Hindawi
Mobile Information Systems
Volume 2023, Article ID 9892304, 1 page
https://doi.org/10.1155/2023/9892304

Retraction

Retracted: Research on the Development Path of Cultural Heritage Information Visualization from the Perspective of Digital Humanities

Mobile Information Systems

Received 3 October 2023; Accepted 3 October 2023; Published 4 October 2023

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] X. Fang, "Research on the Development Path of Cultural Heritage Information Visualization from the Perspective of Digital Humanities," *Mobile Information Systems*, vol. 2022, Article ID 2652920, 9 pages, 2022.

Hindawi
Mobile Information Systems
Volume 2022, Article ID 2652920, 9 pages
https://doi.org/10.1155/2022/2652920

Research Article

Research on the Development Path of Cultural Heritage Information Visualization from the Perspective of Digital Humanities

Xixi Fang

Department of Art Design and Creative Industries, Nanfang College of Guangzhou, Nanfang College of Sun Yat-Sen University, Guangzhou, Guangdong, China

Correspondence should be addressed to Xixi Fang; fangqq@nfu.edu.cn

Received 29 March 2022; Revised 5 May 2022; Accepted 18 May 2022; Published 10 June 2022

Academic Editor: M. Praveen Kumar Reddy

Art and humanities fields can all benefit from the wide range of digital materials, methodologies, and tools available to researchers. It is the merging of conventional humanities fields like archaeology and history with computer-based tools and techniques as well as other conventional fields like linguistics and literature. Increase in digital cultural heritage data from museums, libraries, and so on requires new modes of analysis rather than standard representations of data. Though the field of online humanities was traditionally seen as a text-based one, researchers in fields like cultural heritage are increasingly using digital representations and visual analysis approaches to study their subjects. A country's cultural heritage (CH) preservation and management are important in preserving and enabling history analysis. There is a growing use of digital and visualization technologies in the documentation and preservation of cultural heritage sites. In this paper, we examine the importance of digital humanities methods, such as 3D reconstruction of cultural heritage and using analysis of variance to develop interactive educational platforms. With the help of the digital framework, CH has been examined and an interactive, open-access network for promoting education, heritage preservation, cultural management, and social responsibilities has been established.

1. Introduction

Cultural heritage (CH) is now the most significant medium for transmitting information from the past to the future. Documenting and safeguarding cultural heritage have become increasingly important. With the advancement of technology, conventional documentation approaches were superseded by modernized documentation strategies. Use of digitized tools and technologies in the modeling and representation of the CH was becoming widespread [1]. Digitalization has increased the number of ways of representing and disseminating CH data, allowing huge amounts of cultural content to be accessed by anyone, anywhere. Large cultural heritage assets have been formed on the Internet as a result of years of digitalization, containing huge amounts of content including gallery, library, archive, and museums. This surge in digitized cultural heritage data opens up new avenues for research and exposure for academics and casual regular users. The "digital humanities" concept has received a lot of attention in Chinese academic circles since about 2009.

A variety of ways have lately begun to offer visual access to cultural resources and to examine these as complex and extensive information spaces using visualizations, extending further than the traditional representations of search-centric as well as grid-based platforms. Unlike traditional online interfaces, we are seeing an increasing number of novel visualization styles built specifically for rich data from the cultural heritage field. This new category of data visualizations has spawned a wide range of interaction as well as representational strategies [2]. Accurate spatial data are generated through 3D digital documentation. This information can be handled and improved for a variety of uses. Use of 3D data to assist conservation has become more common throughout the cultural heritage field [3].

In this paper, we studied the importance of the digital humanities methods such as visualizing cultural heritage

information using 3D reconstruction and developing interactive educational platforms using ANOVA. The further proceedings of the paper are ordered as shown. Section 2 shows the related literature and the problem statement. Section 3 provides the materials and methods. Performance evaluation is given in Section 4. Finally, Section 5 gives the conclusion of the proposed paper.

2. Literature Survey

To enable 3D physical CH semantic interoperability, Kuo et al. developed an ontology-based solution that integrates 3D models, metadata, and restoration information throughout the entire lifecycle of a building information model (BIM) [4]. The conceptual reference model (CRM), a top-level ontology covering heritage information, metadata, including restoration, has been used to construct a physical cultural heritage ontology, for building and visualizing ontologies inside the cultural heritage area using digital humanity techniques (Gephi and Protégé). Accordingly, the goal of this research is to create a unique evaluation method for the knowledge structure presentation for cultural heritage ontologies employing 5 ontology factors (data summary, visual presentation, highlight connections, scalability, and query). In the field of digital humanities, Comia et al. suggested a joint visual-semantic embedding which may match illustrations and textual elements autonomously without paired guidance. More sophisticated visual and semantic patterns are advertised in this scenario [5].

