Big Data Integration in Sculpture: A Systematic Review and Case Study

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Abstract. This study investigates the transformative impact of big data on sculpture, focusing on its application in creation, material selection, preservation, and audience interaction. Through a systematic review of existing literature and an in-depth case study of the "Centennial Xing tan" sculpture, the research highlights how big data is revolutionizing traditional sculptural practices. The case study demonstrates how big data enhances design precision, optimizes material selection, and ensures long-term preservation, all while maintaining artistic integrity. The study addresses existing gaps in academic discourse, offering new insights into the integration of advanced technologies with traditional art forms. Despite its contributions, the study acknowledges limitations, such as the narrow scope of case studies and the underrepresentation of challenges associated with big data in art. Future research should expand the diversity of case studies, explore ethical implications, and investigate the long-term effects of these technologies. Ultimately, this research suggests that the convergence of big data and sculpture will drive innovation, enhance creativity, and foster cross-disciplinary collaboration, advancing both the art form and its cultural significance.

Keywords: Big Data, Sculpture, Digital Preservation, 3D Modeling, Art and Technology, Cultural Heritage

1 Introduction

The integration of big data has brought transformative changes across various fields, including healthcare, finance, and particularly in art and cultural heritage preservation. Big data, characterized by its vast volume, velocity, variety, and veracity, enables the extraction of insights previously beyond reach. Its value lies in converting raw data into actionable knowledge, fostering innovation, and improving decision-making processes across sectors. In the context of the arts, especially sculpture, big data serves as a pivotal tool that bridges traditional and contemporary practices, enabling new modes of creation, preservation, and interaction.

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Digitization of cultural heritage artifacts, including sculptures, has been a key area where big data has made significant inroads. Efforts focus on developing comprehensive databases that contain images, reference documents, and factual data, ensuring that cultural heritage is preserved for future generations and made accessible to a global audience [1]. In sculpture, big data facilitates precise documentation, restoration, and even reconstruction of intricate three-dimensional objects. Advanced technologies like 3D modeling and point cloud data processing are now integral to the digital preservation of sculptures, enabling the creation of accurate digital replicas that can be analyzed and manipulated in ways that physical objects cannot [2, 3].

Sculpture, traditionally defined as a three-dimensional art form created through the manipulation of materials like stone, metal, or wood, has played a significant role in the history of art. It has served as a medium for cultural expression, social commentary, and historical narratives. However, with the advent of digital technologies, the role of sculpture is undergoing a profound transformation. Modern sculpture increasingly combines traditional techniques with digital tools, leading to new forms of artistic expression that are dynamic, interactive, and deeply connected to data [4]. This convergence not only expands the creative potential of artists but also enhances the ways in which audiences engage with and interpret art.

Despite these advancements, the academic exploration of big data's impact on sculpture remains in its early stages [2, 3]. Current research predominantly focuses on technical applications such as digitization, restoration of sculptures, and the creation of data-driven sculptures that incorporate real-time data streams to enhance interactivity [5]. However, there is a notable gap in the literature concerning the broader implications of big data on the creative process, the role of the artist, and the viewer's experience. Furthermore, ethical considerations, including privacy and the integrity of cultural data, have not been sufficiently explored, indicating a need for further investigation.

This study seeks to explore the multifaceted applications of big data in the field of sculpture, emphasizing its influence on creation, material selection, preservation, and audience interaction. By addressing existing gaps in the literature, this research aims to provide a comprehensive understanding of how big data is reshaping sculpture. The significance of this study lies in its potential to contribute to both academic discourse and practical applications, offering insights that could lead to new artistic practices and theoretical frameworks. Additionally, this research provides valuable guidance for artists, curators, and cultural institutions looking to harness the power of big data, ultimately advancing digital art and cultural heritage preservation [2, 3, 5].

2 Method

2.1 Literature Search

To explore the integration of big data in sculpture comprehensively, a systematic literature search was conducted using Web of Science (WOS, all databases) and Scopus. These databases were chosen for their extensive coverage of peer-reviewed journals across various disciplines, ensuring that the reviewed literature would be both authoritative and representative of current research trends.

The search, conducted on July 28, 2024, aimed to include relevant studies discussing the intersection of big data technologies and their applications in sculpture. The search strategy was informed by foundational research, such as Tao's (2020) analysis of how historical data from ancient sculptures can be digitized and applied in modern educational contexts [6]. These insights helped shape the search parameters to ensure a comprehensive review of existing literature.

