

Construction and Application of Multimodal Corpus of Chinese Shadow Play

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Abstract

As one of the prominent embodiments of China's intangible cultural heritage, shadow play embodies the essence and distinctive charm of traditional Chinese culture. This paper aims to provide an overview of the research on Chinese shadow puppetry conducted both domestically and internationally, as well as the current state of database construction pertaining to Chinese shadow puppetry. By reviewing the existing literature and ongoing efforts in multimodal corpus construction within the field, this paper elucidates the significance and process involved in developing a multimodal corpus specifically tailored to Chinese shadow puppetry. Moreover, it highlights the potential applications of this corpus in various domains, including the preservation and transmission of shadow puppetry, the advancement of language application research, the industrialization of cultural resources, and the promotion of traditional culture to a global audience.

Keywords: Chinese shadow play, multimodal corpus, digitalization, international communication, cultural industry

1. Introduction

Intangible cultural heritage (ICH) constitutes a vital facet of China's venerable traditional culture, embodying a testament to the nation's historical and cultural accomplishments on a global scale (Zhang et al., 2023). Among the quintessential representatives of China's ICH, shadow puppetry emerges as an exceptionally intricate and distinctive manifestation of folk art. With the passage of millennia, shadow puppetry has undergone continuous refinement and evolution, amassing a wealth of cultural and artistic significance. Its performance style has captivated a diverse array of audiences,

illuminating the quintessence and singular allure of classical Chinese culture (Guo, 2020).

This paper embarks on a comprehensive exploration of the scholarly landscape encompassing Chinese shadow puppetry both domestically and internationally, delving into the current panorama of database development related to this art form. By synthesizing an in-depth survey of research efforts and corpus construction endeavors on a global scale, this paper elucidates the pivotal importance and procedural intricacies underlying the establishment of a multimodal corpus devoted to Chinese shadow puppetry. Moreover, this

endeavor divulges the manifold implications of such a corpus — ranging from safeguarding and perpetuating shadow puppetry to propelling advancements in linguistic application research, catalyzing the industrialization of cultural resources, and amplifying the dissemination of traditional cultural heritage on a global scale.

2. Current Research on Multimodal Corpus and Chinese Shadow Puppetry

2.1 Multimodal Corpus

A multimodal corpus represents an integration of diverse data forms, including audio, video, and text corpora. This framework empowers researchers to navigate, extract insights from, and quantify relevant information through multifaceted methodologies. The term “multimodality” encompasses both the utilization of various sensory modalities in corpus processing (such as visual and auditory), as well as employing multiple modalities for retrieval (such as tactile, visual, and auditory) (Gu, 2013). The applications of multimodal corpora span a multitude of domains, ranging from natural language processing and computer vision to sentiment analysis and intelligent dialogue systems.

In recent years, global research efforts have yielded a wealth of results in the realm of multimodal corpora. Renowned projects include ISLE, HUMA-INE, SIMILAR, CHIL, AMI, VACE, CALLAS, and more (Martin et al., 2008: 253). These corpora encompass a broad array of sources, including social media platforms like Twitter, Facebook, and Instagram, news media outlets spanning news websites, blogs, and forums, visual databases like ImageNet, COCO, and PASCAL VOC, as well as speech recognition repositories such as LibriSpeech, VoxCeleb, and Switchboard. These resources find application in diverse fields, including the cross-fertilization of natural language processing and computer vision, multimodal machine translation, multimodal voice interaction technology, and analysis of social media and network data.

In China, multimodal corpus research has also made substantial strides. Evident structures are emerging, with studies exploring a spectrum of applications. These endeavors encompass translation in the tourism industry (Hu et al., 2022), investigations into simultaneous interpretation (Liu, 2020), linguistics related to sign language (Zhang et al., 2023), and language learning initiatives (Xu et al., 2021). Nonetheless,

given the demanding temporal and resource prerequisites for the establishment and upkeep of multimodal corpora, these collections remain relatively compact at present. And these corpora are purposefully designed to cater to distinct research objectives within specific application domains.