To digitize the Mount Lushan cultural landscape heritage site, Cai et al. employed digital tools including oblique aerial images, 3D laser scanning, and 360° panorama innovation, combining all parts to build a virtual tourist subsystem [6]. It gives consumers a virtual taste of cultural landscape heritage tourism as well as supports the advertising of cultural landscape tourism. Rizvic et al., looked at the difficulties of incorporating interactive digital storytelling and serious game-based learning into the classroom toward cultural heritage transmission [7]. Kushwaha et al. used remote sensing techniques such as the Terrestrial Laser Scanner (TLS) and photogrammetry to obtain 3D data and texture of the structure with minimal contact [8]. TLS point cloud information was textured with high-resolution pictures, and colored point cloud data were utilized to construct various sections and drawings in AutoCAD software. Cedeo-Gonzabay and Llerena-Izquierdo for modeling structures in digital format, 2019, combine the use of the most advanced realism and photogrammetry [9]. It discusses the use of technology in the restoration of the Cathedral of San Pedro in Guayaquil, Ecuador's heritage structures. Voinea et al. [10] investigated the value of new technologies, particularly augmented reality (AR), in the preservation and exploration of cultural heritage (CH) [10]. They looked at how consumers felt about two mobile AR apps, one of which was built with Project Tango and the other with ARCore. Park et al. designed and executed the K-Culture Time Machine application, which brings together and reassembles various types of content from multiple databases using a recently developed metadata schema that allocates spatio-temporal data to all of them for visualization in mixed reality contexts [11].

Thwaites et al. offer insights on Malaysia's diminishing indigenous tangible and intangible heritage, and also a strategy for using digital media to create new types of customer experience and promote awareness [12]. Rahman et al. discovered a set of open source and proprietary tools and services that may be employed enabling 3D rebuilding to MxR visualization of heritage resources and unified them through a realistic process [13]. They wanted to make it easier for nontechnical yet enthusiastic people to create image-based 3D models, publish them online, but also enable viewers to interact with 3D material in a mixed reality context. The effectiveness of phones with 3D depth sensors in 3D rebuilding of cultural heritage artifacts was investigated by Boboc et al. in 2018 [14]. For relief-type cultural heritages, Pan et al. suggested an effective method for achieving 3D visualization immediately from a one-monocular 2D image [15]. To get a good sense of depth in 3D visualization, they first rebuild the 3D point clouds through applying a depth estimation structure to estimate the depth from a monocular image. The reconstructed point clouds are then rendered in 3D transparently using our stochastic point-based rendering method. Ahmed et al. proposed a 3D acquisition and visualization framework aimed at boosting the importance of cultural resources in particular [16].

Caradonna et al. [17] examined the accuracy as well as realism of 3D models improved utilizing two mesh simplification techniques.

Mody and Bhoosreddy described that many of the disorders have multiple odontogenic keratocysts [18]. A 12-year-old female youngster had several odontogenic keratocysts. The studies found no other anomalies indicative of a condition. Garg and Harita explained that personalized medicine employs fine-grained data to identify specific deviations from normal [19]. These developing data-driven healthcare methods were conceptually and ethically investigated using "Digital Twins" within engineering. Physical artifacts were coupled using digital techniques which continuously represent their state. Moral differences can be observed based on data structures and interpretations imposed on them. Digital Twins' ethical and sociological ramifications are examined. The healthcare system has become increasingly data-driven. This technique could be a social equalizer by providing efficient equalizing enhancing strategies. Using a robust algorithm, authors presented a real-time assistance for robotic surgery in censorious surgeries. The optimal path for reaching the region of treatment is more precisely determined by software-driven processes and algorithms. The statistical analysis has proven that the proposed deep Q network approach would be outperforming under favorable learning rate, discount factor, and the exploration factor [20]. A smart solid waste management system for municipalities in urban localities was proposed by authors as a low-cost, dynamic, energy-efficient, and easily deployable system. The garbage container is equipped with a kit consisting of a microcontroller, two ultrasonic sensors, and a global system for mobile communication (GSM)

module. In the first place, the proposed system works toward the achievement of sustainable development goals such as clean water and sanitation, innovation and infrastructure, sustainable cities and communities, and a healthy life on land. Additionally, the contribution relates to the innovative solution for solid waste management in a municipality that may help achieve all three pillars of sustainability: economic, social, and environmental, which is crucial for the sustainable development of future smart cities [21]. The robust security of clinical data has made blockchain technology renowned in recent years. In addition to securing data, blockchain technology automates transactions, providing decentralized, secure, and trustworthy access to transactions, data, and records. Security, storage, and privacy of patient data have become a concern among healthcare researchers, and blockchain algorithms have been utilized to ensure medical data's security and confidentiality.

