

A Study on AI-Assisted English Translation of Ritual Texts and Transference of Ritual Symbols of the Hainan Junpo Festival from a Cross-Cultural Perspective

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Abstract: The present study focuses on the unique folk-cultural phenomenon of the Hainan Junpo Festival. From a cross-cultural perspective, it utilizes AI technology to translate ritual texts into English and to interpret ritual symbols. Grounded in theoretical foundations such as Ritual Communication Theory, the Cultural Turn in Translation Studies, and the Semiotic Approach to Translation, the research employs AI tools, including Large Language Models (LLMs), a cultural symbol semantic network, and an eye-tracker, to investigate ritual texts like those describing "Troop Impersonation" and "Cheek Piercing." By reconstructing ritual scenes through VR technology and analyzing differences in international audiences' visual attention to ritual symbols via eye-tracking experiments, the study aims to explore effective pathways for enhancing the cross-cultural communication efficacy of the Hainan Junpo Festival's culture.

Keywords: Hainan Junpo Festival; Ritual Texts; AI-assisted English Translation; Ritual Symbol Transference; Cross-cultural Communication

Introduction

Under the momentum of globalization, cultural exchange is growing with increasing frequency. As a vital manifestation of cultural diversity, the cross-cultural communication of folk culture has garnered heightened attention. The Hainan Junpo Festival, a highly distinctive and time-honored folk event in the Hainan region, carries rich local culture, religious beliefs, and national spirit, embodying unique ritual symbols and profound cultural connotations. However, due to cultural differences and language barriers, the international dissemination of the Hainan Junpo Festival's culture faces numerous challenges. The accurate translation of its ritual texts and the effective interpretation of its ritual symbols have become crucial issues constraining its cross-cultural communication.

With the rapid advancement of artificial intelligence technology, AI has demonstrated immense potential in fields such as language processing, image recognition, and virtual reality. This progress offers new approaches and methods for addressing challenges in the cross-cultural communication of folk culture. The present study aims to utilize AI technology to assist in the English translation of ritual texts and the interpretation of ritual symbols for the Hainan Junpo Festival. It seeks to explore effective strategies for enhancing cultural communication and to facilitate the international dissemination and exchange of the Hainan Junpo Festival culture.

1. AI-Assisted English Translation Theory

1.1 Ritual Communication Theory

Ritual Communication Theory emphasizes that rituals are not merely specific behavioral patterns but also serve as crucial vehicles for cultural transmission. In the Hainan Junpo Festival, rituals such as "Troop Impersonation" and "Cheek Piercing" construct a culturally symbolic space through specific actions, costumes, props, and other elements. They convey the Hainanese people's reverence for ancestors, their admiration for heroes, and their aspirations for a prosperous life. Ritual Communication Theory provides a theoretical framework for understanding the cultural connotations and

communicative functions of the Hainan Junpo Festival rituals. This framework assists in accurately grasping the symbolic meanings of the rituals during the translation and interpretation process, thereby ensuring the effective transmission of cultural information.

1.2 The Cultural Turn in Translation Studies

The Cultural Turn in Translation Studies posits that translation is not merely the conversion of linguistic signs but also an exchange and dialogue between cultures. In translating the ritual texts of the Hainan Junpo Festival, one must consider the differences between the source and target cultures to avoid translation errors arising from cultural misunderstandings. This theoretical perspective guides translators to focus on the impact of cultural factors on translation, advocating for the adoption of appropriate translation strategies—such as domestication and foreignization—to achieve effective cultural transmission. For instance, when translating culture-specific terms unique to the Hainan region, translators can select suitable renderings based on the cultural background of the target audience. This approach preserves the cultural characteristics of the original text while ensuring its comprehensibility for the intended readers.

1.3 The Semiotic Approach to Translation

The Semiotic Approach to Translation views translation as a process of sign conversion, emphasizing the conveyance and interpretation of sign meaning. Ritual symbols in the Hainan Junpo Festival, such as flags, weapons, and staffs, possess rich cultural connotations and symbolic significance. This semiotic perspective assists translators in gaining a deeper understanding of the meanings of these symbols, analyzing the differences in how these signs function across various cultural contexts, and selecting appropriate translation methods and modes of expression to ensure the accurate transmission of their symbolic meanings. For instance, the "staff" in the "Cheek Piercing" ritual is not merely a physical tool but also symbolizes the expulsion of evil, avoidance of misfortune, and the warning against wrongdoing. Its symbolic meaning must be accurately conveyed during translation^[1].

