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AI Translation Agent Empowers Domestic Game Localization From the Perspective of "Human-AI Collaboration"—A Case Study of Zhipu Qingyan Platform

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Against the backdrop of domestic games "going global" becoming a core path for the international communication of Chinese culture, the quality and efficiency of game localization directly affect the effectiveness of overseas market expansion. Traditional translation models suffer from high costs, long cycles, and unstable quality, while general artificial intelligence (AI) translation faces shortcomings, such as inconsistent terminology and poor cultural adaptation. Based on the concept of "human-AI collaboration", this paper constructs an AI translation agent adapted to game localization scenarios using the Zhipu Qingyan platform. Through the construction of an exclusive knowledge base, customized workflow arrangement, and feedback optimization mechanism, it achieves dual improvements in translation efficiency and quality. Tests show that the agent increases translation efficiency by over 65%, the manual evaluation accuracy of cultural imagery transmission reaches 82%, the terminology consistency rate exceeds 92%, and the translation accuracy rate is 89%. It can shorten the translation cycle by 70% and reduce costs by more than 80%, providing an efficient and feasible technical solution for domestic game localization with significant practical value.

Keywords: human-AI collaboration, AI translation agent, domestic game localization, Zhipu Qingyan

Industry Background and Translation Pain Points

Development Trend of Domestic Games Going Global

In the process of the integration of the global entertainment industry, domestic games "going global" have transformed from an optional path to an inevitable trend. Data show that in the first half of 2025, the overseas revenue of China's independently developed games increased by over 11% year-on-year, with growth returning to its peak period. Emerging markets, such as the Middle East, Latin America, and Southeast Asia have become core growth drivers. As an important carrier of cultural communication, game localization is not merely a simple language conversion, but also requires accurately conveying cultural connotations, plot emotions, and operational logic to ensure that overseas players have an immersive experience consistent with domestic players. Translation quality has become a key factor determining the

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success of going global.

Prominent Problems of Existing Translation Models

Limitations of traditional translation models. For a long time, the game industry has mainly adopted the "human translation + CAT tool assistance" model, which has three core pain points. Firstly, the cost is excessively high, and the high labor and time costs have become a major barrier for small and medium-sized game enterprises to enter overseas markets. Secondly, the cycle is too long to adapt to the rapid iteration of game versions, and the traditional model often fails to complete the translation of urgent update content in a timely manner. And thirdly, the quality stability is insufficient; translation results are highly dependent on the professional capabilities of personnel, and personnel turnover or supplier replacement may easily lead to inconsistent terminology and style, seriously affecting the player experience. In addition, the translation memory of computer-assisted translation (CAT) tools is based on string matching, which has poor adaptability to game texts containing variables, resulting in low utilization of historical translation resources and difficulty in effectively reusing existing achievements.

Adaptation defects of general AI translation. Although general artificial intelligence (AI) translation has improved translation efficiency to a certain extent, it has obvious shortcomings in game localization scenarios. According to relevant research, the terminology accuracy rate of general AI translation in professional fields is less than 70%, and core concepts, such as character names and skill terms are prone to multiple translations, damaging the integrity of the game. It cannot adjust the language style according to different game types, such as Xianxia, sci-fi, and two-dimensional, resulting in translations lacking scene adaptability. It is difficult for general AI to understand the cultural background and worldview behind game texts, and the translation of culture-loaded words is prone to semantic distortion, making it impossible for overseas players to grasp the deep meaning. General AI translation lacks scenario-based customization capabilities and does not integrate the exclusive terminology norms and cultural transmission rules of the game industry, making it difficult to meet the composite needs of game localization.

Core Theory and Technical Support

Connotation and Development of the Human-AI Collaboration Concept

The core of human-AI collaboration is not human-machine replacement, but to leverage the respective advantages of humans and artificial intelligence to form a collaborative effect of "1+1 > 2"—utilizing the efficient advantages of AI in data processing and repetitive work, combined with the unique capabilities of humans in cultural understanding, emotional perception, and value judgment, to achieve dual improvements in efficiency and quality. The development of human-AI collaboration in the field of translation has gone through three stages: the initial stage of "human-led, AI-assisted" (AI undertakes basic work, such as terminology query); the middle stage of "AI-led, human-edited" (AI completes the initial translation + human proofreading and revision); and the current stage of dynamic collaboration, where humans and AI interact in real-time and integrate deeply, perfectly adapting to the core needs of game localization.

Its application follows the closed-loop logic of "intelligent initial translation—human calibration—model optimization": AI quickly processes repetitive texts, such as item descriptions to achieve "large-scale cost reduction"; humans focus on high-value texts, such as plot dialogues and culture-loaded words, correcting deviations, optimizing styles, and adding annotations to achieve "expert-level quality improvement" (e.g., optimizing "jiban" from "fetters" to "bond" with supplementary annotations); and high-quality translated texts

are fed back to the knowledge base to continuously optimize translation results.

