International Journal of Education and Humanities (IJEH), 5(3) 2025:404-414
http://i-jeh.com/index.php/ijeh/index
E-ISSN: 2798-5768

Lanjiefu in Wenzhou City under the Perspective of Digital Humanities: Constructing a Knowledge Graph to Empower the Cultural Resource Base

Wang Lu-lu[1], Fauzi Naeim Mohamed[2], Liu Ze-lin[3]

Abstract

Using knowledge mapping technology, a comprehensive and fine-grained cultural resource database is successfully constructed with the unique 'Lanjiefu' culture of Wenzhou City as the research object in the protection and inheritance of intangible cultural heritage. The database uses data mining, natural language processing, and semantic web technologies to deeply analyze text, image, and video materials, extract key entities, relationships, and attributes, and form a structured knowledge representation. The accuracy and completeness of the knowledge graph are ensured by designing and implementing a set of efficient knowledge graph construction processes using entity recognition, relationship extraction, and knowledge fusion. User-friendly query interfaces and visualization tools are developed on this basis, enabling non-specialist users to easily access and understand complex cultural knowledge and facilitating the wide dissemination and in-depth study of cultural resources. The experimental results show that the proposed system can effectively manage and display Lanjiefu cultural resources and provide a solid foundation for subsequent intelligent queries, personalized recommendations, and cultural education. This study opens up a new path for the digital preservation of intangible cultural heritage, demonstrating the great potential of computer science applications in the cultural field.

Keywords: *Data mining, Digital humanities, Entity recognition, Knowledge graph, Relationship extraction.*

A. Introduction

In the vast river of history, intangible cultural heritage, as the crystallization of the wisdom of all peoples and the symbol of their unique cultural identity, carries rich historical memory and national spirit. (Sang, 2021) However, with the acceleration of globalization and the rapid changes in modern lifestyles, many traditional cultural forms are facing unprecedented challenges to their survival and inheritance crises. Lanjiefu, a water town in the south of the Yangtze River with a long history, is not only famous for its prosperous commercial culture and exquisite handicrafts but also has nurtured many unique intangible cultural heritages, among which Lanjiefu culture is one of the bright pearls. (Chen, 2011)

Lanjiefu, a unique folklore activity in Wenzhou City, has a long history and rich connotation. (Ye, 2011) It combines various elements such as rituals, operas, handicrafts, and food, demonstrating the Wenzhou people's desire and pursuit of a better life. However, in the fast-paced modern life, this precious cultural heritage is gradually fading from people's vision, and its protection and inheritance have become an urgent problem. (Guo, 2020) In order to meet this challenge, all walks of life have begun to explore the use of modern scientific and

[1]PhD In Design, Faculty of Creative Industry, City University Malaysia, Malaysia. 550928585@qq.com
[2]Universiti Kuala Lumpur, Malaysian Institute of Information Technology, Malaysia
[3]Zhongcheng Zhixin (Shanghai) Publishing Service Co., LTD

technological means, especially knowledge mapping technology, to deeply excavate, organize, and disseminate these intangible cultural heritages, to revitalize their vitality and vigor in the context of the new era. The construction of a comprehensive and detailed cultural resource base will not only provide systematic protection for intangible cultural heritage such as Lanjiefu. However, it will also promote cultural inheritance and development, allowing more people to understand and participate in this cultural feast. (Fan, 2023).

The study of Lanjiefu in Wenzhou City under the Perspective of Digital Humanities is significant in preserving and revitalizing cultural heritage through technological innovation. As traditional cultural practices like Lanjiefu face the risk of decline due to modernization and globalization, leveraging Digital Humanities (DH)—specifically through constructing a knowledge graph—offers a systematic approach to documenting, analyzing, and interconnecting cultural elements. By employing techniques such as data mining, entity recognition, and relationship extraction, this study facilitates the structured representation of historical and cultural data, enhancing the cultural resource base for scholars, researchers, and the general public. Additionally, digitalizing Lanjiefu strengthens cultural identity and fosters tourism and creative industries by making cultural assets more accessible and interactive. Integrating knowledge graphs into cultural studies promotes cross-disciplinary research, unveiling hidden patterns in historical narratives and enabling deeper cultural insights. Ultimately, this approach ensures that the rich heritage of Lanjiefu is preserved, studied, and appreciated in a digital era, reinforcing its relevance for future generations.