Ahmed, Bilal, and Aatiqa Ali showed that allergic rhinitis would be a long-standing worldwide epidemic. Taiwanese doctors commonly treat it with either traditional Chinese or Chinese-Western drugs [22]. Outpatient traditional Chinese medicine therapy of respiratory illnesses was dominated by allergic rhinitis. They compare traditional Chinese medicine with Western medical therapies treating allergic rhinitis throughout Taiwan. Shahbaz and Afzal depicted the usage of high-dose-rate (HDR) brachytherapy avoids radioactivity, allows for outpatient therapy, and reduces diagnosis timeframes [23]. A single-stepping source could also enhance dosage dispersion by adjusting latency at every dwell location. The shorter processing intervals need not permit any error checking, and inaccuracies could injure individuals; hence, HDR brachytherapy therapies should be performed properly. Li and Zihan presented a treatment as well as the technology of domestic sewage to improve the rural surroundings [24]. Salihu and Zayyanu Iyya tested soil samples from chosen vegetable farms throughout Zamfara State, Nigeria, for physicochemical and organochlorine pesticides [25]. Testing procedure and data were analyzed using QuEChERS with GC-MS.

3. Materials and Methods

The research focused on analyzing the importance of digital humanities approach in conservation of CH information and CH education using ANOVA. A total of 20 research scholars were selected for this study. A semi-structured interview technique was used to gather the data, which was then evaluated using ANOVA. The flow of the suggested strategy is depicted in Figure 1.

[ICH data were collected from several sources. The large amount of ICH data is organized using topic mapping technology. By mapping keywords to topics stored in knowledge bases, ICH data are organized. The consolidated information source is obtained. The research scholars were allowed to provide their views about traditional documentation technique and digital humanities approach. *F*-statistic and *p*-value are calculated. It is used to analyze the difference between traditional and digital CH documentation techniques].

3.1. Participant Selection. The research scholars of the Dunhuang Research Academy, initially the National Research Institute on Dunhuang Art, a "national comprehensive institution" responsible for overseeing the Mogao Caves, a UNESCO World Heritage Site located near Dunhuang in Gansu, China, were selected for this study [26]. A total of twenty scholars were chosen based on their willingness to participate in this qualitative study. They were given guidelines on answering the questionnaire. Questionnaire covers mainly educational and conservational aspects of digital humanities approach.

3.2. Digital Humanities Approach. The digital humanities (DH) are a research field that combines computing and digital technology with humanities professions such as language, literature, art, history, and culture. It included visualizing cultural heritage information using 3D reconstruction and developing interactive educational platforms.

3.2.1. Digital Visualization Technique. This digital humanities technique is founded on visual literacy, which is defined as the ability to comprehend and use pictures (and spatial objects), and also think and learn in terms of pictures (and spatial objects). Such digital humanities techniques rely on the consumption and creation of graphical and spatial objects instead of text information.

3.2.2. Image Acquisition and Processing. The Mogao Caves are very well of China's Buddhist grottoes and that one of the country's 3 most significant ancient Buddhist sculptural monuments. Images of Buddha sculptures in Mogao Caves are captured. The geometric properties of objects from photographic images are determined. The photos are screened based on size, geometric properties, and resolution. Less resolution images are discarded. The images with better resolution are preprocessed to remove the noise in the images. Image surfaces are processed to detect the significant features and triangulate or align the visual features. Three-dimensional point clouds of good resolution images are constructed using structure from motion (SfM) technique. Figures 2 and 3 depict the original Buddha sculpture, and the basis of 3D reconstruction is laid out with digital data points, respectively.

3.2.3. 3D Modeling. To recreate the geometric model, a mesh layout has been derived from the point cloud. A three-dimensional surface known as a mesh plot is indeed a discrete representation of such a geometric model in the context of geometry, typology, and related properties. The Poisson method is used to create the mesh from the resulting point cloud. If the method produces undesired surfaces, further clearing of the created surface model could be crucially needed. The mesh has been simplified in order to improve the 3D representation. Mesh simplification decreases the number of polygons while maintaining the original shape. The processing time lowers when the quantity of polygons gets decreased. Figure 4 depicts the 3D reconstructed Buddha model.

