Construction of English Translation Standard System and Research on Cross-cultural Communication Path of Longjiang Medical School's Intangible Terms Driven by Artificial Intelligence

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ABSTRACT

In view of the difficulties of different standards, semantic loss and cultural interpretation deviation in the traditional manual translation mode, this paper aims to explore the theoretical reconstruction and dissemination path of the terminology English translation standard system driven by AI (Artificial Intelligence). The research adopts the methods of theoretical deduction and model construction, deeply analyzes the ontological advantages of large language model in semantic disambiguation and cultural mapping, and puts forward the paradigm transformation logic from "empirical induction" to "algorithm generation". On this basis, a man-machine collaborative generation mechanism including core concept extraction, multi-source corpus alignment and three-dimensional normative framework is constructed, and the dialectical relationship between expert-led value judgment and machine-aided efficiency optimization is clarified. Based on the cognitive schema matching theory, this paper designs a cross-cultural cognitive path model under intelligent empowerment, and discusses how standardized terms can eliminate cultural discounts by reducing cognitive load and promote the communication mode from one-way output to two-way mutual construction. AI technology provides a new tool for the precision of intangible terms, reshapes the generation logic of international discourse power of traditional Chinese medicine, and lays a framework for the global expression of Longjiang medical school and even the whole intangible Chinese medicine.

Key words: *Artificial intelligence, Longjiang medical school, Non-legacy terms, Normative system, Intercultural communication.*

1. INTRODUCTION

As one of the treasures of Chinese civilization, the inheritance and dissemination of traditional Chinese medicine (TCM) intangible cultural heritage is not only a continuation of medical skills but also an important carrier to support the "going out" strategy for Chinese culture [1]. Longjiang Medical School, as an outstanding representative of the regional schools of traditional Chinese medicine, occupies an important position in the history of northern medicine with its unique academic ideas and diagnosis and treatment techniques [2]. With the deepening of globalization, how to break through the language barrier and transform the intangible terms of Longjiang Medical School with profound philosophical implications into internationally accepted academic language accurately and normatively has become a key bottleneck restricting its cross-cultural communication efficiency [3]. The traditional manual translation mode often relies on the translator's personal experience and subjective judgment, which has inherent limitations such as different standards, semantic loss and interpretation deviation of culture-loaded words, and it is difficult to meet the strict requirements for accuracy and consistency in the internationalization of traditional Chinese medicine in the new era [4]. The rapid development of big data technology represented by AIGC (Generative Artificial Intelligence) provides a brand-new epistemological tool and methodological

support for the reconstruction of terminology standardization system.

At present, the academic research on the application of AI in the field of translation mostly focuses on the corpus analysis of general texts or literary works, and the systematic construction of terminology system for specific non-legacy schools is still scarce [5]. How to organically integrate the algorithmic logic of AI with the normative principles of traditional terminology has not yet formed a mature theoretical framework. The powerful semantic understanding and multimodal mapping ability of the large language model makes it possible to carry out deep disambiguation, contextual correlation and knowledge map construction of complex TCM concepts [6]. The "black box" feature of AI also raises concerns about the loss of cultural subjectivity and ethical boundaries. Without scientific theoretical guidance, simple technical piling may lead to the risk of "de-contextualization" or even "misreading" of intangible terms in the process of digital translation, thus weakening the cultural authenticity of Longjiang Medical School [7]. Under the background of AI-driven, it is urgent to re-examine and construct a scientific, dynamic and self-evolving standard system for English translation of intangible terms, which contains profound theoretical value. Based on the cross frontier of AI technology and intangible protection, this paper tries to answer the core proposition of how to reshape the standardized logic of TCM terms in the intelligent era.