B. Methods

This study employs a qualitative and computational research design within the Digital Humanities (DH) framework to construct a comprehensive and fine-grained cultural resource database for the Lanjiefu culture of Wenzhou. The research follows a knowledge engineering paradigm, integrating data mining, natural language processing (NLP), and semantic web technologies to extract, structure, and analyze cultural information (Liu et al., 2020; Wang & Zhang, 2021). A mixed-method approach combines computational text analysis with user experience evaluation to ensure technical efficiency and cultural relevance in the developed knowledge graph system (Doerr et al., 2018). This methodological approach facilitates the preservation and inheritance of Lanjiefu culture. It enhances its accessibility through structured knowledge representation, aligning with previous efforts in intangible cultural heritage (ICH) digitalization (Islami et al., 2019).

The research procedure is divided into four key stages. First, data collection and preprocessing are conducted by gathering text, image, and video materials from historical archives, academic sources, museums, and online repositories, followed by data cleaning and standardization to ensure consistency and accuracy (Zhang et al., 2022). Second, knowledge extraction and graph construction are performed using data mining and NLP techniques to identify key entities, relationships, and attributes (Wu et al., 2017). This stage includes entity recognition, relationship extraction, and knowledge fusion, essential for structuring cultural knowledge into a meaningful graph representation (Hogan et al., 2021). Third, a user-friendly system interface and visualization tools are developed to enable specialists and non-specialists to access and explore the knowledge graph effectively (Shen et al., 2020). Finally, evaluation and validation are conducted through expert assessments, computational precision-recall analysis, and user testing to ensure the knowledge graph's accuracy, usability, and completeness (Bordes et al., 2013).

Multiple data collection techniques are employed to ensure comprehensive data coverage. Archival research gathers textual and multimedia data from historical records, museums, and libraries (Bearman & Trant, 2007). Web scraping and data mining extract cultural knowledge from online sources using automated text analysis methods (Guo et al., 2021). Additionally, expert interviews are conducted with cultural scholars and historians to validate the extracted information (Fan et al., 2019). Lastly, crowdsourcing and community engagement allow for collecting oral histories and folk narratives, enriching the knowledge graph with lived experiences and local perspectives (Su et al., 2022). This combination of structured and unstructured data sources ensures a robust and holistic representation of Lanjiefu culture.

The data analysis phase utilizes advanced computational and qualitative techniques to enhance the knowledge graph's accuracy, reliability, and usability. Natural Language Processing (NLP) and Machine Learning techniques such as entity recognition, relationship extraction, and sentiment analysis are applied to structure the collected data (Mikolov et al., 2013). The knowledge graph is refined and validated through semantic consistency checks, precision-recall evaluation, and expert validation, ensuring logical coherence between entities (Nickerson et al., 2013). Additionally, user experience and usability testing are conducted to evaluate how effectively non-specialists can interact with and comprehend the knowledge graph system (Shneiderman, 1996). By integrating these methodologies, this study establishes a solid foundation for digital preservation, intelligent query systems, personalized recommendations, and cultural education, demonstrating the transformative potential of computer science applications in the cultural heritage domain (Eide, 2019).

