

Construction of Multi-modal Interaction Mechanism of Chinese Medicine Empowered by Artificial Intelligence in Global Communication

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ABSTRACT

Chinese excellent traditional culture is the source of Chinese national spirit. As the core value system of Chinese traditional culture, Chinese medicine is a treasure of the Chinese nation. The spread of Chinese medicine is an important way for China's values to be known and accepted globally. In the past, the means of communication were not rich without many people taking part in it, so it is of great practical significance to build a multi-modal interaction mechanism. With the in-depth development and important influence of Artificial Intelligence technology in all aspects of social life, the characteristics of high interactivity, popularity and accuracy of artificial intelligence technology provide new perspectives for the international spread of Chinese medicine and contribute to the construction of its multi-modal interaction mechanism.

Keywords: Artificial intelligence, Chinese medicine, global communication, construction of multi-modal interaction mechanism

1. INTRODUCTION

In 2022, China issued the "14th Five Year Plan" for the development of traditional Chinese medicine. Traditional Chinese medicine culture has quietly entered the lives of the people, and is proudly moving towards various parts of the world, striving to promote the creative transformation of excellent traditional Chinese culture. Chinese medicine has both natural and humanistic attributes, inheriting the excellent genes of Chinese culture, and is an ideal carrier for Chinese excellent culture to go global. In the process of fighting against the COVID-19, the government actively developed traditional Chinese medicine to prevent and treat viruses, and made a series of achievements, making important contributions to building a community with a shared future for mankind and a world people's health community. The internationalization of Chinese medicine requires the construction of a discourse system and communication mechanism for the communication of traditional Chinese medicine. Although the fields of linguistics, translation, communication, and traditional Chinese medicine are all exploring the construction of a system that benefits the global communication of traditional Chinese medicine culture, the theoretical framework is still unclear. Some frameworks only include the translation of traditional Chinese medicine classics, while others only focus on the channels of communication. But the communication effect is also unsatisfactory. Researches on the international communication of traditional Chinese medicine from the perspective of overseas audiences are few. General Secretary Xi Jinping pointed out that media intelligence has entered a rapid development stage, and it is necessary to explore the application of artificial intelligence in news collection, production, distribution, reception, and feedback, and use mainstream value orientation to control 'algorithms' ¹. Therefore, it is valuable to take the cognitive level of overseas audiences as the research object and utilize the characteristics of artificial intelligence based on user tag recognition, deep interaction among subjects, knowledge self-produced, and system integration to construct a multimodal interactive communication mechanism.

2. THE CURRENT SITUATION OF MULTIMODALITY IN COMMUNICATION

Artificial intelligence, with its technological advantages such as big data and cloud computing, grasps people's preferred topics, content preferences, and consumption habits, and advances content of interest to people along the "information

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flood”. However, at present, the mode of global communication of Chinese medicine is relatively single, and artificial intelligence updates the appearance and form of culture. Virtual reality technology connects multi-dimensional space, from textbooks and books to frequency, official account, and then to virtual reality experience hall, making the form of cultural publicity breakthrough from paper to three-dimensional virtual reality. When one modality of discourse cannot fully demonstrate its complete meaning, it will be supplemented by another modality, which is the multimodal discourse pattern. The relationship between two or more modalities is complementary. In a complementary relationship, if pictures or dances are used as forms of communication, language only plays an auxiliary and reinforcing role. But if you play a video with both images and sound, both are essential, otherwise communication will not continue. Multimodal discourse analysis generally believes that nonverbal symbols (such as images, sounds, gestures, colors) are equivalent to language and an important symbol resource, participating in the construction of discourse meaning in Figure 1.



Figure 1 . Types of Multi-Modality

Multimodal analysis has transcended the scope of linguistic research and extended to fields such as translation studies, communication studies, medicine, journalism, psychology, etc. The research object has also expanded from the single field of language to multiple symbol systems such as images, music, images, and sound. The vast majority of scholars engaged in multimodal discourse analysis are systemic functional linguists, and multimodal discourse analysis is interdisciplinary. Relying solely on a school of linguistics is clearly not enough. Only scholars from other disciplines can participate in the construction of multimodal discourse meaning to obtain a more comprehensive and accurate interpretation.