2.2 Research Landscape of Chinese Shadow Puppetry: Domestic and International Perspectives

Presently, there remains a dearth of dedicated foreign studies centered on Chinese shadow puppetry. Prevailing research predominantly revolves around tracing the historical trajectory, delineating production techniques and materials, as well as safeguarding and perpetuating the legacy of this ancient art form. Lisa Kronthal (1997) delves into the history of Chinese shadow puppets housed in American museums, alongside an exploration of the materials and techniques underpinning their creation. Rollins AK (2015) elucidates the contemporary quandary surrounding the preservation and continuation of Chinese shadow play, while Nicholas N (2011) conducts a thorough investigation into the nuances of rural Northwest China’s shadow puppetry.

In recent years, the Chinese government has prioritized the conservation and transmission of intangible cultural heritage, with shadow puppetry — a pivotal facet of China’s intangible cultural tapestry — gaining increasing attention and research focus. Domestically, research endeavors concerning shadow puppetry encompass its historical lineage, cultural conservation and perpetuation, global outreach, artistic essence, digital evolution, and cultural heritage tourism development. A notable instance is Liu et al.’s analysis (2020) and exploration of the spatial diffusion patterns of Chinese shadow puppetry across Europe. Meanwhile, Liu et al. (2018) propose a viable avenue to incorporate shadow puppetry elements into tourist mementos, enhancing these souvenirs’ cultural significance, regional uniqueness, and market variety. Guo (2020) delves into the origins and evolution of shadow puppetry, dissects its artistic attributes, and scrutinizes the cultural value and dissemination policies underpinning this art form.

In light of these contributions, it’s evident that while research into shadow puppetry within China has burgeoned into a significant academic domain, encompassing diverse perspectives

from various institutions and scholars, the global reach and impact of shadow puppetry warrant further augmentation.

2.3 Contemporary Landscape of the Chinese Shadow Puppetry Database

As a pivotal component of the nation's traditional culture and art, Chinese shadow puppetry stands as a globally distinctive form of dramatic expression. Riding the surge of information technology, increasing emphasis has been placed on constructing and harnessing databases dedicated to Chinese shadow puppetry.

The global dissemination of Chinese shadow puppetry encompasses several spheres: exhibitions in museums and art galleries, academic research pursuits, varied performance platforms, and the digital realm of online networks and social media. Museums and art galleries worldwide consistently showcase exhibitions spotlighting Chinese culture, often featuring captivating displays and performances of shadow puppets. International academic institutions and scholars have embarked on systematic explorations and inquiries into Chinese shadow puppetry, lending scholarly rigor to a more profound comprehension of this traditional art. Various global cultural events and festivals routinely extend invitations to Chinese shadow puppet troupes, facilitating interactions and insights for international audiences. In step with the march of internet technologies, a growing number of global audiences access and share information and performance videos pertaining to Chinese shadow puppetry via online platforms such as YouTube and Facebook.

Within China, the shadow puppetry database exemplifies the subsequent attributes: Firstly, its size is incrementally expanding. In recent years, diverse locales have undertaken the digitization of shadow puppetry, yielding an augmentation in associated databases. For instance, the "Shadow Puppet Digital Museum" project earned approval under the "China University Digital Museum Construction Project (Phase II)" in 2007, drawing considerable attention and support from the Ministry of Education. In 2013, the Zhejiang Provincial Department of Culture introduced the "Zhejiang Cultural Heritage Digital Museum" project. Furthermore, the "China Shadow Puppet Network Communication Platform Construction" project

was sanctioned by the National Art Fund in 2017. Secondly, technological means continue to evolve. Leveraging the rapid strides taken by technologies like artificial intelligence and virtual reality, some databases have begun incorporating these tools. For instance, VR technology is employed to emulate the shadow puppetry performance ambiance, enabling audiences to personally experience its charm.