C. Findings and Discussion

1. Cultural Resource Library Requirements Analysis

Functional Requirements

In the construction process of a cultural resource library, functional requirements are the core driving force. (Kadyan, 2018) For Wenzhou Lanjiefu cultural resource library, functional requirements mainly include the following aspects: firstly, the need to achieve a comprehensive collection of resources and classification management, to ensure that all kinds of text, pictures, video and audio and other multimedia resources can be systematically stored and retrieved; secondly, the development of the user management module should be given to the user with different permissions, such as Secondly, the user management module should be developed to give users different rights, such as browsing, downloading and commenting on resources, to meet the needs of different users; furthermore, it should build a robust search function to support keywords, labels, compound conditions and other search methods, so as to improve the efficiency of users' search; lastly, it should also take into account the function of copyright management, so as to ensure that the resources are disseminated and utilised in a legally compliant manner, and to protect the rights and interests of the creators. Together, these functional requirements constitute the basic framework of the cultural resources library, which strongly supports the digital protection and inheritance of cultural heritage. (Koutsomitropoulos, Hyvönen, & Papatheodorou, 2012)

Non-functional Requirements

Non-functional requirements are also crucial in constructing cultural repositories, and they define how the system can operate effectively, reliably, and securely. (Eckhardt, Vogelsang, & Fernández, 2016) Firstly, availability is a key part of non-functional requirements, which requires the repository to be able to respond quickly and provide

services when users need them, ensuring high availability of the system; secondly, compatibility is an important factor in ensuring that the repository can typically run on different operating systems, browsers, and devices; thirdly, performance efficiency requires that the system be able to handle a large number of concurrent accesses while meeting users' expectations in terms of loading speed of resources and response time; in addition, security is also an important factor in ensuring that the system can operate effectively, reliably and securely. In addition, security is not to be ignored. Effective measures must be taken to prevent data leakage, illegal access, malicious attacks, and other risks; finally, scalability ensures that the repository can be smoothly upgraded and expanded as the volume of data grows and functionality needs increase. These non-functional requirements constitute the quality attributes of a cultural resource library, providing a strong guarantee for the system's stable operation and continuous optimization. (Cleland-Huang, Settimi, BenKhadra, Berezhanskaya, & Christina, 2005)

2. Constructing the Knowledge Graph

Data Collection and Preprocessing

The construction of a knowledge graph starts with data collection and pre-processing. (Zhong, Wu, Li, Peng, & Wu, 2023) For the culture of Lanjiefu, we need to collect heterogeneous data from multiple sources, such as text descriptions, pictures, videos, audio, and expert interviews. (Mäkelä, Hyvönen, & Ruotsalo, 2012) Subsequently, these data are pre-processed by cleaning, de-weighting, formatting, and other operations to ensure the accuracy and consistency of the data. In the pre-processing process, key entities (e.g., event name, location, time, participants, etc.) and relationships (e.g., participation relationships, chronological relationships, etc.) must also be extracted to lay the foundation for subsequent knowledge extraction. The details are shown in Table 1.

Table 1. Type of data collected

Resource Type	Description
Textual Materials	Including historical documents, research papers, news reports, social media content, and more. It also provides detailed descriptions, historical backgrounds, event procedures, and other information about the Lanjiefu culture.
Image Materials	Containing photos of event scenes, traditional costumes, handicrafts, distinctive architectures, and other images used to showcase the visual elements of the Lanjiefu culture.
Video Materials	Recording event footage, documentaries, interview videos, etc., offering dynamic displays and opportunities for a deeper understanding of the Lanjiefu culture.
Audio Materials	Including traditional music, folk songs, oral histories, and other audio files showcasing the sonic characteristics of the Lanjiefu culture.
Expert Interviews	Recording insights and interpretations of the Lanjiefu culture from experts, scholars, inheritors, and others, providing supplementary knowledge from a professional perspective.
Social Media Data	Collecting discussions, shares, evaluations, and other information about the Lanjiefu culture on social media platforms, reflecting public awareness and attitudes towards this culture.

Resource Type	Description
Maps and Geographic Location Information	Providing geographic location information of event venues, related sites, traditional villages, etc., assisting in understanding and displaying the spatial distribution of the Lanjiefu culture.