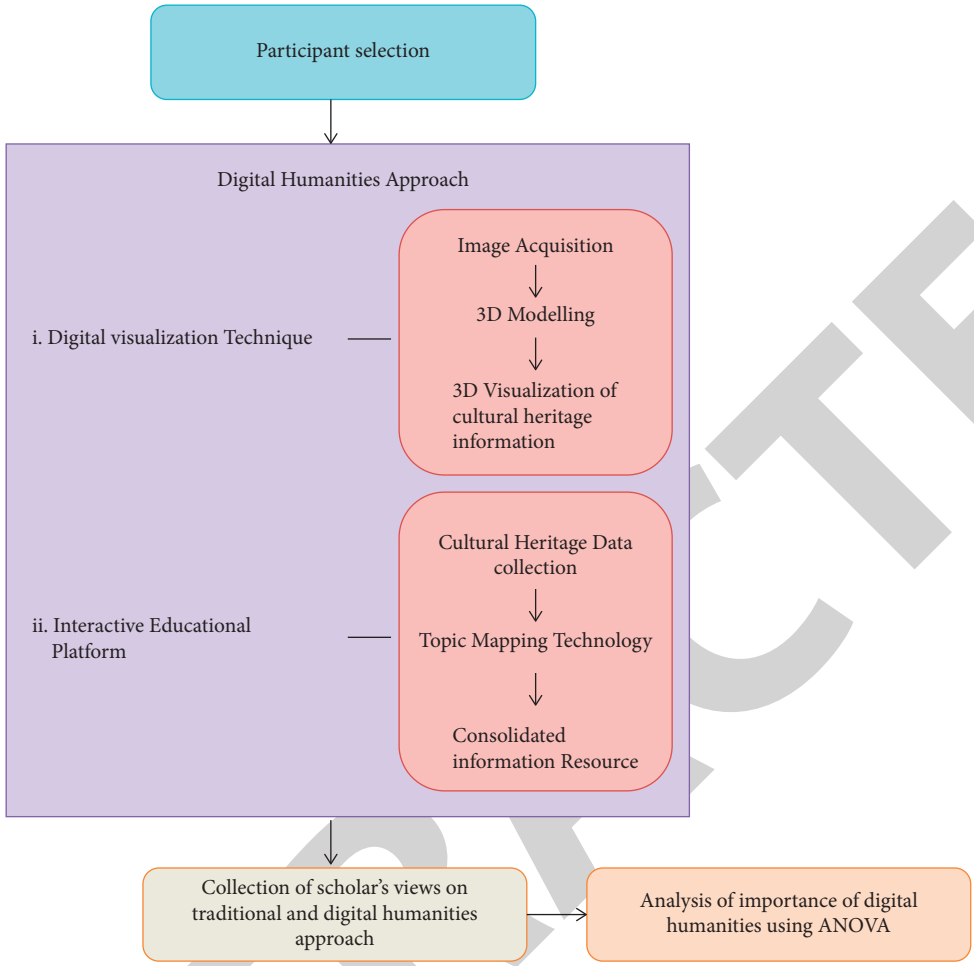

Figure 1: Flow of the suggested research work.

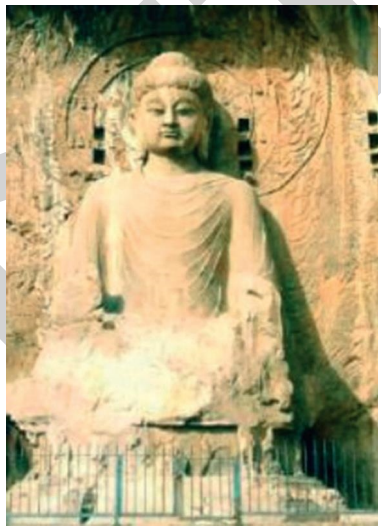

Figure 2: Image of original Buddha sculpture.

Figure 3: Basis of the 3D reconstruction is laid out with digital data points.

3.2.4. Visualization of Cultural Heritage Model. Texture mapping has been the most crucial step in creating realistic 3D models. Texturing is the process of providing visual skin/membrane covering to 3D models so that they resemble the real thing. Texture mapping was being used to add textures onto polygons in order to make designs more realistic. Then, the generated 3D models were stored in cloud-enabled database.

Figure 4: 3D reconstructed Buddha model.

3.3. Developing Interactive Educational Platform

3.3.1. Intangible Cultural Heritage (ICH) Data Collection. Data for the ICH were gathered from a variety of places. Chinese intangible cultural heritage websites, like national and provincial intangible cultural heritage webpages, have been the primary data resources. Those websites' papers, photos, audios, and videos have been accessed. The public cultural service platform and accompanying Internet forums provided a significant volume of ICH text data. The legitimate intangible cultural heritage data were taken after data preprocessing, which included data cleansing, integration, and transformation.