Most overseas audiences have little knowledge of Chinese culture and do not understand our language system. Their information mainly comes from local propaganda media, but there are huge cultural and cognitive differences between China and the West, and there is relatively little research on the understanding and acceptance of traditional Chinese medicine communication and its cognitive process. Therefore, constructing a multimodal interactive mechanism for the global communication of traditional Chinese medicine has theoretical and practical significance.

3. THEORETICAL CONSTRUCTION OF MULTIMODAL INTERACTION MECHANISMS FOR GLOBAL COMMUNICATION OF CHINESE MEDICINE

The interdisciplinary integration of cultural communication research and linguistic theory research in China is not deep enough. Therefore, in the global communication research of Chinese medicine, theoretical research should be given more attention. Artificial intelligence is also based on relevant algorithms to extract information, and theoretical construction is the underlying logic and mechanism for AI to extract information. On the basis of systemic functional linguistics, Zhang Delu proposed a comprehensive theoretical framework for multimodal discourse analysis. This framework includes cultural layer, contextual layer, content layer, and expression layer. The cultural level is an important aspect of achieving multimodal communication, where the cultural context includes ideology and genre; The context layer includes the field, tenor, and mode of discourse, and the situational context is the manifestation of the cultural layer, which also determines the discourse meaning at the meaning level. The discourse meaning is composed of three metafunctions: conceptual meaning, interpersonal meaning, and discourse meaning; On the content level, in addition to the meaning of discourse, it also includes form and relationships. Form includes four factors: language, image perception, sound perception, and sensation. Relationships also include complementary and non complementary relationships. The formal features of different modalities are interconnected and work together to reflect the meaning of discourse. Finally, form and relationships act on the medium of expression in Figure 2, which includes both language as a medium and non linguistic factors.²

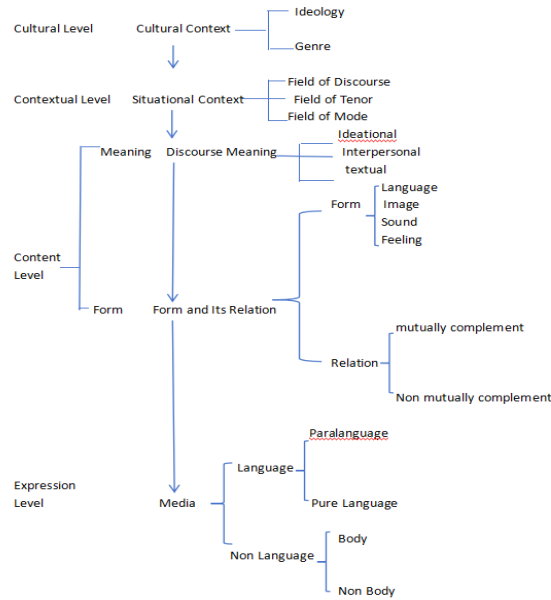


Figure 2. Comprehensive Framework for Multimodal Discourse Analysis, translated from Zhang Delu’s Model, 2009

This paper supplements the concept of “order” in systemic functional linguistics to discourse patterns in the analytical framework proposed by Zhang Delu, and integrates the core ideas of cognitive linguistics. Halliday believes that learning language is about expressing meaning and achieving function. The four categories of language, namely “unit”, “category”, “structure”, and “system”, are related to three abstract levels, namely scale, indexing, and accuracy. The first level is used to describe unit levels, and from top to bottom, it is composed of sentences, clauses, phrases, words, and morphemes. The second level is used to explain the relationship between abstract categories and language materials, and the last level is used to explain the accuracy of grammatical descriptions. One of the means in the global communication of traditional Chinese medicine culture which is the ultimate goal of translation is to express meaning. When translating, it is necessary to select several elements in the hierarchy and choose appropriate language description levels, so as to achieve the level of accurate translation and achieve the function that they want to get. In the process of translating traditional Chinese medicine terminology, it is necessary to have a holistic approach and consider the organic relationships between sentences, phrases, and words. When facing abstract traditional Chinese medicine terminology and categories and concepts that are not included in overseas audience psychological dictionaries, such as yin and yang, five elements, qi, etc., it is necessary to consider their respective categories and use metaphors, and other means to express them in a simple and easy to understand manner, while requiring accuracy in translation in Figure 3.