The search was constructed using two primary sets of keywords: one related to "Big Data" and the other to "Sculpture." Within each set, keywords were connected using "OR" to capture a broad range of relevant studies, and the two sets were combined using "AND" to focus on the intersection of the two domains. The specific search string used was:

("Big Data" OR "Data Analytics" OR "Data Mining" OR "Data Science" OR "Data Processing" OR "Data Visualization" OR "Machine Learning" OR "Artificial Intelligence" OR "AI") AND ("Sculpture" OR "Statues")

The search was limited to peer-reviewed articles classified as "Article" to ensure that only substantive research contributions were included. The search yielded 296 unique records.

2.2 Literature Screening

The screening process involved two stages:

Stage 1: Title and Abstract Screening. Titles and abstracts of the identified articles were reviewed for relevance to "Big Data in Sculpture." Articles clearly addressing the use of big data technologies in the context of sculpture were retained. Ambiguous articles were also retained for further evaluation to avoid premature exclusion.

Stage 2: Full-Text Screening. Full-text versions of the retained articles were reviewed. Articles were included if they explicitly addressed the application of big data in any aspect of sculpture, including creation, materials analysis, conservation, and audience interaction. Articles were excluded if they did not directly relate to big data and sculpture, were duplicates, or lacked rigorous methodologies.

After this rigorous screening process, 57 articles were selected for detailed analysis, providing a robust foundation for understanding the current landscape of big data applications in sculpture.

2.3 Case Study and Practical Application

In addition to the literature review, this study includes an in-depth case study of the "Centennial Xing tan" sculpture, a project that exemplifies the practical application of big data in contemporary sculpture. This case study method was chosen to provide a detailed examination of how big data can be integrated into the design, fabrication, and long-term maintenance of a large-scale sculpture.

The "Centennial Xing tan" sculpture, selected for its significance as a commemorative work, integrates traditional cultural elements with modern design principles, enhanced by big data technologies. The project's comprehensive use of big data at various

stages—from initial design to ongoing preservation—makes it an ideal subject for exploring these technologies' impact on sculpture.

This approach not only demonstrates the practical applications of big data in sculpture but also contributes to broader discussions on how digital technologies are reshaping traditional art forms. By combining rigorous analysis with real-world application, this study offers valuable insights for both academic researchers and practitioners in digital art and cultural heritage preservation.

3 Systematic Review

3.1 Publication Trends

Research on big data in sculpture has seen steady growth, particularly since 2020, as shown in **Figure 1**. This surge reflects a broader trend of integrating advanced technologies like AI and machine learning into the arts. Early contributions (1996-2015) were sporadic, focusing on foundational techniques like 3D modeling and digital restoration [1, 7, 8]. Post-2020, research has expanded rapidly, highlighting increasing interest in how big data can transform sculpture creation, preservation, and interaction [4, 9]. The significant rise in publications in 2024 underscores growing momentum in this interdisciplinary field.

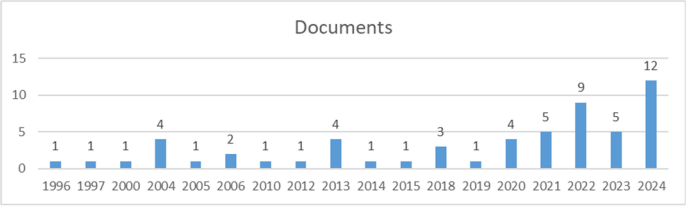


Fig. 1. Distribution of publications by year (created by the author)

3.2 Evolution of Research Themes

Thematic evolution in this field shows a progression from digitization and preservation of cultural heritage to more complex applications involving the creation, analysis, and interaction with sculptures using big data and AI. Early studies focused on restoring and preserving iconic sculptures using digital techniques [10, 11]. As research progressed, the focus expanded to include creating and interacting with sculptures through big data, reflecting a trend towards using technology to enhance artistic expression [9, 12]. Recent literature emphasizes big data's role in the creative process, particularly in "data sculptures" that blend data analytics with art [13] [5].

3.3 Technical Framework and Methods

The technical methodologies in this research area are diverse, reflecting its interdisciplinary nature. Early research focused on developing algorithms for data processing in

sculpture restoration, laying the groundwork for more complex applications [14] [15]. In recent studies, AI and machine learning have become central, enhancing our understanding and interpretation of art [16]. The development of new tools for data visualization and analysis has also been significant, underscoring the growing sophistication of data processing techniques [17].