3.3.2. Topic Mapping Technology. Topic mapping technology is applied to organize the large stock of ICH data based on the domain topic. Domain topic describes the concepts and relationships between concepts in particular fields. The concept/class, relation, and instance are included in the knowledge base of digital educational platform. The keywords in the ICH data are obtained by natural language processing. The ICH data are organized based on mapping the keywords to the topic stored in knowledge base. The consolidated information source is obtained.

3.4. Analysis of Importance of Digital Humanities Approach Using ANOVA. The research scholars were allowed to provide their views about traditional documentation technique and digital humanities approach. The multiple choices available for a question in LS are strongly disagree, disagree, neutral, agree, and strongly disagree. The scores are 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree. ANOVA is a statistical approach for determining if two or more groups' averages vary considerably. F-statistic and p-value are calculated. It is used to analyze the difference between traditional and digital CH documentation techniques.

ICH data were collected from several sources. The large amount of ICH data is organized using topic mapping technology. By mapping keywords to topics stored in knowledge bases, ICH data are organized. The consolidated information source is obtained. The research scholars were allowed to provide their views about traditional documentation technique and digital humanities approach. F-statistic and p-value are calculated. It is used to analyze the difference between traditional and digital CH documentation techniques.

4. Results and Discussion

This section explains the importance of digital humanities approach, including digital visualization technique and interactive educational platform in preserving historical sites of China and CH education, over traditional documentation technique. The questionnaire filled out by the research scholars is quantitatively analyzed by ANOVA. Table 1 depicts the different views of scholars about both techniques. Table 1 covers two major aspects, namely, CH education and CH preservation. CH educational aspects included accessibility, knowledge, learning interest, learning experience, and learning motivation. CH preservation aspects included scholarly research, tourism development, conservation of historical damages, and protection of CH information.

5. Discussion

Cultural heritage structures usually undergo considerable damages. Irreparable damages have been inflicted on some old structures in such cases, and documentation proved to be a very useful tool for the reconstruction of the structure and preserving it. Heritage structures usually undergo considerable damages. Digital CH documentation using 3D reconstruction and visualization of damaged historical sites, objects, sculptures, and paintings proved to be a very useful tool for the preservation of cultural heritage of China. In addition, this makes availability of endangered CH sites for the future generation. The results of the ANOVA are provided in Table 2. The mean score of digital CH documentation techniques in each concern was greater than that of traditional CH documentation technique. The p-value for digital humanities approach in each regard was less than 0.05 which means that there is no significant difference between traditional and digital CH documentation techniques. The traditional and digital CH documentation techniques are statistically different. Figure 5 shows the comparative analysis of impacts of traditional documentation and digital humanities approach on culture heritage education. The positive responses for the fact that digital CH documentation technique can enhance accessibility, CH knowledge, learning interest, and learning motivation were significantly higher than that for traditional documentation technique. Figure 6 shows the comparative analysis of impacts of traditional documentation and digital humanities approach on culture heritage preservation. The positive responses for the fact that digital CH documentation technique can

Table 1: Views of research scholars about traditional and digital CH documentation techniques.

Aspects		Technique	Responses (%)				
			Strongly disagree	Disagree	Not sure	Agree	Strongly agree
Educational aspects	Improves CH knowledge	Digital humanities approach	2	—	1	10	7
		Traditional documentation technique	2	10	4	1	3
	Easy accessibility	Digital humanities approach	—	3	2	5	10
		Traditional documentation technique	10	6	—	4	—
	Enhances interest in learning CH	Digital humanities approach	1	2	—	8	9
		Traditional documentation technique	3	6	6	3	2
	Improves learning experience	Digital humanities approach	4	—	—	6	10
		Traditional documentation technique	8	9	—	2	1
	Enhances CH student's learning motivation	Digital humanities approach	—	—	1	9	10
		Traditional documentation technique	10	7	—	1	2
	Efficiently safeguards CH information	Digital humanities approach	1	2	—	8	9
		Traditional documentation technique	5	4	1	6	4
	Improves the imagination about CH sites	Digital humanities approach	2	3	—	10	5
		Traditional documentation technique	10	2	1	7	—
Preservation aspects	Conserves tangible historical artifacts	Digital humanities approach	—	1	—	10	9
		Traditional documentation technique	5	10	2	1	2
	Develops tourism	Digital humanities approach	—	2	—	10	8
		Traditional documentation technique	2	8	5	2	3
	Improves scholarly research on CH	Digital humanities approach	2	2	—	10	6
		Traditional documentation technique	4	6	1	6	3

Table 2: Results of ANOVA.