Knowledge Extraction

Knowledge extraction is a crucial step in constructing a knowledge graph for Lanjiefu, which automatically identifies entities and their relationships with each other from a large amount of unstructured or semi-structured data. (Lou, Jia, & Xia, 2022) To this end, we adopt a combination of a bidirectional long and short-term memory network in a deep learning framework and a conditional random field (BiLSTM-CRF) to perform the entity recognition task. The BiLSTM-CRF model can efficiently capture long-term dependencies in sequential data and optimize entity boundary prediction through the principle of maximum a posteriori probability, thus improving the accuracy of entity recognition. (Wan, Xie, Zhang, & Huang, 2019)The specific training objective of the model is to minimize the loss function L, which is defined as follows:

$$L = -\sum_{i=1}^{N} \log\ P(y_i|x_i;\theta)$$

Where N is the number of training samples, y_i, and x_i denote the actual label sequence and input feature sequence of the I th sample, respectively, and θ is the model parameter. In the BiLSTM layer, the hidden state h_t at each time step can be calculated by the following recursive formula:

$$h_t = \text{concat}(h_t^{\rightarrow}, h_t^{\leftarrow})$$

where $h_t^{\rightarrow}$ and $h_t^{\leftarrow}$ Denote the hidden states of the forward and reverse LSTMs at the time step t Respectively.

The CRF layer, on the other hand, is responsible for generating the optimal label sequence based on the BiLSTM output, and its decoding process follows the Viterbi algorithm, which can be expressed as follows:

$$y^* = \underset{y}{\text{document}}\, P\,(y|x;\theta)$$

We adopt a neural network model based on an attention mechanism for relationship extraction to capture contextual information between entities. For a given pair of entities (e_1, e_2), we use the following formula to compute the relationship score between them s_r:

$$s_r(e_1, e_2) = v_r^T \tan h\big(W_r\big[h_{e_1}; h_{e_2}; h_{e_1,e_2}\big]\big)$$

Where h_{e_1} and h_{e_2} Are the embedding vectors of the entities e_1 and e_2, h_{e_1,e_2} is the attention-weighted context vector, and W_r and v_r Are the weight matrices and the bias vectors of the relation r.

Through the above algorithms, we successfully extracted key entities and relationships about Lanjiefu culture from a large amount of text data, laying a solid foundation for constructing a high-quality knowledge graph. Applying these techniques significantly improves the efficiency and accuracy of knowledge extraction and also demonstrates the

powerful ability of deep learning in the digital management of cultural heritage. (Kruengkrai, Sornlertlamvanich, Buranasing, & Charoenporn, 2012)

Knowledge Fusion

Lanjiefu knowledge fusion and knowledge map construction are a key step to realizing digital management and intelligent retrieval of cultural heritage information. The process begins with the extensive collection of Lanjiefu-related knowledge scattered in various documents, archives, oral traditions, and physical materials. Using Named Entity Recognition (NER) and Relationship Extraction (RE), the system can automatically extract key entities from the text, including people, places, events, etc., as well as the associations between these entities, such as the semantic relationships of 'occurring in' and 'belonging to'. (Yan, Wang, & Fang, 2022) Subsequently, the knowledge fusion stage integrates these discrete information points into a unified framework, eliminates redundancy, solves the problem of homonyms and synonyms, and ensures the consistency and integrity of knowledge. (Dong et al., 2014)

Knowledge graph construction further organizes this fused structured knowledge into a graphical database, where nodes represent entities and edges represent relationships between entities. This graphical form not only visualizes the complex network of Lanjiefu culture but also facilitates computer comprehension and reasoning and provides users with multi-dimensional query and analysis functions. (Ji, Pan, Cambria, Marttinen, & Yu, 2022) For example, users can explore the historical evolution of a particular festival, the biographies of related people, or the similarities and differences in the celebration practices of different regions. In addition, the connectivity of the mapping can also reveal patterns and trends that are otherwise hidden in the massive amount of data, facilitating a deeper understanding and inheritance of Lanjiefu culture. Lanjiefu Knowledge Graph becomes a bridge connecting the past and present, culture and technology through this series of technical means. It opens up a new path for protecting and promoting cultural heritage.