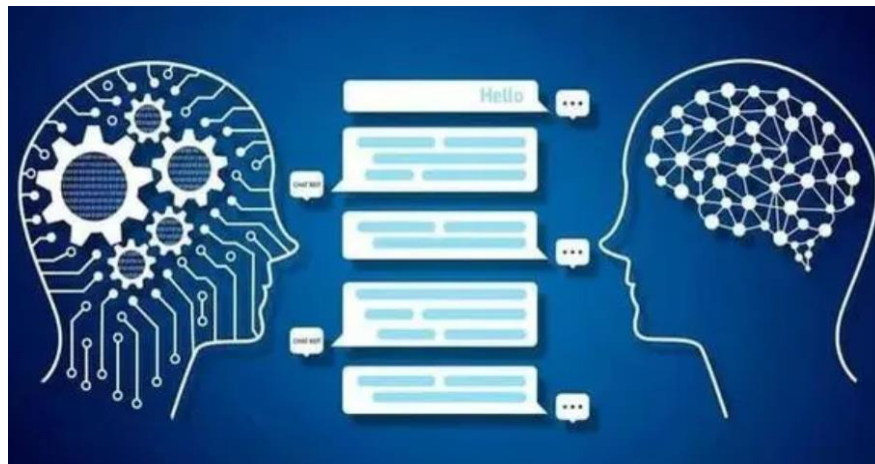


Figure 3. Translation of abstract concepts among people of different cultural backgrounds with different cognitive mechanism

In contextual meta functions, attention should be paid to cohesion and coherence. There is a significant difference in writing strategies between Chinese and English. Chinese emphasizes the expression of meaning, and individual sentence has inherent logical connections with the next sentence. Even without coherent words, the meaning can still be clearly conveyed. The logic of English requires cohesive devices to demonstrate the relationships between contexts. Therefore, when translating texts of traditional Chinese medicine classics into foreign languages, although Chinese does not use conjunctions, ellipsis, substitution and other cohesive devices, the translation should also reflect the English style of discourse planning, while paying attention to the pattern of thematic progression. There are differences in the thematic progression patterns between Chinese and English discourse. As the theme progresses, the discourse continues to move forward until it forms a coherent whole that can express a complete meaning, making it easier for overseas audiences to understand the overall meaning expressed in traditional Chinese medicine discourse in Figure 4.

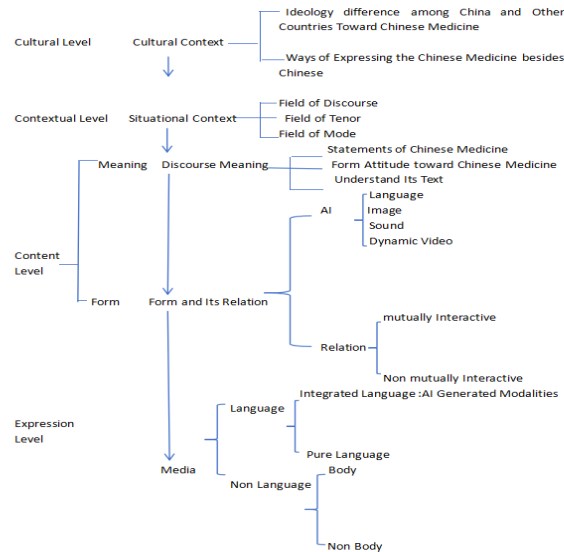


Figure 4. Multi-Modality Framework for Global Communication of Chinese Medicine

4. CONSTRUCTION OF MULTIMODAL INTERACTIVE MECHANISMS FOR GLOBAL COMMUNICATION OF TRADITIONAL CHINESE MEDICINE UNDER ARTIFICIAL INTELLIGENCE