2. Application of AI-Assisted Tools

2.1 Application of Large Language Models (LLMs) in Text Translation

Large Language Models possess robust capabilities in language comprehension and generation, enabling them to accurately understand and translate the ritual texts of the Hainan Junpo Festival. During the translation process, LLMs can analyze the grammatical structure, semantic relationships, and cultural context of the text to produce translations that conform to English idiomatic usage. For example, for the description of "warriors dressed in ancient costumes, holding weapons, and proceeding in formation" within the "Troop Impersonation" ritual, an LLM can generate a translation such as "The warriors, dressed in ancient costumes and holding weapons, marched in formation," based on the context and English expression conventions. Furthermore, LLMs can also optimize and adjust the generated translations, thereby enhancing the quality and accuracy of the output.

2.2 Construction and Analysis of a Cultural Symbol Semantic Network

A cultural symbol semantic network is a network structure used to represent cultural symbols and their interrelationships. By constructing a semantic network for the cultural symbols of the Hainan Junpo Festival, the connections and meanings among various ritual symbols can be clearly visualized. For instance, symbols such as flags, weapons, and costumes from the "Troop Impersonation" ritual can be linked to concepts like "military affairs," "bravery," and "loyalty," thereby forming a comprehensive semantic network. During the processes of translation and interpretation, this semantic network can be utilized to accurately grasp the cultural connotations of the symbols and to select suitable translation methods and modes of expression. For example, regarding the "staff" in the "Cheek Piercing" ritual, the semantic network reveals that it is not merely a physical tool but also carries symbolic meanings such as exorcising evil and warning against wrongdoing. Consequently, more precise expressions like "a rod symbolizing the exorcism of evil and a warning against misconduct" can be chosen for translation.

2.3 Application of Eye-Tracking in Audience Attention Analysis

An eye-tracker can record the eye movements and gaze patterns of audiences while they view ritual scenes of the Hainan Junpo Festival. By analyzing this eye-tracking data, differences in the focal points of attention that international audiences devote to various ritual symbols can be understood. For instance, within a VR-reconstructed ritual scene, an eye-tracker can record the duration and frequency of an international audience's gaze on symbols such as the flags and weapons in the "Troop Impersonation" ritual, or the "staff" in the "Cheek Piercing" ritual. Analysis of this data can reveal the varying levels of attention international audiences pay to different symbols, thereby providing valuable references for translation and interpretation. For symbols that receive higher attention, greater emphasis can be placed on their expression and presentation during translation and interpretation to enhance the effectiveness of cultural communication.

2.4 Application of VR Technology in Scene Reconstruction

VR technology is capable of creating highly realistic virtual environments, offering international audiences an immersive experience. By reconstructing the ritual scenes of the Hainan Junpo Festival through VR technology, international audiences can gain a more intuitive sense of the ceremony's atmosphere and cultural characteristics. During the scene reconstruction process, meticulous attention is paid to the presentation of details—such as the costumes of participants, the props used, and their actions—enabling international audiences to authentically perceive the solemnity and mystique of the rituals. For example, when reconstructing the "Troop Impersonation" ritual, the neat formations, imposing postures, and impassioned shouts of the warriors can be displayed. When reconstructing the "Cheek Piercing" ritual, the performers' expressions of pain and determination, along with the thrilling scene of the "staff" piercing through the body, can be presented.

3. AI-Assisted Research Unveils New Horizons in Hainan Junpo Festival Studies

In the research journey of the Hainan Junpo Festival, traditional research methods, despite their solid foundation, have gradually revealed their limitations when confronted with complex and diverse research demands. The integration of artificial intelligence (AI) technology, however, has introduced fresh perspectives and efficient methodologies to the field, significantly expanding the depth and scope of research. The following section will elaborate on several AI-assisted research methods employed in this study.

3.1 Documentary Research Method Lays a Solid Theoretical Foundation

The documentary research method serves as the foundation and prerequisite for any academic inquiry, and this holds true for research on the Hainan Junpo Festival. By extensively reviewing relevant historical documents, folkloric materials, and existing scholarly works, we can systematically and comprehensively understand the festival's origins, its developmental trajectory, its ritual contents, and the rich cultural connotations embedded within. These documentary materials function as a vast repository of knowledge, providing a solid theoretical groundwork for our research. From ancient historical texts and records to local folk chronicles, and from prior academic research papers to orally transmitted materials preserved among the people, each document acts as a key, helping us unlock the mysteries of the Hainan Junpo Festival. This process fosters a clearer and deeper understanding of the subject, thereby offering substantial data support and theoretical guidance for the subsequent AI technology-based research^[2].