2. PARADIGM TRANSFORMATION OF TERMINOLOGY SPECIFICATION FROM THE PERSPECTIVE OF AI

Under the background of AI's deep involvement in language services, the standardization logic of intangible terms of Longjiang Medical School is undergoing an ontological transition from "empirical induction" to "algorithm generation". The traditional terminology standardization system relies on the knowledge accumulation of experts and the compilation of static dictionaries, which has the characteristics of lag and discreteness, and it is difficult to meet the complex interpretation needs of traditional Chinese medicine concepts, context flow and culture-loaded words [8]. However, the introduction of AI technologies such as large language model fundamentally reshapes the epistemological basis of terminology generation. It no longer regards terms as isolated symbolic labels, but puts them in a dynamic knowledge map network, and realizes the structural analysis of the deep logic of medical concepts through semantic disambiguation, context awareness and multimodal mapping.

The core of this paradigm shift is to establish a new standard that "dynamic correlation" is superior to "static definition". The AI-driven normative system can capture the changes of academic frontiers and clinical practice in real time, and make the term definition have the internal mechanism of self-iteration and evolution. The evaluation dimension has also expanded from a single accuracy to a double coupling of semantic accuracy and cultural interpretability [9]. The former ensures the scientific rigor of medical information, while the latter uses algorithms to deeply decode cultural metaphors to avoid the loss of meaning in cross-cultural translation. Therefore, terminology specification from the perspective of AI is no longer a closed dogma, but an open, intelligent and cognitively adaptive ecosystem.

3. ARCHITECTURE: BUILDING THE BASIS OF TERMINOLOGY STANDARD GENERATION THROUGH MAN-MACHINE COLLABORATION

The core of constructing the AI-driven English translation standard system of Longjiang medical school's intangible terms lies in establishing a set of "man-machine collaboration" generation mechanism with strict logic, dynamic evolution and self-correction ability. This mechanism does not simply hand over translation tasks to algorithms instead of manual work, but builds a deep complementary symbiotic relationship based on the cultural subjectivity of human experts and the computational efficiency of machine intelligence. In this theoretical framework, anthropologists are responsible for defining the ontological value, cultural boundary and ethical bottom line of terms, while AI undertakes the cleaning of massive corpus, the construction of semantic network and the alignment of multi-source data.

3.1 Core Concept Extraction and Depth Mapping of Culture-loaded Words

The starting point of man-machine collaboration lies in the accurate identification and deconstruction of the special terms of Longjiang Medical School. At this stage, the big language model uses its powerful natural language processing ability to scan all historical documents, clinical records and oral historical materials, and automatically identifies

words with high-frequency characteristics and unique medical philosophy concepts. However, when AI recognizes "culture-loaded words", it faces the challenge of semantic ambiguity or lack of context. At this time, human experts intervened to define these concepts on the ontological level according to the basic theory of traditional Chinese medicine, and to clarify their exact connotation in a specific school. Then, the system enters the stage of "depth mapping" to match the core semantic vectors labeled by human experts with the corresponding concepts in the target language. This process requires the algorithm not only to find literal equivalents, but also to explore the deep relationship between them in pathological mechanism, therapeutic logic and philosophical background through knowledge map, so as to ensure that the translation conforms to the cognitive habits of the international medical community on the basis of retaining the original intention.

3.2 Multi-source Corpus Alignment and the Establishment of Three-dimensional Normative Framework

After the core concept mapping is established, the architecture needs to be further extended to multi-dimensional corpus verification and rule generation. In this study, it is considered that a three-dimensional normative framework including "ontology layer, rule layer and application layer" can be constructed. In order to ensure the stable operation of this framework, a strict mechanism of "multi-source corpus alignment" must be established. The system can automatically capture and compare authoritative Chinese and English classics, modern academic papers and international journal databases, and use consistency checking algorithm to find potential translation conflicts. When the initial translation generated by AI is significantly different from the existing authoritative corpus, the system will trigger an early warning and push it to the expert review end, and the expert will make a final decision according to the specific context. “Figure 1” shows the complete logical chain from the input of original corpus to the final standardized output, emphasizing the decision-making role of human experts in key nodes and the auxiliary position of AI in data processing.

