales forward were used and combined with contemporary notions of value. The use of archetypes and the visual representation of the piece both respected established visual traditions and introduced novel concepts through the blending of ideas. In terms of the tools used, Derivative TouchDesigner was employed, drawing upon its capabilities such as channel matte effects, real-time thresholding, and the generation of geometry from bitmap imagery. Commonly used image composite effects were facilitated by this software, and GLSL shader-based techniques (OpenGL Shading Language) were utilized for the programming of code aimed at creating visuals. With these techniques, the only limitation of expressive possibilities was the imagination.

The objective of the project was to enrich the space with subtle contemporary imagery within the constraints of the platform: the Media Art Nexus Screen at NTU. With a daily footfall of approximately 5,000 people passing by the location among the 40,000 students at the university, specific constraints were encountered. These limitations involved adhering to the pixel aspect ratio of 3840x480 and managing the time required to render any motion within the design. Due to the nature of the space: a 2-meter by 15-meter walk-through corridor, it must be ensured that visuals do not move too fast or flash. This corridor served as a thoroughfare for individuals navigating through their busy day. Although benches were available for those who wished to sit and observe, the intention was not for viewers to linger. Instead, the artwork was designed to be appreciated at a glance, allowing for a tangential absorption of its content, as opposed to a focused analysis akin to a short film or gallery installation. Particularly, the work premiered at the Art Gwangmyeong x U Planet Media + Arts Festival in Seoul, South Korea, held under the theme "Beyond the Space" in Oct 2022. Titled Mindscape, the presentation unfolded on an extensive widescreen situated on the AKA Plaza façade, measuring an impressive 290.4 meters by 47.4 meters as an LED display. Furthermore, Mindscape was showcased at U Planet from October 21 to November 20, 2022. According to the media artist, Ina, broader exposure to Singapore and global platforms acts as a catalyst for a more enthusiastic embrace of the project's thematic elements and workflow.

Concept: Wu Guanzhong's Brush Magic of the Intersection of Cultures and Art

Wu Guanzhong, a prominent 20th-century figure in Chinese art, is widely recognized as the vanguard of modern Chinese painting. His artistic style reflects a harmonious blend of Western and Chinese traditions, influenced by comprehensive studies in oil painting both in China and abroad. This artistic synthesis transcends geographical boundaries and resonates particularly well in cosmopolitan settings like Hong Kong and Singapore. Of notable significance is the National Gallery of Singapore, where the "Guanzhong Exhibition Series" serves as a portal into the exploration of the maestro's life and artistic journey. [22] The exhibition acted as a catalyst, prompting the genesis of the idea for the graduate course "Art in the Age of Creative Machines" at the School of Art, Design and Media at NTU. Embraced by the aura of Wu's brushwork, the idea crystallized to merge his artistic legacy with the innovative capacities of AI. This project, recognized as "AI Meets Wu Guanzhong", aspired to pay tribute to Wu's lasting impact while embracing the possibilities presented by AI. Wu's artworks were interpreted and processed using Disco Diffusion, which employed text prompts exclusively to engender animated sequences. Through the convergence of technology and tradition, this animated creation fostered a timeless connection between the past and the present, all while resonating with the beauty inherent in the realm of Wu's artistry.