3.4 Research Hotspots and Trends

Key research hotspots include:

Digital Preservation and Restoration: Using advanced 3D modeling and AI technologies to preserve and restore cultural heritage remains a primary focus [2, 18].

AI and Big Data in Creative Processes: The use of AI and big data in sculpture design and interpretation is growing rapidly, creating new forms of digital sculpture [4, 19].

Interactive and Data-Driven Sculptures: Interactive sculptures that respond to real-time data inputs are gaining traction, demonstrating big data's potential to create dynamic, responsive art [5, 13].

3.5 Research Gaps and Challenges

Despite advancements, challenges persist:

Integration of Technologies: Combining various technologies into a cohesive workflow remains challenging [3].

Data Processing and Analysis: As data volumes grow, processing and analyzing them becomes more complex, necessitating more efficient techniques [17].

Preservation of Cultural and Artistic Value: Balancing technological innovation with preserving traditional artistic values is essential [20].

Ethical Implications: The integration of big data in art raises ethical concerns, particularly regarding the integrity and interpretation of cultural data [6].

3.6 Summary

The application of big data in sculpture is an evolving field at the intersection of art and technology. Research increasingly focuses on using AI and big data to innovate in the creation and interaction with art. As this field develops, addressing technology integration and data processing challenges will be crucial in unlocking its full potential.

4 Discussion

The integration of big data into sculpture has catalyzed advancements across various aspects of the art form, including creation, materials, preservation, and audience interaction. This section synthesizes insights from case studies to illustrate the transformative impact of big data in these areas and highlights the challenges and opportunities that arise from this integration.

4.1 Big Data in Sculpture Creation

Big data enhances precision and efficiency in digital sculpture design by leveraging advanced 3D modeling technologies [4]. This allows artists to explore new dimensions in sculptural art, where creative possibilities are expanded through data-driven processes.

4.2 Big Data in Sculpture Materials and Techniques

Big data plays a crucial role in understanding and applying materials and techniques in sculpture [2, 21]. It improves the precision of reconstructions and facilitates continuous monitoring of restoration processes, preserving the material integrity of sculptures over time.

4.3 Big Data in Sculpture Preservation and Restoration

Big data technologies have significantly enhanced the preservation and restoration of sculptures, allowing for non-invasive monitoring of structural integrity and more effective restoration strategies based on precise, data-driven models [18] [22].

4.4 Big Data in Sculpture Display and Interaction

Big data has transformed how sculptures are displayed and interacted with, creating dynamic, responsive artworks that engage audiences on emotional and sensory levels, turning sculptures into active participants in communicating complex ideas [5, 13].

4.5 Summary

Big data opens new avenues for creation, material research, preservation, and interaction, demonstrating the profound impact of digital technologies on traditional art forms. However, this integration raises important questions about balancing data-driven design with artistic intuition and the potential challenges of over-reliance on technology in the creative process. Future research should explore these dynamics further.

5 Case Study and Practical Application

5.1 Background and Design Philosophy

The "Centennial Xing tan" sculpture, commissioned to commemorate Jiaying University's 100th anniversary, serves as a symbol of the university's commitment to education. The design integrates modern principles with traditional cultural elements, reflecting the university's heritage and mission to foster educational excellence.

Big data played a pivotal role throughout the project, from initial conceptualization to final installation, ensuring that the sculpture was not only a visual representation of

these values but also a technically and aesthetically optimized piece that resonates with the university community and beyond.

5.2 Sculpture Practice Based on Big Data

The creation of the "Centennial Xing tan" sculpture was meticulously planned and executed, with big data enhancing the design process, material selection, and integration with its environment. Big data analytics were employed in various aspects, including structural analysis, material selection, light and shadow simulation, pedestrian flow analysis, interactive elements, visitor experience modeling, predictive maintenance, and digital archiving (**Figure 2**).

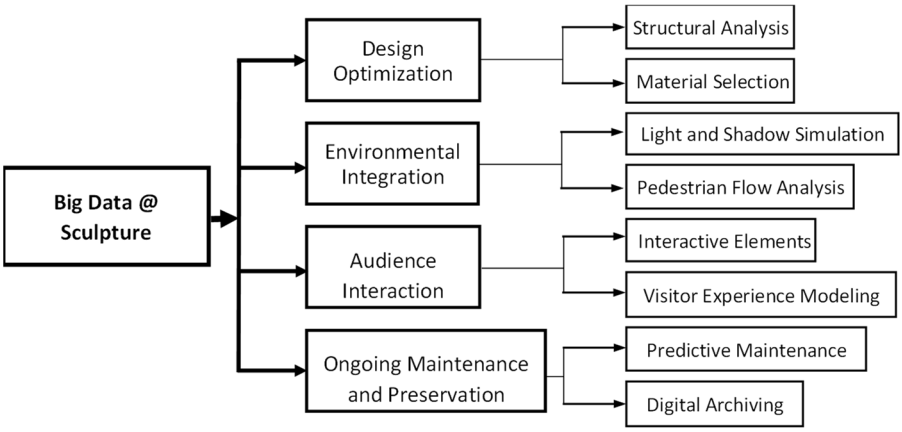


Fig. 2. A comprehensive experimental application of big data in sculpture (created by the author)