Aspects		Technique	Mean score	SD	F-statistic	p-value
Educational aspects	Improves CH knowledge	Digital humanities approach	4.7	0.53	7.29	0.039
		Traditional documentation technique	1.6	0.67		
	Easy accessibility	Digital humanities approach	4.5	0.86	8.34	0.034
		Traditional documentation technique	2.3	0.35		
	Enhances interest in learning CH	Digital humanities approach	4.3	0.76	5.24	0.032
		Traditional documentation technique	2.2	0.76		
	Improves learning experience	Digital humanities approach	4.8	0.34	9.23	0.026
		Traditional documentation technique	2	0.86		
	Enhances CH student's learning motivation	Digital humanities approach	4.65	0.56	10.13	0.032
		Traditional documentation technique	2.1	0.46		
	Efficiently safeguards CH information	Digital humanities approach	4.4	0.75	7.29	0.041
		Traditional documentation technique	2	0.55		
	Improves the imagination about CH sites	Digital humanities approach	4.7	0.73	8.34	0.034
		Traditional documentation technique	1.5	0.561		
Preservation aspects	Conserves tangible historical artifacts	Digital humanities approach	4.6	0.67	5.24	0.023
		Traditional documentation technique	1.5	0.54		
	Develops tourism	Digital humanities approach	4.2	0.47	9.23	0.04
		Traditional documentation technique	1.4	0.54		
	Improves scholarly research on CH	Digital humanities approach	4.6	0.57	10.13	0.021
		Traditional documentation technique	2.12	0.73		

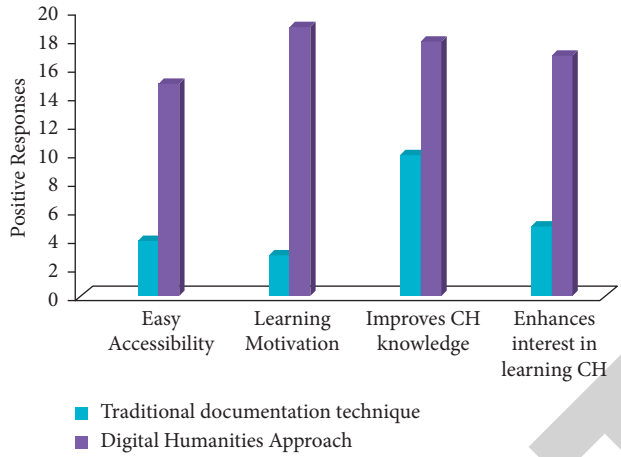

Figure 5: Comparative analysis of traditional documentation and digital humanities approach on culture heritage education.

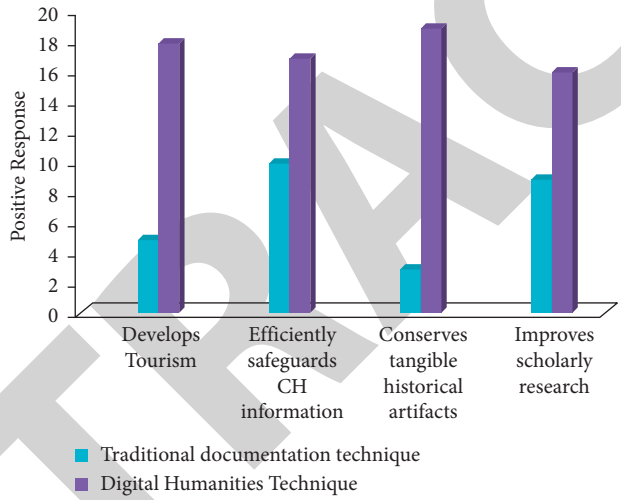

Figure 6: Comparative analysis of traditional documentation and digital humanities approach on protection of culture heritage.