3.2 AI-Assisted Translation Method Bridges the Cultural Divide

The Hainan Junpo Festival embodies a unique island culture, and its ritual texts are replete with vocabulary and expressions bearing distinct local characteristics. To facilitate the global dissemination of this precious cultural heritage, translation is of paramount importance. Traditional translation methods often encounter numerous challenges when dealing with such culture-specific content. The application of the AI-assisted translation method provides an effective pathway to address this issue. We employ advanced Large Language Models (LLMs) to perform preliminary translations of the ritual texts. Leveraging their powerful language processing capabilities, LLMs can swiftly generate relatively fluent translations. However, language is not merely a combination of vocabulary and grammar; it also

carries profound cultural connotations. Therefore, we refine and adjust the translation output by integrating it with a cultural symbol semantic network. This network functions like an extensive cultural dictionary, meticulously documenting the meanings and usages of various cultural symbols across different contexts. During the translation process, we give full consideration to the differences between the source and target cultures, adopting appropriate translation strategies, such as domestication and foreignization. This ensures that the translations are not only linguistically accurate but also achieve precise cultural conveyance, thereby avoiding translation errors stemming from cultural misunderstandings and guaranteeing both the accuracy and cultural adaptability of the final output.

3.3 VR Scene Reconstruction Method Recreates the Grandeur of Historical Scenes

The ritual ceremonies of the Hainan Junpo Festival are imbued with a mysterious and solemn atmosphere, and its unique ritual scenes and actions carry rich cultural significance. To enable researchers and international audiences to experience the charm of this traditional festival more intuitively, we employ the VR scene reconstruction method. Through VR technology, we are able to realistically recreate the ritual scenes of the Hainan Junpo Festival, including the entire process of ceremonies such as "Troop Impersonation" and "Cheek Piercing." During the scene reconstruction process, we collaborate closely with folklore experts and technical personnel. The folklore experts, drawing on their extensive professional knowledge and practical experience, provide accurate guidance for the scene reconstruction, ensuring that every detail aligns with historical authenticity and cultural tradition. The technical personnel, in turn, utilize advanced technical means to transform the guidance from the folklore experts into vivid and realistic virtual scenes, guaranteeing the authenticity and accuracy of the reconstructed environment.

3.4 Eye-tracking Experimental Method Provides Insights into Audience Attention

To gain an in-depth understanding of how international audiences perceive and engage with the ritual symbols of the Hainan Junpo Festival, we invited overseas participants to take part in an eye-tracking experiment. Participants were asked to view the reconstructed ritual scenes through VR devices. During the experiment, an advanced eye-tracker was used to record their eye movements and gaze patterns. The eye-tracking data functions like a mirror, faithfully reflecting the audience's visual attention and points of interest. Upon completion of the experiment, we conducted a thorough analysis of the eye-tracking data to discern differences in the focal points of attention that international audiences devote to various ritual symbols. These differences inherently reflect the cognitive patterns and aesthetic preferences of audiences from diverse cultural backgrounds, thereby providing a crucial basis for us to further refine our cultural communication strategies and enhance the effectiveness of cultural dissemination^[3].

AI-assisted research methods have played an irreplaceable role in the study of the Hainan Junpo Festival. They have not only provided more efficient and precise means for research but have also enabled us to interpret and preserve this precious cultural heritage from a new perspective, thereby promoting the global dissemination and exchange of the Hainan Junpo Festival culture.

4. AI-Empowered Translation and Focal Point Analysis of the Hainan Junpo Festival

In the current era of surging globalization, cultural exchange and dissemination have become increasingly vital. The Hainan Junpo Festival, as a traditional festival imbued with distinctive characteristics and rich cultural heritage in the Hainan region, carries profound historical memory and national sentiment. To facilitate the global dissemination of this precious cultural legacy, AI technology has been introduced into the translation of its ritual texts and the study and communication of its ritual symbols. This integration has opened up new perspectives and pathways for our endeavors.

4.1 Significant Translational Achievements and Pending Challenges

AI-assisted translation has brought about a qualitative leap in the translation of ritual texts for the Hainan Junpo Festival. Significant improvements have been made in terms of translation accuracy and cultural adaptability. Large Language Models (LLMs) function like multilingual scholars of profound wisdom, capable of swiftly and accurately grasping the deeper meanings of Chinese texts and generating coherent, fluent translations in accordance with English idiomatic usage. The application of

the cultural symbol semantic network further enhances the outcome. It functions like a precise key, unlocking the door to cultural connotations and ensuring the accurate transmission of the rich meanings embedded within ritual symbols. This effectively prevents misunderstandings and translation errors arising from cultural differences.

Taking the translation of "flags fluttering in the wind" from the "Troop Impersonation" ritual as an example, the translated version, "The banners are fluttering in the wind," vividly and accurately depicts the scene of flags waving in the wind. It also conveys the solemn yet fervent atmosphere of the ritual, allowing overseas readers to feel as if they are personally present at the scene. However, the path of translation is not without its challenges. During the practical application, we have encountered several difficulties. The unique dialect vocabulary and metaphors rich in regional cultural characteristics of Hainan are like mysterious treasures hidden within the cultural treasury, posing considerable challenges for translation. These terms and metaphors often embody the unique emotions and life wisdom of the local people. Existing AI tools still exhibit certain limitations in comprehending and converting them, necessitating further exploration to find more appropriate and fitting translations that can better showcase the distinctive charm of Hainan's culture.