At the node of "Human Expert Decision Center", the system forces that the terminology involving cultural metaphors, philosophical concepts and ethical judgments must be finally decided by human experts, which ensures the "cultural subjectivity" of the terminology system. The design of the feedback loop enables the AI model to be iteratively optimized according to the expert's correction opinions, thus realizing the dynamic evolution of the specification. Through this rigorous framework design, the English translation of the intangible terms of Longjiang Medical School is no longer a static translation result, but a dynamic system of continuous growth and self-improvement.

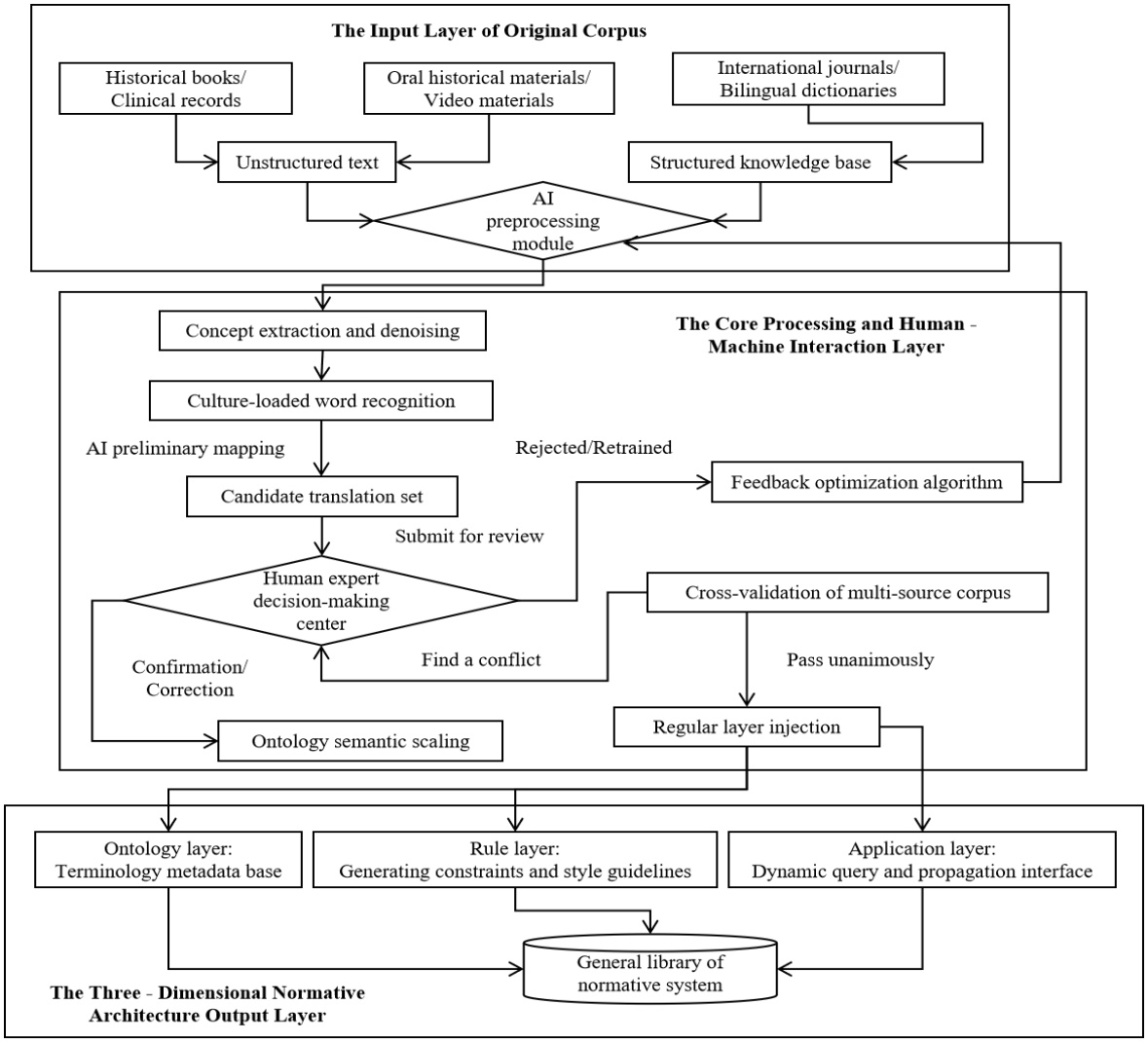


Figure 1 Mechanism of English translation standard system of Longjiang medical school based on man-machine collaborative generation powered by AI.