Structural Analysis: Big data analytics were employed to simulate various environmental stressors, including wind load, seismic activity, and temperature fluctuations. Extensive datasets on material performance under these conditions were analyzed to optimize the design for durability and safety.

Material Selection: Data-driven analysis guided the selection of the most suitable materials, evaluating factors such as long-term performance, resistance to corrosion, and environmental interaction.

Light and Shadow Simulation: Advanced big data tools modeled how natural light interacts with the sculpture throughout the day and across seasons, ensuring that the reflective surfaces produced the intended visual effects.

Pedestrian Flow Analysis: Data on pedestrian movement patterns within the atrium was collected and analyzed to optimize the sculpture's placement, maximizing visibility and engagement while minimizing disruptions to natural foot traffic.

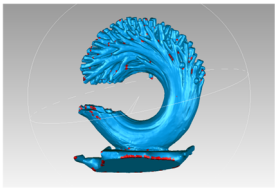
Interactive Elements: Big data was used to design and simulate interactive components, such as light reflections that change with viewer movement, enhancing viewer engagement.

Visitor Experience Modeling: Predictive analytics modeled how different audiences would interact with the sculpture, allowing for design fine-tuning to maximize its emotional and intellectual impact.

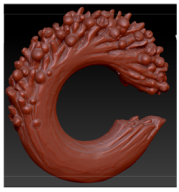
Predictive Maintenance: Big data analytics were applied to predict wear and tear over time based on environmental conditions and material fatigue data, enabling timely maintenance.

Digital Archiving: The sculpture was digitally archived using 3D scanning and point cloud data, creating a detailed digital twin for future restoration efforts or virtual exhibitions.

These comprehensive applications of big data ensured that the "Centennial Xingtan" sculpture not only embodied the university's heritage but also stood as a testament to the power of integrating modern technology with traditional art forms (**Figure 3**).



(a) Sculptural point cloud data in Geomagic Wrap



(b) Optimization of sculpture in ZBrush

Fig. 3. Big data driven sculpture practice application (created by the author)

5.3 Analysis and Outcomes

The "Centennial Xingtan" sculpture exemplifies the successful integration of traditional cultural elements with modern design and cutting-edge technology, as shown in **Figure 4**. Big data played a crucial role in enhancing the design, material selection, environmental integration, and ongoing maintenance of the sculpture.

The "Centennial Xing tan" sculpture is conceived as a semi-open, circular structure, resembling a phoenix-shaped apricot tree surrounded by flying birds, set within a two-tiered flower bed. Central to the sculpture is the apricot tree, symbolizing the "Xing tan" (Apricot Altar), the legendary site where Confucius taught his disciples. The tree, laden with fruit, represents the university's dedication to nurturing educators who, like the fruits of the tree, carry knowledge and wisdom into the world. The circular form of the sculpture, inspired by ancient towering trees, symbolizes growth, vitality, and the collaborative nature of education. This design also echoes the Hakka tradition of "Weilongwu" (circular houses), reinforcing the university's role as a bastion of education in the Hakka region. The five birds in flight around the tree represent Jiaying University's graduates, spreading knowledge globally, much like the university's far-reaching influence.

The circular form of the sculpture is deeply rooted in traditional Chinese philosophy, symbolizing completeness, harmony, and the balance between heaven and earth. This reflects the cyclical nature of education, where knowledge is continually passed down and refined. The concept of "Centennial Nurturing" underscores the university's com-

mitment to its founding mission of educating generations of teachers, with each generation contributing to the university's legacy. The symbolic representation of abundant fruits on the apricot tree highlights the diversity of the university's students and the personalized education they receive, enabling each to realize their full potential.