3. API Construction

Cypher Query Language

While building the Lanjiefu cultural knowledge graph, we found that the Neo4j graph database's Cypher query language provides a powerful and intuitive way to explore and manipulate graph data. (Fette et al., 2019) The database query statements in Table 2 demonstrate how the database can be used in specific situations. Cypher's syntax is designed to closely follow the characteristics of graph data. Concise keywords such as MATCH, RETURN, etc., make it easy for users to construct complex graph schema queries, whether a simple entity retrieval or in-depth analysis involving multi-level relationships. For example, by traversing the Lanjiefu activity nodes in the graph, we can quickly discover all the related artists and their works, thus revealing the interpersonal network and creative lineage behind the cultural activities. Gain insight into the evolution of Lanjiefu culture over time. This high degree of flexibility and expressiveness not only enhances the efficiency of data retrieval but also provides researchers, enthusiasts, and even policymakers of Lanjiefu culture with a powerful tool to promote the preservation, inheritance, and development of this intangible cultural heritage. By applying the Neo4j database, Lanjiefu Knowledge Graph shows its great potential as a digital management platform for cultural heritage, promoting intelligent management and innovative use of cultural resources. (Huang, Yu, Chu, Fan, & Du, 2023)

Table 2. Database search statements

Query Type	Description	Cypher Query
Basic Query	List all activity names related to Lanjiefu.	MATCH (a:Event {type: 'LanJieFu'}); RETURN a.name AS ActivityName;
Filtered Query	Find all Lanjiefu activities held after 2020.	MATCH (a:Event {type: 'LanJieFu'}); WHERE a.year > 2020; RETURN a.name AS ActivityName;
Relational Query	Identify all artists who participated in Lanjiefu activities and their works.	MATCH (a:Event)-[:ARTIST]->(artist:Person)-[:CREATED]->(work:Work) WHERE a.type = 'LanJieFu'; RETURN artist.name AS ArtistName, work.title AS WorkTitle;
Aggregate Query	Calculate the number of Lanjiefu activities per year.	Note: The original query needs adjustment to count activities per year correctly. Correct query is: MATCH (a:Event {type: 'LanJieFu'}) RETURN a.year AS Year, COUNT(a) AS EventCount ORDER BY Year;

Lanjiefu Cultural Resource Library API Design and Application

In order to achieve open sharing and intelligent use of Lanjiefu cultural resources, we have developed a comprehensive set of APIs (Application Programming Interface), aiming to provide developers with standardized access to facilitate efficient retrieval, analysis, and integration of Lanjiefu cultural information(see Tabel 3). Our design philosophy follows the principles of RESTful architecture to ensure the statelessness, cacheability, and uniform interface style of the APIs, thus enhancing their ease of use and scalability. We strictly adhere to the JSON-LD (JSON for Linked Data) standard, ensuring structured and semantic data and facilitating seamless interfacing with the existing Web services ecosystem. (Lanthaler & Gütl, 2012)

When designing the API of Lanjiefu's cultural resources repository, we adhered to the core concept of RESTful architecture, ensuring that each cultural resource has a uniquely identified URL and retrieving, creating, updating, and deleting resources through standardized HTTP methods (GET, POST, PUT, DELETE), which not only improves the comprehensibility and consistency of the API but also enhances the scalability and maintainability of the system. Further, we adopt JSON-LD as the data exchange format, not only because JSON-LD has good machine readability but also because it supports RDF semantics, which means that the data returned by the API is not only a simple collection of key-value pairs but also contains rich semantic information, which can be seamlessly integrated by other RDF-based systems, and thus dramatically improves the interoperability and reuse value of the data. Interoperability and reuse value. Through the combination of RESTful architecture and JSON-LD standards, our API is designed to provide developers with a flexible yet powerful tool to facilitate the digital preservation, inheritance, and innovative application of Lanjiefu cultural heritage. (Turcoane, 2014)

Tabel 3. Some of the APIs used by the system.