4. COMMUNICATION PROSPECT: CROSS-CULTURAL COGNITIVE PATH UNDER INTELLIGENT EMPOWERMENT

Driven by AI, the cross-cultural communication of non-legacy terms of Longjiang Medical School is no longer limited to the traditional language conversion level, but has evolved into a deep interactive process based on cognitive schema matching. The communication path theory of intelligent empowerment advocates that by building a standardized terminology system and using algorithm technology to reduce the cognitive load of the audience, the abstract concept of traditional Chinese medicine will be transformed into a symbol system that conforms to the cognitive habits of the target audience, thus realizing the paradigm shift from "one-way output" to "two-way mutual construction". The core of this path lies in using AI's personalized recommendation and multimodal presentation ability to accurately connect the knowledge structure of audiences with different cultural backgrounds, so that the unique value of Longjiang Medical School can be accurately decoded and deeply recognized in the international context.

4.1 Cognitive Schema Matching and the Resolution Mechanism of Cultural Discount

Cross-cultural communication is the collision and blending of two cultural cognitive schemata. The communication path of intelligent empowerment is first devoted to establishing a "cognitive schema matching" model. The model uses natural language

processing technology to analyze the language habits, knowledge background and cognitive preferences of the target audience, and dynamically adjust the interpretation strategies of terms. For example, for terms with profound philosophical color, AI not only provides literal translation, but also automatically generates multimodal annotations including analogical explanations, visual charts and clinical cases, helping the audience to build new cognitive bridges within their existing knowledge framework. This strategy effectively eliminates the "cultural discount" caused by cultural differences, and makes the obscure theory of traditional Chinese medicine sensible and understandable. The standardized terminology system provides a unified semantic basis for this kind of matching, avoids the cognitive confusion caused by the arbitrariness of translation, and ensures the scientificity and consistency of the communication content.

4.2 Intelligent Interactive Ecology from Unilateral Output to Bi-directional Co-construction

Blessed with intelligent technology, the road of cross-cultural communication has taken a basic turn-around, which is a reciprocal interactive ecology with data feedback at the core. The system of intelligent empowerment builds a real-time interactive dialogue space. Based on the user's behavior data and feedback information, AI system can dynamically evaluate the effect of terminology communication, identify the confusion and interest points of the audience, and optimize the subsequent communication content accordingly. When the system detects that the query frequency of a certain term in a specific area is high but the stay time is short, it can automatically trigger a more popular explanation scheme or push related popular science videos. This mechanism improves the pertinence of communication, and more importantly, it gives the audience the right to participate in the definition and interpretation of terms, making it change from a passive receiver to an active co-builder.