4.1 Communication mode based on user tag recognition

The study of the audience for the communication of traditional Chinese medicine culture is very important. User tags are the basic information registered by individuals on websites or platforms, including age, gender, education level, interests, living areas, etc.³. In early Weibo or current short videos and streaming media, algorithmic recommendation technology commonly uses the method of user tag recognition to classify and recommend information based on personal basic information, making the recommended information more in line with individual specific needs, thereby enhancing user platform stickiness, user platform stay time, and improving platform traffic attraction and revenue conversion rate. The current mainstream information platforms or self media generally use user tagging when distributing medical related content in China, meeting the diverse information needs of different audiences. The same audiences in different fields or at different times based on region, age, education level, political outlook, interests and hobbies are identified, in order to achieve the goal of “finding people through information”. This requires multimodal images, language, etc. to have higher generative and precise capabilities, using AI technology to identify user tags and push vivid content related to traditional Chinese medicine, rather than boring and abstract textual expressions.

4.2 Communication model based on deep interaction among subjects

In the communication environment of artificial intelligence, the interaction technology between humans and machines is becoming increasingly advanced. Machines have considerable language comprehension ability, expression recognition ability, action capture ability, etc. They can not only use speech recognition systems to translate natural language, but also

use facial recognition technology and other systems to understand the audience's emotions, thoughts, attitudes, etc., thus achieving more efficient and natural intelligent interaction between humans and machines. The popularization of artificial intelligence technology has accelerated the depth and frequency of human-computer interaction, providing necessary technical support for human-computer interaction⁴.

Human beings are the ideal medium for the communication of traditional Chinese medicine culture. Artificial intelligence empowers the communication between the subject and object of traditional Chinese medicine culture communication, with the communication subject shifting from mainstream media and government agencies to social platforms and self media. The interactive communication mode effectively mobilizes people's enthusiasm for discussing traditional Chinese culture, breaks down the communication barriers of traditional Chinese culture through free and lively forms of communication, promotes the decentralization of the communication subject, and constructs a dynamic and two-way communication situation.⁵ . Cognitive linguistics holds that the generation and development of knowledge is the result of the interaction between subject and object, not a simple and mirror response to external environmental stimuli, but rather the interaction between the subject and the objective world, accumulation of experience, and participation in the entire process of cognitive development. People's cognitive process originates from interactive "sensation" and "perception", on which images are formed. The combination of images and schema becomes image schema, thus constructing abstract cognitive models. We integrate the concepts of subject object interaction, metaphor, and metonymy in cognitive linguistics into the conceptual meaning of discourse, emphasizing the experiential and concrete sensibility between overseas audiences and traditional Chinese medicine. The interaction between metaphor and metonymy can achieve the extension of metaphorical meaning, concretizing abstract concepts, and is a cognitive tool for concretizing abstract categories. It can help viewers better understand the meaning of discourse and generate emotional resonance. The famous classic of traditional Chinese medicine, *Classic of Internal Medicine*, was formed before the Warring States period. It used the method of analogy to organically connect humans with nature. Cognitive linguistics emphasizes that the formation of human conceptual systems depends on people's experiences. Traditional Chinese medicine takes the interaction experience between ancient people and the natural environment as the theoretical background, which is the combination of cognitive linguistics and traditional Chinese medicine research. In the book *Su Wen • Jin Kui Zhen Shi*, the sentence "Eastern blue, enters through the liver" describes the function of the liver. The liver belongs to wood, and the color of wood is blue. Wood can store water and produce carbon dioxide.⁶ The liver is metaphorically referred to as wood while the liver has the function of storing and generating blood. Liver is like a tree. If a tree withers, it becomes lifeless. Nowadays, Artificial Intelligence(AI) for Chinese medicine is applied to the diagnose the illness for the patients. And the translation of Chinese Medicine is also facilitated by AI in Figure 5.