Despite the recent swift expansion of domestic shadow puppetry databases, they exhibit several shortcomings. Primarily, resource coverage remains constrained. Given the extensive historical breadth and geographical span of shadow puppetry, database resources may still be relatively confined. Some regions or genres of shadow puppetry might not have received adequate documentation, curtailing the database's comprehensiveness and depth. Secondly, multimedia resources are insufficient. As an art form that melds auditory and visual elements, shadow puppetry is traditionally displayed through elements such as puppets, lighting and sound effects. Nonetheless, current databases predominantly prioritize text information collection and recording, thereby lacking multimedia support for the actual performance and presentation aspects of shadow puppetry. Thirdly, construction imbalance and a dearth of systematization persist. While all regions ardently foster shadow puppetry databases, significant discrepancies exist among them. Certain locales boast abundant and diverse shadow play databases, while others possess meager holdings or merely basic shadow play materials. Lastly, interactivity and user engagement are wanting. Some shadow play databases may lack interactive features and user participation, providing solely passive functions for browsing and search inquiries.

In summation, the Chinese shadow puppetry database arena still presents untapped potential in terms of resource breadth, data amalgamation and updates, multimedia content enrichment, accessibility, and user engagement. In the future, regional collaborations should be fortified, multimodal resources amalgamated, and a more comprehensive database established. This proactive approach will furnish robust support and assurance for the safeguarding and continuation of shadow puppetry's legacy.

3. Significance of Constructing a Multimodal Corpus for Chinese Shadow Puppetry

3.1 Theoretical Implications

The rapid strides in modern information and communication technology have become a pivotal support pillar for the global dissemination of intangible cultural heritage. Leveraging emerging technologies, platforms like social media and short videos have evolved into vital conduits for the transmission of traditional Chinese culture. Amidst this digital age, the establishment of a multimodal corpus for shadow puppetry carries profound theoretical significance, impacting its safeguarding, research, and international outreach.

Firstly, the widespread prevalence of shadow play across China has engendered diverse genres through long-term evolutionary processes within distinct regions. These various regional shadow plays have assimilated elements from local operas, quyi (narrative singing), folk songs, and musical systems, giving rise to unique local characteristics. Numerous researchers have delved into the intricacies of locally distinctive shadow puppets. However, their endeavors are often circumscribed by differing research focuses and regional policies, precluding a unified approach to research and preservation strategies. Additionally, certain studies lack in-depth, firsthand knowledge, relying instead on perceptual and simplistic descriptions, thus resulting in repetitive and monotonous research outcomes. The construction of a multimodal corpus for Chinese shadow puppetry can address these challenges. By aggregating and harmonizing various databases, it will yield a systematic, discernible, and easily retrievable multimodal corpus, enhancing the cultural understanding of shadow puppetry and offering a robust foundation for related research endeavors.

Secondly, there remains a dearth of comprehensive information regarding the research and development of multimodal corpora in China, with prevailing efforts largely centered on language learning. The creation of a corpus dedicated to Chinese shadow puppetry will contribute to the enhancement of multimodal discourse analysis frameworks, expanding current multimodal annotation systems and catalyzing interdisciplinary exploration in fields such as multimodal linguistics.

Meanwhile, the construction of the multimodal

corpus for Chinese shadow puppetry necessitates the handling and analysis of diverse linguistic forms, including text, speech, images, and videos, thereby furnishing vital data sources and research subjects for multimodal linguistics investigations. Through this exploration of the shadow puppetry corpus, researchers can glean insights into the attributes and patterns of multimodal language, fostering advancements in multimodal linguistic theory.

Lastly, a dearth of knowledge and research on Chinese shadow puppetry persists beyond China's borders. Pioneering a multimodal corpus centered on Chinese shadow puppetry can create a unified platform for its showcase and promotion, furnishing high-quality resources for the global propagation of traditional Chinese culture. Capitalizing on the Chinese shadow puppetry corpus, a new era of digitally preserved and diversely presented shadow puppetry can unfold within international collections. This approach will facilitate the widespread dissemination and effective utilization of cultural heritage, thus facilitating the exploration of strategies and avenues for the international communication of China's intangible cultural legacy.

3.2 Practical Significance

The establishment of a multimodal corpus for Chinese shadow puppetry carries profound practical implications for the preservation and continuation of shadow puppetry, as well as for the industrialization of cultural resources.