Fig. 4. Big data- driven campus sculpture real picture (photographed by the author)

Crafted from stainless steel with a mirror finish, the sculpture serves as a dynamic centerpiece in Jiaying University's Centennial Memorial Building. Its reflective properties allow it to interact with its environment, creating a dynamic visual experience that changes with the light and weather conditions throughout the day. Standing at 110 inches (approximately 3.67 meters) tall, the sculpture was designed to harmonize with the atrium's proportions, ensuring that it is both imposing and accessible. The careful consideration of scale and proportion emphasizes its aesthetic appeal and reinforces its symbolic significance as a representation of the university's dedication to education and cultural heritage.

Big data was crucial throughout the design and creation process. It facilitated the creation of a digital model that was manipulated and refined with high accuracy, ensuring that the final sculpture faithfully represented the original design. Big data also optimized materials and structural elements, making the sculpture both aesthetically pleasing and structurally sound. The project reflects a broader trend in the art world, where traditional practices are increasingly augmented by digital technologies. This convergence opens new possibilities for creativity, preservation, and public engagement.

In conclusion, the "Centennial Xing tan" sculpture stands as a testament to the effective integration of big data with traditional artistic practices. The project achieved a

high level of precision, quality, and relevance, ensuring that the sculpture remains a meaningful and resonant landmark for future generations. This case study underscores the transformative potential of big data in the field of sculpture, offering valuable insights for artists, designers, and cultural institutions seeking to explore the intersection of art and technology.

6 Conclusion and Future Prospects

This study has thoroughly investigated the integration of big data into the field of sculpture, focusing on its influence across various dimensions including creation, material selection, processes, preservation, restoration, exhibition, and audience interaction. The research highlights how big data can revolutionize traditional sculptural practices, offering new opportunities for design innovation, material optimization, and enhanced viewer engagement.

However, the study acknowledges limitations, such as the narrow scope of case studies and the underrepresentation of challenges associated with big data in art. Future research should aim to expand the breadth of case studies, explore the ethical implications of big data in art, and investigate the long-term effects of these technologies.

The convergence of big data and sculpture presents substantial opportunities for cross-disciplinary collaboration. As we continue to explore and refine the integration of big data with sculptural practices, we can anticipate a future where art becomes increasingly dynamic, responsive, and integral to our technological and cultural landscapes.

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References

1. B. Mannoni, "Bringing museums online," (in English), *Commun ACM,* Article vol. 39, no. 6, pp. 100-105, 1996, doi: 10.1145/228503.228524.
2. S. Barone, A. Paoli, and A. V. Razionale, "3D Reconstruction and Restoration Monitoring of Sculptural Artworks by a Multi-Sensor Framework," *SENSORS,* Article vol. 12, no. 12, pp. 16785-16801, 2012 DEC 2012, doi: 10.3390/s121216785.
3. V. S. Alfio, D. Costantino, M. Pepe, and A. Restuccia Garofalo, "A Geomatics Approach in Scan to FEM Process Applied to Cultural Heritage Structure: The Case Study of the "Colossus of Barletta"," *REMOTE SENSING,* Article vol. 14, no. 3, 2022 FEB 2022, Art no. 664, doi: 10.3390/rs14030664.