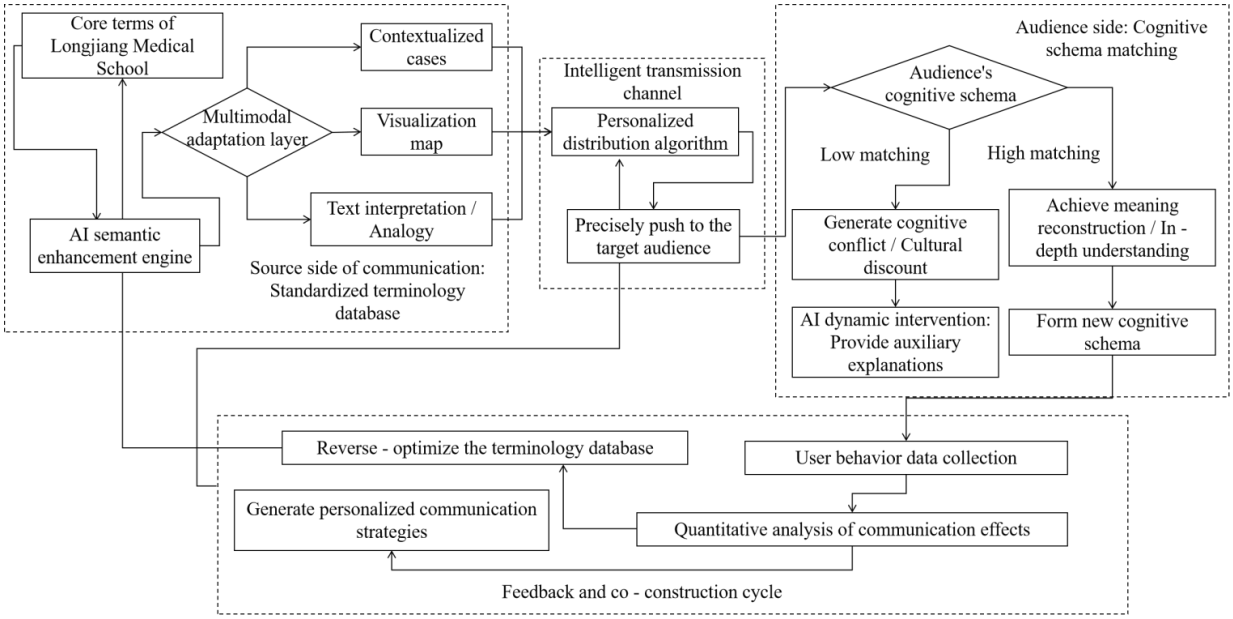


Figure 2 Two-dimensional Dynamic evolving dynamic model of cross-cultural cognitive path of intelligent empowerment Longjiang medical school unmastered Degree in intangible words.

"Figure 2" also illustrates a spiral cognitive evolution process of the model. The standardized terms at the communication source end are adapted by AI in a multi-modal way, and accurately reach the audience through intelligent channels. This closed-loop mechanism ensures that the cross-cultural communication of Longjiang medical school terms is always in dynamic balance and self-improvement, solves the technical problem of "incomprehensible", and promotes the equal dialogue and deep integration of Chinese and Western medical cultures at a deep level.

5. CONCLUSION

This study systematically constructs the theoretical framework and cross-cultural communication path of Longjiang medical school's intangible terms translation standard system, based on the intersection of AI technology and intangible cultural heritage protection. Its core contribution lies in breaking through the empirical limitations of traditional translation studies and establishing a new paradigm of deep integration of technical rationality and humanistic spirit. This paper profoundly reveals the paradigm transformation logic of terminology specification from the perspective of AI, and demonstrates the fundamental transformation from static dictionary definition to dynamic knowledge map association. This transformation is not a simple technical substitution, but an innovation at the epistemological level. It uses the semantic analysis ability of the algorithm to solve the problem of ambiguity and contextual fluidity of TCM concepts, and makes the terminology system have the inherent vitality of self-iteration and evolution. By constructing a mechanism for generating terminology standards based on human-computer collaboration, this paper clarifies the boundary between human experts and AI in the process of translation. In this mechanism, human experts, as cultural subjects, firmly hold the leading power of value judgment and ethical calibration to ensure that the cultural authenticity of terms is not alienated by algorithms. As an efficient tool, AI undertakes the heavy responsibility of massive data processing and multimodal mapping. This collaborative model of "human-oriented and technology-assisted" effectively avoids the risk of cultural misreading caused by "algorithm black box" and forms a set of theoretical models with both academic rigor and communication adaptability.

The international communication logic of intangible cultural heritage of traditional Chinese medicine is redefined through the cross-cultural cognitive path theory innovatively put forth in this paper. In the future, with the further maturity of AIGC technology, this theoretical framework is expected to be constantly revised and improved in practice, and promote the deeper global sharing of Chinese medicine culture in the era of digital civilization.

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