Figure 5.The interactive communication between AI and Human

The concept of cognitive linguistics can concretize abstract terminology in traditional Chinese medicine literature, making it easier for overseas audiences to accept them.

4.3 Communication model based on knowledge self production

Knowledge production is quite common in creative activities such as scientific research and cultural arts, and human wisdom and spirit play a decisive role. In the past, knowledge production was generally regarded as a unique skill of humanity. With the rapid development of artificial intelligence technology in recent years, especially the release of GPT-4 as a multimodal artificial intelligence model, it means that powerful data, computing power, and language models endow machines with excellent text content generation ability. The use of probabilistic language and piecemeal innovation for knowledge creation has led to many "unverified" knowledge entering the human knowledge system⁷, which to some extent affects the existing knowledge production methods of humans.

At present, in the field of medical communication in China, the powerful generation ability of artificial intelligence not only enables the association and promotion of existing traditional Chinese medicine cultural information, combined with user reading habits for labeling, but also enables the recreation and reproduction of existing traditional Chinese medicine cultural information. That is, according to user instructions and by learning language rules, logic, grammar, and sentence structures, information that conforms to language norms can be generated, thereby more accurately meeting the audience's thematic needs for traditional Chinese medicine cultural information. Traditional Chinese medicine cultural information is mainly composed of specific historical materials, which can fully leverage the unique advantages of large models in organizing and constructing massive data. It can display multiple channels of historical information and detailed historical details, presenting historical events or figures with more detailed and objective information, helping the audience to have a more comprehensive and three-dimensional understanding of the essence of culture, thereby achieving the goal of deep communication and traditional Chinese medicine culture.

4.4 Communication mode based on system integration recommendation

The advent of the artificial intelligence era has made human technological dependency increasingly common, and the range of use of devices such as smartphones, AR glasses, and human motion sensors is also constantly expanding. This also means that human interaction with the objective world is more presented through digital processing, leading individuals to enter a state of “technological existence.”⁸ Many terms in Chinese medicine are obscure and difficult to understand, and are relatively abstract. The raw materials for pharmaceuticals are mostly herbs, most of which are unique to China. Overseas audiences know very little about their appearance, characteristics, efficacy, and production process. Through devices such as AR glasses, virtual reality, and human motion sensors, the audience can intuitively simulate and experience the long history and entire production process of traditional Chinese medicine, thereby gaining a deeper understanding of it. The multimodal interaction mechanism constructs meaning through the diversity of communication methods. Nowadays, the global communication of traditional Chinese medicine culture mainly relies on the translation of traditional Chinese medicine classics, and the video promotion of traditional Chinese medicine mainly focuses on introductory content, lacking storytelling and fun. Therefore, in addition to translating traditional Chinese medicine classics, the global communication of traditional Chinese medicine should also promote traditional Chinese medicine TV dramas and adapt them for external translation, expand the mode of communication, and adapt the classic parts into shorter videos, making it easier to attract audiences, such as “The highly skilled doctor Hua Tuo” and “The highly skilled doctor Hua Tuo Xi Lai Le,” mainly through audio-visual channels, displayed on the online platform YouTube, to achieve the construction of the meaning of hypertexts and hyperlinks in TV dramas. The characteristic elements of traditional Chinese medicine in TV dramas mobilize multiple channels such as vision, hearing, and sensation through multimodal means, conveying them to overseas audiences through text, sound, images, and other multimodal forms. It also achieves the goal of global communication of Chinese medicine through multimodal discourse promotion such as advertising, media news, and image promotion.

5. CONCLUSION

With the rapid development of technology, we use advanced algorithms in Artificial Intelligence to study communication modes such as user tag recognition, deep interaction between subjects, knowledge self-generation, and system integration recommendation. Guided by the theory of multimodal interaction, the paper aims to enhance the construction function of multimodal communication and the cognitive level of communication objects towards traditional Chinese medicine culture. Through persistent strengthening of communication, Chinese values are gradually accepted by overseas audiences and the true internationalization of Chinese medical culture will be promoted.

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