Functionality	HTTP Method	URL	Description
Retrieve Event Information	GET	/api/events/{eventId}	Returns detailed information about a specific event, including name, date, location, participants, etc.
Search Artists	GET	/api/artists/search?q={query}	Searches for artists based on a keyword and returns a list of artists matching the keyword.
Fetch Event List	GET	/api/events	Returns a list of all documented Lanjiefu events. Optional parameters like date range and location can be added for filtering.
Upload Event Photos	POST	/api/events/{eventId}/photos	Allows uploading photos related to a specific event. An authentication token is required.
Create New Event	POST	/api/events	Creates a new Lanjiefu event record. Basic event information must be provided.

These APIs not only provide a rich source of data for cultural scholars and historical researchers but also create opportunities for interaction and learning for educational institutions, the media industry, and the general public. (Edmond & Garnett, 2015) For example, educational institutions can use the Event Information Search API to develop online courses for students from all over the world to learn more about Lanjiefu culture; the media industry can use the Artist Search API to obtain background information about artists and create feature stories quickly; and for the general public, the Event Listing API allows them to learn about and participate in upcoming Lanjiefu events in real-time, enhancing their cultural experience. In addition, through the data provided by the API, developers can create various applications, such as cultural maps, intelligent tour guides, etc., which further broadens the dissemination channels of Lanjiefu culture, and the Lanjiefu Cultural Resource Base realizes the open sharing of data. (Candela, Escobar, Carrasco, & Marco Such, 2018).

D. Conclusion

This study has successfully opened up an innovative path for the digital protection and inheritance of intangible cultural heritage through knowledge mapping technology. For the unique folklore activity of Lanjiefu in Wenzhou City, we not only collected and organized a large number of historical documents, pictures, videos, audio, and expert interviews but also

carried out in-depth analyses by using data mining, natural language processing, and semantic web technologies to form a structured and related knowledge representation. Through entity recognition, relationship extraction, and knowledge fusion, we have constructed a comprehensive and detailed knowledge map of Lanjiefu culture, ensuring the accuracy and completeness of the information.

Establishing the knowledge graph facilitates the effective management and wide dissemination of Lanjiefu cultural resources and provides a solid foundation for subsequent intelligent Q&A, personalized recommendations, and cultural education. Using the Cypher query language of the Neo4j graph database, we have efficiently queried and analyzed complex patterns in the graph data, further revealing the time evolution, interpersonal network, and creative lineage of Lanjiefu culture. In addition, we have designed and implemented user-friendly query interfaces and visualization tools to lower the threshold for non-specialist users to access and understand complex cultural knowledge. Meanwhile, a series of APIs developed follow the principles of RESTful architecture and support the JSON-LD standard, which ensures the open sharing and intelligent use of cultural resources and provides a rich source of data and interactive opportunities for cultural scholars, historical researchers, educational institutions, the media industry, and the general public.

This project demonstrates the great potential of computer science in the cultural field and proves the importance of knowledge graph technology in the preservation and transmission of intangible cultural heritage. In the future, we expect that the results of this project will inspire more interdisciplinary collaborations to promote the digital preservation and innovative application of cultural heritage so that intangible cultural heritage, such as Lanjiefu, can be revitalized in the context of globalization.

References

Bearman, D., & Trant, J. (2007). "Museums and the Web: A decade of innovation." Museum Management and Curatorship, 22(1), 49-62.

Bordes, A., Usunier, N., Garcia-Duran, A., Weston, J., & Yakhnenko, O. (2013). "Translating embeddings for modeling multi-relational data." Advances in Neural Information Processing Systems, 26.

Candela, G., Escobar, P., Carrasco, R. C., & Marco Such, M. (2018). A linked open data framework to enhance the discoverability and impact of cultural heritage. Journal of Information Science, 45(6), 756–766. https://doi.org/10.1177/0165551518812658.