Technical Empowerment of Large Language Models

Large Language Models (LLMs) are the core technical foundation for realizing human-AI collaborative game localization. Represented by models, such as Doubao and Zhipu Qingyan based on the transformer architecture, their technical characteristics are highly compatible with the needs of game localization. Firstly, the context understanding ability can process long texts and analyze cross-sentence connections, solving the problem of plot fragmentation caused by sentence-by-sentence translation of traditional CAT tools. Secondly, the customized learning ability can quickly adapt to different game styles and improve terminology consistency by importing industry corpora and optimizing prompts. And thirdly, the interactive collaboration ability supports real-time dialogue interaction, allowing humans to guide the model to adjust strategies and achieve real-time optimization. Experimental data show that translation tools based on large language models have an accuracy rate in professional fields that is more than 35% higher than that of traditional machine translation, providing a solid guarantee for the construction of the agent.

Construction Process of the AI Translation Agent

Platform Selection and Technical Architecture

Considering that the team is a college student innovation and entrepreneurship team with limited technology and funds, the Zhipu Qingyan platform was selected as the development carrier. Its advantages of no-code development, multi-model integration, and flexible deployment greatly reduce the development threshold and adapt to the actual situation of the project. The agent adopts a four-layer architecture design: the data layer (including exclusive knowledge base, terminology base, etc.) provides data support; the algorithm layer (large language model + RAG technology) realizes accurate translation and retrieval; the interaction layer optimizes the operating experience; and the feedback layer collects calibration results to support iteration.

Core Construction Steps

Construction of exclusive knowledge base. A 100,000-word core knowledge base including a terminology base, cultural base, and style base was built. The corpus sources cover official localized texts of different types of games, such as Black Myth: Wukong and Genshin Impact, supplemented by professional translation norms and cases; the corpus is sorted using the “three-level annotation method” (text type, cultural load degree, and translation strategy); and converted into a standard format and imported into the platform, with keyword trigger mechanisms set to ensure terminology and style adaptation.

Role definition and parameter configuration. A three-stage “role—skill—restriction” definition was adopted: “A professional game translation expert proficient in the language styles and cultural transmission rules of different games; core skills include accurate translation, style adaptation, and supplementary cultural annotations; and restrictions are not to expand or abbreviate the original text, follow terminology norms, and only output translations and necessary annotations”, clarifying the agent’s work guidelines.

Workflow arrangement. An “input-processing-output-feedback” process was designed: input “text to be translated” and “target language” (supporting mutual translation among Chinese, English, Japanese, Korean, and other five mainstream languages); associate the model with role prompts to achieve collaborative input; output in the format of “translation + annotation” in a streaming manner; and set quality scoring and revision suggestion

input boxes to collect feedback.

Association optimization. A dual association strategy of "keyword retrieval + semantic matching" was adopted. Core terms are accurately matched, and texts without clear keywords retrieve semantically similar historical corpora. Core terms are prioritized for retrieval through manual annotation and classification, and manually calibrated cases are automatically added to the knowledge base with increased weights to achieve continuous optimization.

Agent Testing and Application Value

Testing Plan and Results

A three-dimensional testing plan of "quality + efficiency + practicality" was designed. A total of 65,000 words of texts from Jianwang 3, Genshin Impact, and Endless Sky were selected for comparative testing with traditional human translation and general AI translation. The results show that the terminology consistency rate is over 92% (reaching 95% for Genshin Impact), far exceeding the 78% of general AI; the average translation accuracy rate is 89% (93% for sci-fi texts and 85% for Xianxia texts), higher than the 72% of general AI; and the single-word translation speed is 0.003 seconds per word, and 65,000 words of text only take 3.5 hours, which is more than 70% shorter than traditional human translation (14 days) and reduces costs by more than 80% (only 65 yuan for 65,000 words), with the accuracy rate of cultural imagery transmission reaching 82%.

Application Value

1. Cost reduction and efficiency improvement: Solves the pain points of translation for small and medium-sized game enterprises going global, lowering the threshold for going global;

2. Quality assurance: Improves the professionalism and stability of translation, reducing market risks;

3. Industry empowerment: Promotes the transformation of game localization towards "human-AI collaboration". Ninty percent of the 10 surveyed small and medium-sized game enterprises are satisfied with its operational convenience and cost control effect, and put forward suggestions for improvement, such as adding small language support and optimizing long sentence translation.

Deficiencies and Prospects

Currently, there are problems, such as limited support for small languages, insufficient fluency in long sentence translation, and the need to enrich cultural annotations. In the future, we will expand application scenarios, such as game voice translation and real-time communication between cross-language players, deepen integration with game development engines, realize automatic import and adaptation of translation results, and help domestic games go global and promote the international communication of Chinese culture.

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