Technical Process: A Tribute to Wu's Painting in Digital Strokes

Wu's artistic process is anchored in his profound connection to the natural world and China's culturally rich heritage. His work spans a wide spectrum of Chinese subjects, including architectural elements, botanical motifs, depictions of animals, individuals, and landscapes and waterscapes. [23] In developing this project, the recurring themes found in Wu's paintings were explored through a text-based approach, resulting in a total of 400 frames. The project's structure unfolded in segments, with each 100 frames dedicated to a specific theme, further subdivided into four distinct sub-themes. The initial phase involved a comparative analysis of prompts to capture the very essence of Wu's artistic spirit. Compared with the prompt of image(a), image(b)'s prompt offered a more detailed description with the inclusion of specific objects, leading to more favorable outcomes. Likewise, in other trials, it became evident that the impact of descriptive particulars in prompts was subtle yet substantial which ultimately influenced the focus and composition of the generated images. Following this, keywords like "simple painting," "elegant painting," and "ink painting," were evaluated for their effectiveness in producing visual effects closely resembling Wu's style. Then the "weight" variable, as a means of introducing alterations to generated images, was tested. In this test, both images shared an identical prompt. Image(c) used a weight value of 5, while image(d) employed a weight value of 1. The value of 1 demonstrated the capacity to introduce changes without overly impacting the image's central content.
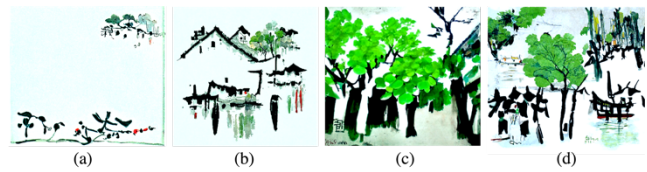

Figure 4 Testing of prompts. © Shujiao.

In the final stage of the project, the process of generating a video consisting of 400 frames was undertaken, with each frame originating from one of 16 unique prompts. The first century of frames focused on villages, capturing various aspects such as bird's-eye views, stone bridges, drifting boats, and rustic cottages. Moving into the second set of 100 frames, attention shifted to the landscape, depicting both natural and man-made elements. The frames showcased pristine snowy mountains, vibrant paddy fields, and the serenity of Chinese-style classical gardens, masterfully bringing forth the essence of these terrains. The third sequence of 100 frames explored the realm of botanic life, including the delicate beauty of plum blossoms, the cascading elegance of wisteria, the graceful resilience of bamboo shoots, the serene allure of lotuses, and the abundant growth of bamboo shoots. The final segment, spanning 100 frames, was an exploration of the animal kingdom, encapsulating the charm and diversity of creatures including pandas, cranes, black swans, and buffaloes. Furthermore, to sustain the animation's dynamic quality and mitigate abrupt disruptions to the viewer's experience, the movement parameters were adjusted every 50 frames by the transition of sub-themes. These alterations involved nuanced interplays of factors, such as rotation, zooming, and other visual dynamics. Through the synchronization of parameter shifts with sub-theme transitions, the animation upholds a harmonious rhythm, intensifying its visual impact and safeguarding the fluidity and coherence of the narrative. This project graced the Media Nexus Urban screen in December 2023, enveloping the campus in a transcendent ambiance that evoked the delicate, elegant, and simple landscapes immortalized by Wu (See Figure 5).

Figure 5 The screen is displaying "AI Meets Wu". © Shujiao.

Discussion: Artists' Collaborations with AI in Urban Media Art Installations

Artists' Inspiration from Urban Context

Endowing AI with Meaning and Purpose. The urban context diverges markedly from the controlled ambiance of a white cube gallery, given its intricate interplay of urban politics, cultures, conflicts, and contestation. The urban settings inevitably permeate the artistic landscape, rendering urban media art distinctly dissimilar to forms of art that remain detached from direct involvement with the multifaceted intricacies of the world. [24] From the artist's perspective, the culturally diverse urban context serves as a fertile ground for sourcing inspiration and conceptual enrichment. This contextual backdrop imparts practical significance to their decision to incorporate AI in their creative process, thereby averting the aimless use of AI for generating content devoid of purpose and meaning. In each of these projects, a seamless integration with the distinctive urban fabric of Singapore is evident. In the rapidly globalizing and fast-developing urban landscape, Singapore strives to provide its residents with a sense of belonging and cultural identity. As such, the strategic application of AI aims to unearth and preserve the city's historical heritage while simultaneously unveiling its pioneering technological vision for the future. This approach allows both the global audience and the city's inhabitants to perceive its cultural memory and cutting-edge technological urban image. Through the synergistic collaboration between AI and artists, the very essence of the city is captured. This resonates with Singapore's unique urban context while also establishing a bridge that spans the city's historical, contemporary, and future narratives through the creation of a dynamic "everywhen" urban experience.