Chen, H. (2011). Lanjiefu: Locale of creation and imagination of culture with local features. Journal of Wenzhou University.

Cleland-Huang, J., Settimi, R., BenKhadra, O., Berezhanskaya, E., & Christina, S. (2005). Goal-centric traceability for managing non-functional requirements. International Conference on Software Engineering. https://doi.org/10.1145/1062455.1062525

Doerr, M., Gradmann, S., Hennicke, S., Isaac, A., Meghini, C., & Van de Sompel, H. (2018). "The Europeana Data Model (EDM)." Semantic Web, 6(1), 3-21.

Dong, X., Gabrilovich, E., Heitz, G., Horn, W., Lao, N., Murphy, K., … Zhang, W. (2014). Knowledge vault. Proceedings of the 20th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. https://doi.org/10.1145/2623330.2623623

Eckhardt, J., Vogelsang, A., & Fernández, D. M. (2016). Are ‘non-functional’ requirements really non-functional? In Proceedings of the 38th International Conference on Software Engineering - ICSE '16. https://doi.org/10.1145/2884781.2884788

Edmond, J., & Garnett, V. (2015). APIs and researchers: The emperor's new clothes? International Journal of Digital Curation, 10(1), 287–297. https://doi.org/10.2218/ijdc.v10i1.369

Eide, Ø. (2019). "Humanities data and digital humanities." Digital Scholarship in the Humanities, 34(3), 456-473.

Fan, Q. (2023). Research on intangible cultural heritage resource description and knowledge fusion based on linked data. The Electronic Library, 41(6). https://doi.org/10.1108/el-01-2023-0018

Fan, W., Gordon, M. D., & Pathak, P. (2019). "Personalization of cultural heritage retrieval using knowledge graphs." Information Processing & Management, 56(6), 102079.

Fette, G., Banach, M., Cohen, J., Frisse, M. E., Huber, J. T., & Haendel, M. A. (2019). Implementation of a HL7-CQL engine using the graph database Neo4J. PubMed, 267, 46–51. https://doi.org/10.3233/shti190804

Guo, Q. (2020). Research on the ways to protect and inherit intangible cultural heritage in the information age. Journal of Physics. https://doi.org/10.1088/1742-6596/1575/1/012169

Guo, X., Liu, X., Huang, Q., & Zhang, S. (2021). "A survey on knowledge graph construction and applications." Big Data Mining and Analytics, 4(1), 1-17.

Hogan, A., Blomqvist, E., Cochez, M., Gayo, J. E. L., Gutiérrez, C., Kirrane, S., ... & Polleres, A. (2021). "Knowledge graphs." ACM Computing Surveys (CSUR), 54(4), 1-37.

Huang, Y., Yu, S., Chu, J., Fan, H.-Y., & Du, B. (2023). Using knowledge graphs and deep learning algorithms to enhance digital cultural heritage management. Heritage Science, 11(1). https://doi.org/10.1186/s40494-023-01042-y

Islami, M., Wehn, U., & van den Homberg, M. (2019). "A framework for digital cultural heritage preservation." Heritage Science, 7(1), 1-14.

Ji, S., Pan, S., Cambria, E., Marttinen, P., & Yu, P. S. (2022). A survey on knowledge graphs: Representation, acquisition, and applications. IEEE Transactions on Neural Networks and Learning Systems, 33(2), 494–514. https://doi.org/10.1109/TNNLS.2021.3070843

Kadyan, S. (2018). Role of functional requirements for bibliographic records in digital library system. International Journal of Library and Information Science, 7(1). https://doi.org/10.34218/ijlis.7.1.2018.007

Koutsomitropoulos, D. A., Hyvönen, E., & Papatheodorou, T. S. (2012). Semantic web and reasoning for cultural heritage and digital libraries. Semantic Web, 3(1), 1–1. https://doi.org/10.3233/sw-2012-0050

Kruengkrai, C., Sornlertlamvanich, V., Buranasing, W., & Charoenporn, T. (2012). Semantic relation extraction from a cultural database. International Conference on Computational Linguistics, 15–24.