4.2 Attention Focus Variations Reveal Cultural Diversity

The eye-tracking experiment has revealed variations in the focus of attention that international audiences devote to the ritual symbols of the Hainan Junpo Festival. These differences reflect underlying aesthetic preferences and cognitive patterns shaped by distinct cultural backgrounds. During the "Troop Impersonation" ritual, male participants demonstrated a higher level of attention toward flags and weapons, a tendency which may be related to their stronger interest in military culture and symbols of power. In military culture, flags and weapons often represent authority, courage, and combat effectiveness, potentially resonating with a deeply rooted heroic sentiment among male viewers. In contrast, female participants tended to focus more on the costumes and facial expressions of the performers. They paid greater attention to the aesthetic and emotional aspects of the ritual. The elaborate costumes and vivid expressions convey nuanced emotions and rich cultural information, aligning with female participants' appreciation for beauty and emotional expression^[4].

In the "Cheek Piercing" ritual, the "staff" becomes a common focal point for international audiences. However, there exists a significant difference in how audiences from diverse cultural backgrounds interpret the symbolic meaning of the "staff". Some Western audiences may associate the "staff" with the scepters used in religious ceremonies, perceiving it as a symbol of power and sanctity. Conversely, they often convey insufficient understanding of the staff's symbolic meaning within the context of the Hainan Junpo Festival, which embodies the expulsion of evil and the avoidance of misfortune. This difference reflects both the clash and integration between distinct cultures. It also serves as a reminder that in the process of cultural communication, greater emphasis must be placed on providing in-depth interpretation and explanation of cultural connotations.

4.3 Acknowledging Significant AI Contributions and Inherent Limitations

AI tools play a crucial role in the English translation of ritual texts and the interpretation of ritual symbols for the Hainan Junpo Festival. Large Language Models (LLMs) significantly enhance translation efficiency through their high processing capability while ensuring translational accuracy; the cultural symbol semantic network assists in accurately grasping the cultural connotations of symbols, leading to more precise translations; eye-trackers provide in-depth insights into the differences in international audiences' focal points of attention, offering a scientific basis for formulating cultural communication strategies; and VR technology supplies international audiences with an immersive experience, allowing them to appreciate the unique charm of the Hainan Junpo Festival more intuitively^[5].

However, we must also maintain a clear-eyed recognition that AI tools are not a panacea. They possess limited comprehension when dealing with culture-specific vocabulary and metaphors, unable to fully capture the rich cultural information embedded within them. Therefore, when utilizing AI tools for translation and interpretation, we must avoid over-reliance. Instead, we should fully leverage human agency, combining the experience and wisdom of human translators to further optimize and refine the AI-generated translations. Only through this approach can we enhance the quality of translation, ensuring the cultural essence of the Hainan Junpo Festival is communicated more accurately and vividly, allowing it to shine even more brightly on the global stage of cultural exchange.

5. Conclusion

Supported by theoretical frameworks including Ritual Communication Theory, the Cultural Turn in Translation Studies, and the Semiotic Approach to Translation, this study employed AI tools such as Large Language Models (LLMs), a cultural symbol semantic network, an eye-tracker, and VR technology to investigate the English translation of ritual texts and the interpretation of ritual symbols for the Hainan Junpo Festival. Through methodologies encompassing textual analysis, AI-assisted translation, VR scene reconstruction, and eye-tracking experiments, the research generated translations that align with the cognitive habits of English-speaking readers and identified differences in the focal points of attention that international audiences devote to ritual symbols. The findings indicate that AI tools play a significant role in enhancing translation accuracy and the effectiveness of cultural communication. However, they also possess certain limitations, necessitating optimization and adjustment through integration with human translation.

Subsequent research may further expand the application scope of AI tools in the translation and dissemination of folk culture, exploring more effective translation strategies and methods. For instance, dedicated translation models tailored for folk culture could be developed to enhance the capability of translating culture-specific vocabulary and metaphors. Furthermore, by integrating social media and online platforms, broader cross-cultural communication activities could be conducted to amplify the influence of the Hainan Junpo Festival's culture. Simultaneously, increased emphasis should be placed on interdisciplinary research, combining theories and methodologies from linguistics, cultural studies, communication studies, computer science, and other relevant fields. This integrated approach would provide more comprehensive theoretical support and practical guidance for the translation and dissemination of folk culture.

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