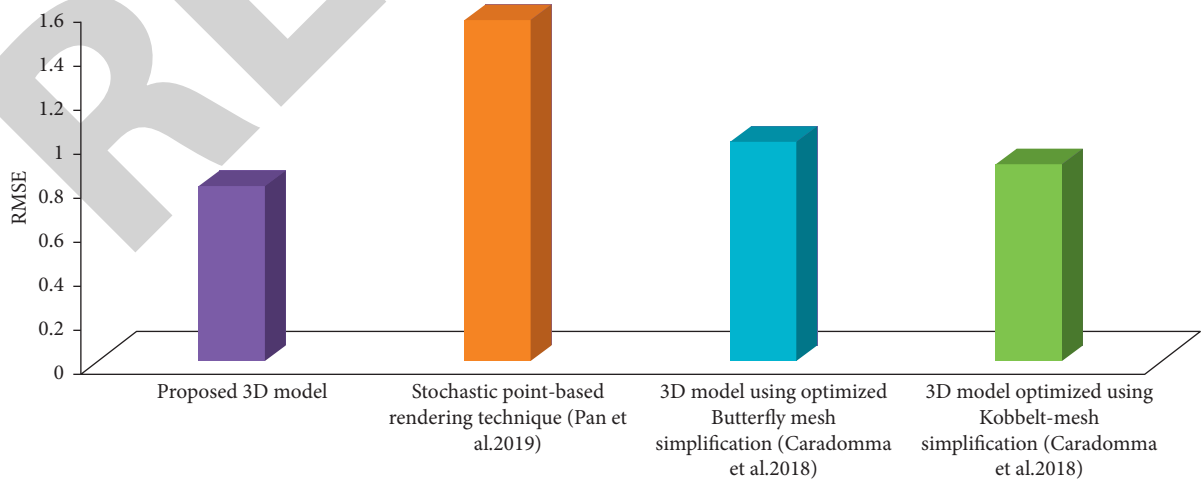

Figure 7: Comparison of various 3D models based on accuracy.

enhance scholarly research, tourism, conservation of historical damages, and protection of CH information were significantly higher than that of traditional documentation technique. Figure 7 depicts the comparison of accuracy in terms of RMSE (root mean square error) of proposed 3D model and existing 3D techniques, namely, stochastic point-based rendering technique and 3D model optimized by butterfly and Kobbelt mesh simplification techniques. RMSE of proposed 3D model was lesser than that of existing 3D models. This indicated the efficiency and visualization accuracy of the suggested digital visualization technique. According to Caradonna et al., there is a limitation of speed prediction of instantaneous representation of 3D simplified design [25]. According to Pan et al. there is a limitation of clarity of the 3D model [26]. To overcome these specified downsides of the existing techniques, the proposed approach is examined with the greatest effectiveness.

6. Conclusion

The preservation and management of a country's cultural heritage (CH) help maintain and evaluate history. Digital and visual techniques are frequently used in cultural heritage documentation and preservation. This paper analyzed the importance of digital humanities (DH) technologies through employing the 3D reconstruction and ANOVA. By employing the digital framework, the cultural heritage (CH) was demonstrated for examination and protection and an interactive, open-access network promoting education, preservation, cultural management, and social obligation was formed. In comparison with traditional documentation techniques, digital CH documentation showed significantly better results for accessibility, CH knowledge, learning interest, and motivation. There were significantly more positive responses to digital CH documentation techniques that could enhance scholarly research, tourism, preservation of historical damages, and protecting CH information as compared to traditional CH documentation techniques.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] R. Laing, "Built heritage modelling and visualisation: the potential to engage with issues of heritage value and wider participation," *Developments in the Built Environment*, vol. 4, Article ID 100017, 2020.

[2] F. Windhager, P. Federico, G. Schreder et al., "Visualization of cultural heritage collection data: State of the art and future challenges," *IEEE Transactions on Visualization and Computer Graphics*, vol. 25, no. 6, pp. 2311–2330, 2019.

[3] L. Wilson, A. Rawlinson, A. Frost, and J. Hepher, "3D digital documentation for disaster management in historic buildings: applications following fire damage at the Mackintosh building, the Glasgow School of Art," *Journal of Cultural Heritage*, vol. 31, pp. 24–32, 2018.

[4] C.-L. Kuo, Y.-M. Cheng, Y.-C. Lu, Y.-C. Lin, W.-B. Yang, and Y.-N. Yen, "A framework for semantic interoperability in 3D tangible cultural heritage in taiwan," *Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection*, Springer, pp. 21–29, Berlin, Germany, 2018.

[5] M. Cornia, M. Stefanini, L. Baraldi, M. Corsini, and R. Cucchiara, "Explaining digital humanities by aligning images and textual descriptions," *Pattern Recognition Letters*, vol. 129, pp. 166–172, 2020.

[6] Z. Cai, C. Fang, Q. Zhang, and F. Chen, "Joint development of cultural heritage protection and tourism: the case of Mount Lushan cultural landscape heritage site," *Heritage Science*, vol. 9, no. 1, pp. 86–16, 2021.

[7] S. Rizvic, D. Boskovic, V. Okanovic, S. Sljivo, and M. Zukic, "Interactive digital storytelling: bringing cultural heritage in a classroom," *Journal of Computers in Education*, vol. 6, no. 1, pp. 143–166, 2019.

[8] S. K. P. Kushwaha, K. R. Dayal, S. Sachchidanand et al., "3D digital documentation of a cultural heritage site using terrestrial laser scanner-A case study, Lecture Notes in Civil Engineering," in *Applications of Geomatics in Civil Engineering*, pp. 49–58, Springer, Singapore, 2020.