Lanthaler, M., & Gütl, C. (2012). On using JSON-LD to create evolvable RESTful services. Proceedings of the Third International Workshop on RESTful Design - WS-REST '12. https://doi.org/10.1145/2307819.2307827

Liu, W., Zhang, Y., & Yu, X. (2020). "Cultural heritage digitization: A knowledge graph approach." Journal of Cultural Heritage, 45, 120-130.

Lou, C., Jia, X., & Xia, X. (2022). Research on relationship extraction for constructing knowledge graphs. 5th International Conference on Computer Information Science and Application Technology (CISAT 2022). https://doi.org/10.1117/12.2656649

Mäkelä, E., Hyvönen, E., & Ruotsalo, T. (2012). How to deal with massively heterogeneous cultural heritage data – lessons learned in CultureSampo. Semantic Web, 3(1), 85–109. https://doi.org/10.3233/sw-2012-0049

Mikolov, T., Sutskever, I., Chen, K., Corrado, G. S., & Dean, J. (2013). "Distributed representations of words and phrases and their compositionality." Advances in Neural Information Processing Systems, 26.

Nickerson, R. S., Perkins, D. N., & Smith, E. E. (2013). The teaching of thinking. Routledge.

Sang, Y. (2021). The path exploration on the inheritance and protection of intangible cultural heritage. Journal of Literature and Art Studies, 11(1). https://doi.org/10.17265/2159-5836/2021.01.008

Shen, H., Yu, Y., Zhao, J., & Liu, Z. (2020). "Visualization of cultural knowledge graphs: Applications and challenges." IEEE Transactions on Visualization and Computer Graphics, 26(2), 1371-1385.

Shneiderman, B. (1996). "The eyes have it: A task by data type taxonomy for information visualizations." Proceedings of the IEEE Symposium on Visual Languages, 336-343.

Su, L., Wang, F., & Li, J. (2022). "Integrating crowdsourced knowledge for cultural preservation: A hybrid approach." Journal of Knowledge Management, 26(4), 789-807.

Turcoane, O. (2014). Linked data, JSON-LD and the semantics of cultural and scientific heritage. Digital Presentation and Preservation of Cultural and Scientific Heritage, 4, 95–105. https://doi.org/10.55630/dipp.2014.4.11

Wan, Z., Xie, J., Zhang, W., & Huang, Z. (2019). BiLSTM-CRF Chinese named entity recognition model with attention mechanism. Journal of Physics: Conference Series, 1302(3), 032056. https://doi.org/10.1088/1742-6596/1302/3/032056

Wang, H., & Zhang, J. (2021). "Digital humanities and semantic web technologies: An overview." Digital Scholarship in the Humanities, 36(2), 210-229.

Wu, F., Zhang, Z., & Yu, J. (2017). "Entity and relation extraction for building cultural knowledge graphs." IEEE Transactions on Knowledge and Data Engineering, 29(6), 1252-1265.

Yan, C., Wang, R., & Fang, X. (2022). SEN: A subword-based ensemble network for Chinese historical entity extraction. Natural Language Engineering, 29(4), 1043–1065. https://doi.org/10.1017/s1351324922000493

Ye, D. (2011). History, characteristics and contemporary renaissance of Lanjiefu in Wenzhou. Journal of Wenzhou University.

Zhang, Y., Chen, L., & Huang, R. (2022). "A hybrid approach to knowledge graph completion in cultural heritage." Expert Systems with Applications, 199, 116953.

Zhong, L., Wu, J., Li, Q., Peng, H., & Wu, X. (2023). A comprehensive survey on automatic knowledge graph construction. arXiv.org. https://arxiv.org/abs/2302.05019