To begin, the transmission of shadow puppetry largely relies on written records and oral traditions passed down through generations. Additionally, the intricate production process and challenges in preserving finished products contribute to the gradual erosion of shadow puppetry-related materials over time, with some even lost permanently due to unforeseen circumstances (Huang, 2021). In contrast, a multimodal corpus seamlessly integrates various data forms including audio, video, and textual elements. Through multimodal processing, retrieval, and analysis of pertinent texts and data, it provides a comprehensive archival of shadow puppetry's evolution and inheritance. This, in turn, offers substantial data support for the safeguarding of shadow puppetry. Furthermore, the multimodal corpus bridges existing data gaps between disparate regional databases, furnishes multimedia

resources to augment written record repositories and archives, and facilitates the sharing of multimodal data.

Secondly, the establishment of a multimodal corpus for Chinese shadow puppetry yields essential backing for the development of related industries. As a quintessential manifestation of China's intangible cultural heritage, traditional shadow puppetry possesses vast market potential due to its profound cultural undertones and distinctive artistic expressions. The fusion of shadow puppetry with modern technology and creative culture can unlock new market avenues, paving the way for its commercialization and branding. The corpus serves as a resource for diverse sectors to advance cross-industry research content, methodologies, and trajectories. By conducting multifaceted research in digital shadow puppetry, animation, and cultural and creative design, it fosters the transition of shadow puppetry's cultural resources into an industrialized realm. This accelerates the breadth and depth of impact for intangible cultural heritage.

Lastly, shadow puppetry stands as an integral facet of Chinese traditional culture, embodying historical heritage and collective wisdom. Its unique regional characteristics and rich cultural implications bestow an enchanting allure upon global cultural heritage. Through the amalgamation and integration of diverse forms of shadow play resources, the multimodal corpus of shadow puppetry emerges as an international platform to showcase China's cultural heritage and traditional wisdom to the world. This endeavor augments the international influence of Chinese traditional culture, spotlighting its abundant historical and cultural legacy. Concurrently, the corpus facilitates cross-cultural communication by providing enhanced resources and channels. It affords the world a deeper comprehension of Chinese traditional culture while fostering profound cultural exchanges between China and other nations.

4. Construction Process of the Multimodal Corpus of Chinese Shadow Puppetry

In the era dominated by visual communication, multimedia platforms like audio and video have become instrumental in comprehending and disseminating traditional culture. Shadow puppetry, as an intangible cultural heritage,

seamlessly intertwines performance, music, and artistic elements, embodying a multitude of modalities that readily convey its essence and allure through multimedia. Visual resources emerge as a potent medium for the promotion of shadow puppetry. The specific process of constructing the corpus of Chinese shadow puppetry is described below.

4.1 Determining the Scope and Objectives of the Corpus

Before embarking on the construction of a multimodal corpus for shadow puppetry, it's imperative to define the scope encompassing geographical range, age, performance styles, genres, actors, and other facets of shadow puppetry performances. It's worth noting that numerous domestic intangible cultural heritage museums already house bilingual corpora associated with shadow puppetry.

4.2 Data Collection

Collecting multimodal data for shadow puppetry serves as a pivotal phase in corpus construction. Beyond acquiring resources from pertinent domestic and overseas museums, exhibition spaces, and galleries, data can be amassed through a diverse array of channels:

On-site Collection: Attend shadow play performances across various regions to record performance content and gather multimodal information.

Video Recording: Source video data of shadow puppetry from television broadcasts, the internet, DVDs, and other media.

Visual and Textual Resources: Source imagery and textual content related to shadow puppetry from online sources.

Voice Recording: Record shadow play performers to amass vocal information.

4.3 Data Organization and Database Establishment

Post-collection, the data undergoes a series of processes including classification, filtration, cleaning, labeling, and coding. The tasks encompass:

Data Classification: Sorting distinct data types such as video, images, text, and voice.

Data Filtration and Cleansing: Eliminating redundant or irrelevant data while ensuring data cleanliness and noise reduction.

Data Labeling: Affixing labels to denote elements like performance time, location, actors,

and plot details.