4. S. Liu, "Innovative design of digital sculpture art under 3D modeling technology," (in English), *Appl. Math. Nonlinear Sci.,* Article vol. 9, no. 1, 2024, Art no. 20241525, doi: 10.2478/amns-2024-1525.
5. V. Sorensen, J. S. Lansing, N. Thummanapalli, and E. Cambria, "Mood of the Planet: Challenging Visions of Big Data in the Arts," *Cognitive Comput.,* Article vol. 14, no. 1, pp. 310-321, 2022 JAN 2022, doi: 10.1007/s12559-020-09766-w.
6. J. Tao, "Analysis of the influence of ancient sculpture on modern and contemporary sculpture education based on big data technology," in *Journal of Physics: Conference Series*, 2020, vol. 1648: IOP Publishing Ltd, 2 ed., doi: 10.1088/1742-6596/1648/2/022109.
7. H. X. Wang, Z. L. Deng, and M. J. Huang, "Algorithm on the data processing of the intelligent sculpture technology," (in Chinese), *Beijing Youdian Daxue Xuebao,* Article vol. 23, no. 4, pp. 16-19, 2000.
8. G. Guidi, J. A. Beraldin, and C. Atzeni, "High-accuracy 3-D modeling of cultural heritage: The digitizing of Donatello's "Maddalena"," *IEEE TRANSACTIONS ON IMAGE PROCESSING,* Article vol. 13, no. 3, pp. 368-378, 2004 MAR 2004, doi: 10.1109/TIP.2003.822592.
9. O. Wiles and A. Zisserman, "Learning to Predict 3D Surfaces of Sculptures from Single and Multiple Views," *INTERNATIONAL JOURNAL OF COMPUTER VISION,* Article vol. 127, no. 11-12, pp. 1780-1800, 2019 DEC 2019, doi: 10.1007/s11263-018-1124-0.
10. M. Callieri *et al.*, "Visualization and 3D data processing in the David restoration," (in English), *IEEE Computer Graphics and Applications,* Article vol. 24, no. 2, pp. 16-21, 2004, doi: 10.1109/MCG.2004.1274056.
11. D. Hou, X. Shen, X. Li, Y. Liu, and Y. Wang, "Digital restoration of historical heritage by reconstruction from uncalibrated images," in *TECHNOLOGIES FOR E-LEARNING AND DIGITAL ENTERTAINMENT, PROCEEDINGS*, vol. 3942, Z. G. Pan, H. Diener, X. G. Jin, S. Gobel, and L. Li Eds., 2006, ch. 1st International Conference on Technologies for E-Learning and Digital Entertainment (Edutainment 2006), pp. 1377-1382.
12. C. Liu and S. Guo, "3D Reconstruction of Chinese Traditional Sculpture based on Artificial Intelligence Drawing," (in English), *Comput.-Aided Des. Appl.,* Article vol. 20, no. S5, pp. 1-10, 2023, doi: 10.14733/cadaps.2023.S5.1-10.
13. D. Kosminsky and D. T. de Oliveira, "Slave Voyages: Reflections on Data Sculptures," *IEEE COMPUTER GRAPHICS AND APPLICATIONS,* Article vol. 41, no. 1, pp. 65-73, 2021 JAN 2021, doi: 10.1109/MCG.2020.3025183.
14. Z. Luo, "Exploration of the cultural attributes of Chinese character sculpture using machine learning technology," (in English), *J. Auton. Intell.,* Article vol. 7, no. 4, 2024, Art no. 1471, doi: 10.32629/jai.v7i4.1471.
15. J. Yu and J. Ma, "Application of Computer Graphics and Machine Learning in Computer Aided Design of Digital Sculpture," (in English), *Comput.-Aided Des. Appl.,* Article vol. 21, no. S14, pp. 108-123, 2024, doi: 10.14733/cadaps.2024.S14.108-123.
16. C. Flagg and O. Frieder, "Reconstruction of Artifacts from Digital Image Repositories," *ACM JOURNAL ON COMPUTING AND CULTURAL HERITAGE,* Article vol. 16, no. 1, 2023 MAR 2023, Art no. 14, doi: 10.1145/3552298.
17. V. Poline, R. R. P. Purushottam Raj Purohit, P. Bordet, N. Blanc, and P. Martinetto, "Neural networks for rapid phase quantification of cultural heritage X-ray powder diffraction data," (in English), *J. Appl. Crystallog.,* Article vol. 57, no. Pt 3, pp. 831-841, 2024, doi: 10.1107/S1600576724003704.
18. X. Zhang, R. Ma, and R. Gao, "Detection of Changes of Ancient Buildings from Terrestrial Laser Scanning and Hyperspectral Imaging," (in English), *Scanning,* Article vol. 2021, 2021, Art no. 3760592, doi: 10.1155/2021/3760592.

19. U. L. Roncoroni, V. Crousse de Vallongue, and O. Centurion Bolaños, "Computational creativity issues in generative design and digital fabrication of complex 3D meshes," (in English), *Int. J. Archit. Comput.,* Article 2024, doi: 10.1177/14780771241260850.
20. A. Rabello-Mestre and F. Otondo, "Listening to the Anthropocene: A Queda do Céu," (in English), *Computer Music Journal,* Article vol. 46, no. 1-2, pp. 25-39, 2022, doi: 10.1162/comj_a_00633.
21. N. Macchioni, L. Sozzi, and G. B. Fidanza, "The Relationship between Carving Work and Timber Features: A Database for the Italian Wooden Statuary," (in English), *Forests,* Article vol. 13, no. 4, 2022, Art no. 517, doi: 10.3390/f13040517.
22. V. S. Alfio, D. Costantino, M. Pepe, and A. R. Garofalo, "A Geomatics Approach in Scan to FEM Process Applied to Cultural Heritage Structure: The Case Study of the "Colossus of Barletta"," (in English), *Remote Sensing,* Article vol. 14, no. 3, 2022, Art no. 664, doi: 10.3390/rs14030664.