Furnishing AI with Data Sources. As elaborated earlier, artists consistently draw inspiration from the physical and cultural elements inherent in urban settings. The geographical location, architectural characteristics, the local populace, and the influence of indigenous culture all serve as foundational pillars upon which artists construct their concepts and designs. In "(RE)ROOTING", the National Gallery occupies a central position within the city, with its façade symbolizing Singapore's colonial history, and its permanent collection representing the city's artistic preferences and cultural treasures. Given its cultural status, the artist found herself inspired to delve into the representation of Singapore's urban memory. The architectural features and the treasures housed within offer a vast dataset that lends itself perfectly to the application of AI. As for screen projects at NTU, this media facility is strategically situated in a densely populated central area of the campus. While devoid of historical roots, it has evolved into a significant platform that fosters an artistic ambiance and showcases artworks, effectively transforming into a campus-wide, open-air art gallery. The screen projects thus function as a contemplative exploration of the city's deep-rooted historical relationship with Chinese traditions in literature and painting. They rekindle memories of past floods and cultivate an awareness of traditional arts and culture. The integration of AI provides artists with the means to analyze extensive archives of previous artworks, allowing them to weave narratives that evoke a profound sense of cultural continuity.

Artists' Guidance of AI in the Creative Process

AI Assistance as A Component. The realm of AI-assisted art has sparked a multitude of enduring concerns and scholarly debates. Central deliberations are often rooted in the contentious issues of AI potentially supplanting human artists and the consequent implications for the inherent vitality of art. [25][26][27] Within these three projects, it becomes evident that AI does not stand alone as the exclusive tool but rather functions as a collaborative creative partner. It operates as a catalytic force propelling the artist's ideational process. These techniques are instrumental in data analysis, interpretation, and the transformation of data into art, allowing artists to harness atmospheric qualities, colors, and shapes to inspire their creative process. However, artists also employ a variety of tools to exercise control and precision over AI-generated content. These tools include software such as After Effects, Photoshop, Touch Designer, etc, which facilitate data visualization and video composition of AI-generated visuals. Purely AI-generated, plagiaristic art lacks the capacity to emotionally resonate with audiences. Its suitable role is that of an assisting tool, serving as one component of artistic creation, assisting artists in creating captivating visual and auditory experiences. The merit or demerit of such tools itself remains neutral, contingent upon the methods and intentions of their use. Therefore, as the integration of AI into artworks becomes increasingly integral in the future, it is suggested that artists effectively employ AI as a creative tool to narrate stories, striking a wise balance between independent artistic expression and collaborative engagement with artificial intelligence.

Refining AI For Artistic Vision. In the utilization of AI, artists engage in the precise adjustment of AI algorithms to ensure that their work aligns with their creative vision. The artistic journey is frequently marked by iterative refinement, wherein diverse AI settings are experimented to attain the desired aesthetic and conceptual outcomes. It involves the establishment of parameters, the definition of artistic objectives, and the careful curation of the AI's output. For instance, in the case of "AI Meets Wu Guanzhong," which employs Disco Diffusion, an approach that is often simplistically perceived as generating images from input text, the configuration of prompts for descriptive objects, weight values, and styles requires multiple testing to harmonize with Wu's artistic style. This process combines iterative experimentation, fine-tuning of algorithms, and a discerning curation process, all orchestrated by the artists. In this way, AI's computational prowess is appropriately harnessed, while human oversight of the overarching artistic vision is also maintained. The final artwork is a synthesis, which amalgamates the artists' expert guidance, their deep understanding of the artistic intent, and their creative sensibilities with the unbounded creative potential facilitated by AI.