Integration and Alignment: Associating data from various modalities, establishing linkages between dialogues and narratives, and preparing for subsequent analytical and applicative endeavors.

Corpus Creation: Merging labeled and cleansed multimodal data to craft a cohesive multimodal corpus. Cloud or local storage ensures sustainable data usage and management.

4.4 Data Analysis and Utilization

Following storage, employ technologies such as natural language processing, computer vision, and machine learning to dissect and mine the multimodal data. Extract pivotal information such as character imagery, storylines, sound effects, and stage settings for diverse applications spanning the research, protection, and promotion of shadow puppetry. For instance, researchers can engage in speech signal processing with recorded data to extract speech features, comprehending and mastering the language and pronunciation used in shadow puppetry. They can also conduct video processing on video data, extracting video features for action recognition and emotional analysis, all aimed at gaining insights into shadow puppetry actions and emotional expressions. Additionally, image processing can be applied to image data, extracting image features, and performing object recognition and emotion analysis to better understand and learn the forms and visual expressions of shadow puppetry. In addition, text processing, natural language processing, and text mining can be employed on textual data to grasp the plot and literary significance of shadow puppetry. Furthermore, bilingual texts can be utilized to construct a high-quality shadow puppetry translation memory library, enhancing the efficiency and quality of external publicity translators in related fields.

5. The Key Prospects for Applying the Multimodal Corpus of Chinese Shadow Puppetry

5.1 Advancing Digital Transformation of Shadow Puppetry

The compilation and organization of the Chinese shadow puppetry multimodal corpus stands to catalyze the digital transformation of this ancient art form. Conventional exhibitions in ICH museums and galleries often rely on static

artifacts and text descriptions, leaving audiences passively engaged. Leveraging the multimodal shadow puppetry corpus, these institutions can accelerate their digital endeavors. Virtual reality technology can enable interactive encounters with collections, converting language and staging scenes through 3D animation. Human-computer interaction and knowledge visualization can redefine audience engagement, transitioning from mere “observation” to immersive “experience” of shadow puppetry. The power of network technology can create a “cloud shadow puppet” experience, transcending geographical, temporal, and platform constraints to offer comprehensive, intelligent online browsing and cultural education services. This ensures broader accessibility to ICH (Zhao, 2023).

5.2 Infusing Intangible Cultural Elements into Creative Industries

Shadow puppetry encapsulates the historical essence and collective wisdom of the people. The multimodal corpus contains diverse shadow play elements — text, images, audio, and video. Within various cultural industries, stakeholders can integrate these elements, fostering cross-disciplinary collaboration and innovation. This symbiosis spurs novel business models and industrial networks, transforming traditional cultural research into tangible outcomes. For instance, merging traditional shadow puppetry with cinema breathes national essence into the film industry. Integrating shadow puppet elements into gaming and cultural products sparks young interest and garners attention, broadening the reach of shadow puppetry while invigorating the creative sector.

5.3 Enhancing Language Research via Multimodal Corpus

Shadow puppetry’s oral tradition relies on voice mastery to convey character traits, emotions, and nuances. As an object of phonetic study, it enables research into phonemes, phonology, and tonal variations — illuminating Chinese phonetics and dialect evolution. The multimodal shadow puppetry corpus encompasses bilingual oral expressions and multimedia facets, presenting complex translation challenges. This corpus serves as a vital resource for translation studies, especially in cross-cultural translation and transliteration. Moreover, it advances intelligent speech technology and natural language processing by offering vital data for

speech synthesis, recognition, natural language generation, machine translation, and more.

5.4 Catalyzing Intelligent Tourism Industry Development

The multimodal shadow puppetry corpus enriches cultural resources for the tourism industry. As an integral facet of Chinese culture, shadow puppetry's unique performance style and cultural depth offer substantial tourism potential. As the tourism sector embraces digitization and intelligence, the corpus becomes pivotal. It bolsters intelligent services by fueling voice guides, propelling the creation of bilingual question-answer systems, and enhancing digital multimedia tourism in shadow puppetry. This elevates the quality of tourist experiences (Hu et al., 2022), manifesting shadow puppetry's artistic attributes through Chinese and English dual-voice video explanations, thereby attracting more domestic and foreign tourists who are interested in shadow puppetry culture.