[9] J. Llerena-Izquierdo and L. Cedeño-Gonzabay, "Photogrammetry and augmented reality to promote the religious cultural heritage of San Pedro Cathedral in Guayaquil, Ecuador," in *Proceedings of the International Conference on Applied Technologies*, pp. 593–606, Springer, Quito, Ecuador, December 2019.

[10] G.-D. Voinea, F. Girbacia, C. C. Postelnicu, and A. Marto, "Exploring cultural heritage using augmented reality through google's Project Tango and ARCore," in *Communications in Computer and Information Science*, pp. 93–106, Springer, Berlin, Germany, 2018.

[11] H. Park, E. Kim, H. Kim et al., "K-culture time machine: a mobile AR experience platform for Korean cultural heritage sites," in *Proceedings of the Human Interface and the Management of Information. Information in Applications and Services*, pp. 167–180, Springer, Las Vegas, NV, USA, July 2018.

[12] H. Thwaites, D. Santano, H. Esmaeili, and Z. S. See, "A Malaysian cultural heritage digital compendium," *Digital Applications in Archaeology and Cultural Heritage*, vol. 15, Article ID e00116, 2019.

[13] H. Rahaman, E. Champion, and M. Bekele, "From photo to 3D to mixed reality: a complete workflow for cultural heritage visualisation and experience," *Digital Applications in Archaeology and Cultural Heritage*, vol. 13, Article ID e00102, 2019.

[14] R. G. Boboc, F. Gîrbacia, C. C. Postelnicu, and T. Gîrbacia, "Evaluation of using mobile devices for 3D reconstruction of cultural heritage artifacts," in *Proceedings of the International Conference on VR Technologies in Cultural Heritage*, pp. 46–59, Springer, Brasov, Romania, May 2018.

[15] J. Pan, L. Li, H. Yamaguchi et al., "3D transparent visualization of relief-type cultural heritage assets based on depth reconstruction of old monocular photos," in *Communications in Computer and Information Science*, pp. 187–198, Springer, Singapore, 2019.

[16] H. O. Ahmed, A. Belhi, T. Alfaqheri, A. Bouras, A. H. Sadka, and S. Foufou, "A cost-effective 3d acquisition and visualization framework for cultural heritage," in *Proceedings of the Fifth International Congress on Information and Communication Technology*, pp. 495–503, Springer, Singapore, February 2020.

[17] G. Caradonna, E. Tarantino, M. Scaioni, and B. Figorito, "Multi-image 3D reconstruction: a photogrammetric and structure from motion comparative analysis," in *Proceedings of the Computational Science and Its Applications-ICCSA 2018*, pp. 305–316, Springer, Melbourne, Australia, July 2018.

[18] R. N. Mody and A. R. Bhoosreddy, "Multiple odontogenic keratocysts: a case report," *Annals of Dentistry*, vol. 54, no. 1-2, pp. 41–43, 1995.

[19] H. Garg, "Digital twin technology: revolutionary to improve personalized healthcare," *Science Progress and Research*, vol. 1, no. 1, p. 1, 2020.

[20] P. N. Srinivasu, A. K. Bhoi, R. H. Jhaveri, and G. T. M. Reddy, "Probabilistic Deep Q Network for real-time path planning in censorious robotic procedures using force sensors," *Journal of Real-Time Image Processing*, vol. 18, no. 5, pp. 1773–1785, 2021.

[21] A. K. Bhoi, J. Bhatia, D. M. Patel et al., "An ICT-based solid waste management system for smart cities: a case of municipality in India," *International Journal of Ad Hoc and Ubiquitous Computing*, vol. 38, no. 1/2/3, p. 158, 2021.

[22] B. Ahmed and A. Ali, "Usage of traditional Chinese medicine, western medicine and integrated ChineseWestern medicine for the treatment of allergic rhinitis," *Science Progress and Research*, vol. 1, no. 1, pp. 1–9, 2020.

[23] A. Shahabaz and M. Afzal, "Implementation of high dose rate brachytherapy in cancer treatment," *Science Progress and Research*, vol. 1, no. 3, pp. 77–106, 2021.

[24] Z. Li, *Treatment and Technology of Domestic Sewage for Improvement of Rural Environment in China-Jiangsu: A Research*, UK Zhende Publishing Limited, South Croydon, UK, 2022.

[25] S. O. Salihu and I. Zayyanu, "Assessment of Physicochemical parameters and Organochlorine pesticide residues in selected vegetable farmlands soil in Zamfara State, Nigeria," *Science Progress and Research (SPR)*, vol. 2, p. 2, 2022.

[26] S. Bomin, "Wall painting materials and techniques of the Mogao grottoes," *Conservation and Painting Techniques of Wall Paintings on the Ancient Silk Road*, Springer, pp. 253–263, Singapore, 2021.