Impact and Implications of AI-Enhanced Urban Media Art

Weaving Time, Space and Memory. Urban media art installations often infuse fresh vitality into otherwise static urban environments by incorporating virtual layers through new media technologies. These installations possess the transformative power to convert vacant plazas, underpasses, or building facades into compelling attractions that draw people in. The integration of AI into the installations, however, brings new possibilities to the field. AI-enhanced projects possess the inherent capability to interweave elements of time, space, and memory, allowing the audience to experience the convergence of distinct temporal and spatial dimensions within the current cityscape. Unlike prior projection mappings at the National Gallery, which primarily centered on animating specific architectural elements, "(RE)ROOTING" utilizes AI to extend the reach of the gallery's internal collections onto its exterior facade, allowing these collections to engage a significantly larger audience. As for the screen projects, the artworks displayed initially in the gallery are recreated and interlinked within the campus environment, establishing a dynamic link between the two spaces. It also results in the revival of ancient stories and paintings, reimagined in a contemporary context that transcends the confines of time. Through the use of historical data, these AI installations stimulate discussions about the past, present, and future of the urban landscape. They function as both visual and auditory narratives, prompting contemplation regarding the city's cultural heritage and the challenges it currently confronts, all while encouraging inquiries into the potential futures that lie ahead.

Data Privacy Concerns. While AI-enhanced urban installations offer numerous benefits, it also presents challenges. The selection of data resources is an essential part of AI art creation, involving both artistic expression and moral deliberations. As we shift our focus to urban installations, which are by nature aimed at broader audiences than traditional galleries, this aspect becomes even more vital. In "(RE)ROOTING", permission was obtained from the National Gallery to access the necessary data. However, for images from different contemporary locations in Singapore, a suggested approach for future projects is for the artist to obtain relevant datasets through a payment arrangement. Alternatively, AI artists may consider using datasets with little or no artistic merit, minimizing data privacy concerns in the creation process. In addition, while these projects do not directly involve the collection and utilization of individual data, it remains imperative to uphold the fundamental principles of consent and data protection. This necessity extends to individuals whose information might be captured by sensors integrated within urban media art installations. As such, AI artists face a compelling obligation to navigate these ethical intricacies with heightened insight and sensitivity. They are tasked not only with pushing the boundaries of artistic innovation but also with respecting the limits of privacy and ethical propriety within the evolving ethical landscape shaped by AI advancement.

Conclusion

In the domain of urban media art, the convergence of art and artificial intelligence has witnessed a steadily growing fusion. This paper has undertaken an examination of the intricate relationship between AI and artists in the urban context of Singapore, specifically focusing on three emblematic projects that have orchestrated an "everywhen" urban experience. It explores the conceptualization and technical execution of these projects, including projection mapping onto the National Gallery and two urban screen installations at NTU, each employing distinct AI models. In the conceptual phase, urban settings serve as rich sources of inspiration, infusing the use of AI with meaningful purposes for artists. The physical and cultural aspects of the environment, such as location, architecture, individuals, and local traditions, offer abundant data resources. Artists proficiently harness AI to create content that captures the unique characteristics of these urban elements. In the technical implementation phase, artists utilize various tools to modify AI-generated content and fine-tune AI parameters to align with their artistic vision. Evidently, they retain control over the ultimate artistic output, guiding the creative process to preserve the integrity of their vision and intent. In terms of impact and implications, AI-enhanced urban media art installations bring about transformative effects. They not only reshape the urban landscape but redefine our perception of time, space, and memory. These projects transcend the mere resuscitation of history, rather, they exemplify AI's potential to weave the fabric of time and space into artistic expression. Aside from its advantages, ethical considerations arise, with data privacy emerging as a prominent issue. Feasible approaches to address this concern may include obtaining prior permission or utilizing images of little or no artistic merit.

In conclusion, this study emphasizes the significance of the evolving intersection between urban media art and artificial intelligence, where the synergy of these realms produces immersive, intellectually stimulating, and culturally meaningful urban experiences. With the unstoppable trend of AI bringing revolutionary changes to the art world, it is encouraging that artists boldly embrace AI as a creative tool for crafting meaningful urban experiences that resonate with the distinctive characteristics of each locale. Concurrently, artists must cautiously maintain their independence while considering concerns related to data privacy.

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