6. Conclusion

Shadow puppetry, a quintessential representative of China's ICH, stands as a testament to the sagacity of the Chinese people and a shared treasure of global civilization. This paper has presented an overview of Chinese shadow puppetry research both domestically and internationally, alongside the current progress in constructing a comprehensive database for Chinese shadow puppetry. By scrutinizing the multifaceted corpus initiatives undertaken worldwide, the paper has illuminated the significance and process behind crafting the multimodal corpus of Chinese shadow puppetry. Envisioned as a catalyst, this corpus will poise to foster protection, inheritance, and innovation within the realm of shadow puppetry, while propelling language application research, the cultural resource's industrialization, and traditional culture's projection onto the international stage.

Looking forward, continuous refinement and enrichment of the multimodal corpus of Chinese shadow puppetry is imperative. This trajectory will kindle the digital inheritance, evolution, and innovation of shadow puppetry. As this cherished cultural heritage evolves in the embrace of modern technology, its enchantment will persist, igniting a profound appreciation among audiences worldwide.

References

- Gu Yueguo. (2013). On the principle of integration of speech, thinking, sentiment and appearance and the study of fresh discourse — Multimodal corpus linguistics method. *Contemporary Rhetoric*, (06), 1-19.
- Guo Lin. (2020). The artistic characteristics and dissemination of shadow puppetry. *Henan Social Sciences*, 28(02), 119-124.
- Hu Fumao, Song Jiangwen, Wang Wenjing. (2022). Research on the Construction and Application of Multimodal Tourism Translation Corpus. *Shanghai Translation*, (05), 26-31.
- Huang Lihe, Wu Yun. (2021). Construction and application of multi-modal interpreting teaching corpus based on authentic experience and modeling. *Language Teaching Theory and Practice*, (04), 127-136.
- Liu Chang, Feng Yuqiao. (2020). Research on the Spatial Distribution Characteristics of Chinese Intangible Cultural Heritage Spread in Europe — Taking Shadow Puppetry as an Example. *World Geographic Research*, 29(04), 867-874.
- Liu Haiying, Liu Xuan, Han Fuli, et al. (2018). Research on the Application of Shadow Play Elements in the Design of Tourist Souvenirs. *Packaging Engineering*, 39(24), 333-339.
- Liu Jian, Chen Shuiping. (2020). Research on the Prolonged Speech in Simultaneous Interpretation Based on Multimodal Corpus. *China Foreign Languages*, 17(04), 104-111.
- Martin J C, Paggio P, Kuehnlein P, et al. (2008). Introduction to the special issue on multimodal corpora for modeling human multimodal behavior. *Language Resources and Evaluation*, 42, 253-264.
- Nicholas N. (2011). Chinese shadows: The amazing world of shadow puppetry in rural Northwest China.
- Rollins A K. (2015). Chinese Shadow Puppetry's Changing Apprentice System: Questions of Continuance and a Survey of Remaining Shadow Puppet Practitioners in Mainland China, 2008-2013. *Asian Theater Journal*, 295-318.
- Xu Linhong, Liu Xin, Yuan Wei, et al. (2021). Construction and Application of Russian Multimodal Emotional Corpus. *Computer Science*, 48(11), 312-318.

- Zhang Long, Jiang Yehong, Kang Junchi. (2003). International Communication of Chinese Intangible Cultural Heritage Videos from the Perspective of Empathy. *Contemporary Communication*, (02), 45-49.
- Zhang Yanqiong, Zhu Zhaosong, Zhao Xiaochi. (2023). Research on Multimodal Corpus Construction of Chinese Sign Language Vocabulary for Sign Language Linguistics. *Data Analysis and Knowledge Discovery*, 1-22.
- Zhao Yunhai, Liu Rui. (2023). Reflections on the Practice of Intellectual Property Protection of Intangible Cultural Heritage in the Digital Age. *Cultural Heritage*, (02), 10-18.