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Research on the Development of Software for Authentic Cross-Cultural Communication Against the Background of Artificial Intelligence Development

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Abstract

With the rapid advancement of globalization, the demand for authentic cross-cultural communication has surged substantially, yet traditional translation software suffers from prominent shortcomings in emotional interaction and cultural connotation transmission, failing to meet practical communication needs. Focusing on developing AI-enabled authentic cross-cultural communication software, this study analyzes the current status of international cross-cultural communication and machine translation's development process, and explores the machine translation market from the dimensions of inter-field demand differences, market scale, competitive landscape and user group characteristics to clarify the software's market positioning and development direction. On this basis, it designs a software system integrating real-time dialogue, AI intelligent assistance, social interaction and cultural experience, elaborates on its core functions, innovation points and product features, and formulates a comprehensive marketing strategy covering social media promotion, cooperative alliance, data analysis and user experience optimization. The research finds that in-depth integration of artificial intelligence into such software development effectively compensates for the defects of traditional translation tools, enabling authentic and barrier-free cross-cultural communication. This software boasts significant practical application value and broad market development prospects in daily life, business cooperation, technological exchange and other diverse fields.

Keywords

artificial intelligence, cross-cultural communication, software development, market demand, marketing strategy

1. Introduction

In the era of economic globalization and increasingly close international exchanges, cross-cultural communication has become an indispensable part of international communication, academic cooperation, transnational business and daily life, and the ability to conduct efficient and authentic cross-cultural communication has also become an important demand for personal and social development [1]. However, from the current actual situation of foreign language communication at home and abroad, there are still significant practical obstacles in cross-cultural communication [2]. According to data released by an international authoritative English organization, among the population in China with more than ten years of

foreign language learning experience, 90% are unable to use the foreign languages they have learned to communicate effectively with foreigners or complete simple email exchanges, and less than 1% can achieve fluent cross-cultural dialogue. This situation reflects the disconnection between the traditional foreign language learning model and the actual communication needs, and also gives rise to an urgent demand for professional cross-cultural communication tools.

At the same time, the rapid development of artificial intelligence technology has provided technical support for the upgrading and iteration of machine translation and cross-cultural communication tools. Machine translation software has gradually evolved from simple experiments based on linguistic rules to intelligent tools covering multiple languages and scenarios. Technology enterprises such as Baidu, Alibaba and Tencent have all laid out in the field of machine translation, driving its development towards practicality, diversification and contextualization [3]. Nevertheless, existing translation software still focuses on "language conversion" itself, with obvious deficiencies in context judgment, emotional transmission, cultural connotation restoration and authentic communication experience, making it difficult to achieve real authentic cross-cultural communication.

Based on this, with artificial intelligence technology as the core support, this study carries out relevant research on the development of software for authentic cross-cultural communication. Through a comprehensive market analysis, it clarifies the product positioning, designs a software function system that meets the actual communication needs, and formulates a scientific marketing strategy. The purpose is to develop an intelligent software that can realize barrier-free and authentic cross-cultural communication, make up for the shortcomings of traditional translation tools, meet the diversified and in-depth cross-cultural communication needs of people under the background of globalization, and provide practical reference for the application of artificial intelligence in the field of cross-cultural communication.

2. Research Background: The Current Situation of Cross-Cultural Communication and the Development Process of Related Software

2.1 The Current Situation of International Cross-Cultural Communication

The in-depth advancement of globalization has made people more willing to go abroad and carry out cross-cultural communication activities, and the continuous expansion of scenarios such as tourism, studying abroad, transnational business and international academic exchanges has made authentic cross-cultural communication a common social demand [4]. However, the current cross-cultural communication is still faced with two core problems. First, the phenomenon of "dumb foreign language" is prominent among foreign language learners, and the proportion of people with practical communication ability is extremely low, which cannot meet the communication needs of daily life and professional scenarios. Second, traditional translation software has functional limitations; most existing tools focus on literal translation, lacking consideration of context, emotion and cultural background, making it difficult to realize emotional communication and cultural connotation transmission, which easily leads to misunderstandings and poor communication in cross-cultural communication.

The development of artificial intelligence technology provides a new way to solve the above problems [5]. Its technological breakthroughs in natural language processing, context recognition and emotional analysis can drive the upgrading of machine translation from "literal conversion" to "intelligent communication", realize emotional resonance between humans and machines, and make authentic cross-cultural communication possible.

2.2 The Development Process of Machine Translation Software

The development of machine translation software is deeply bound to the progress of computer technology and artificial intelligence technology. Its development history can be traced back to the mid-20th century, and it has gone through several key development stages so far, gradually moving towards intelligence and practicality. The concept of machine translation was first proposed and preliminary experiments were carried out in 1950, when Georgetown University and IBM in the United States jointly carried out an English-Russian translation experiment based on linguistic rules, exploring the feasibility of machine translation for the first time and laying a theoretical foundation for its subsequent development. In the 1980s, with the

improvement of computer computing power and the popularization of computers, machine translation research regained attention, and China's machine translation industry also entered its first period of prosperity, starting localized technological exploration. The official launch of Baidu Machine Translation Service in 2011 marked that domestic machine translation tools moved from the laboratory to the market and began to provide practical translation services for ordinary users. In 2015, Alibaba Machine Translation was launched, with the core of “eliminating language barriers in business”, driving the in-depth penetration of machine translation into the business field and realizing the application expansion of professional scenarios. In 2016, Tencent launched translation and simultaneous interpretation functions supporting 15 languages, Sogou launched machine simultaneous interpretation and travel translators, iFlytek released hardware translation products, and NetEase launched neural network translation and Youdao Translation and other products, marking that machine translation entered a diversified development stage featuring multiple languages, forms and scenarios.

From the perspective of the development process, machine translation software is gradually transforming from a single translation tool to a comprehensive communication tool, and the continuous breakthroughs in artificial intelligence technology will further promote its development towards authentic cross-cultural communication, providing a mature technical environment for the software development in this study.

3. Market Analysis of Software for Authentic Cross-Cultural Communication

3.1 Demand Differences of Machine Translation in Different Fields

With the continuous expansion of the application scenarios of machine translation, the translation quality and functional demands of machine translation in different fields show significant differentiated characteristics, which can be mainly divided into four major fields with distinct core demands. In the scientific and technological field, translation mainly focuses on professional content such as scientific papers and patent documents, with the core demand for accuracy and professionalism, requiring the precise restoration of professional terms and technical logic, and the demand in this field will continue to grow with the increase in international academic exchanges. In the field of regional culture, the translated content covers folk stories, cultural customs, regional characteristic expressions and so on, with the core demand for retaining emotions, styles and cultural connotations, requiring the restoration of the deep meaning behind culture while converting languages to avoid cultural misunderstandings. In the business field, with the frequent development of transnational business cooperation, the translation of contracts, reports, business communication and other content has become a rigid demand, with the core demand for speed, accuracy and standardization, requiring a balance between translation efficiency and professionalism to meet the timeliness and rigor requirements of business scenarios. In the field of daily life, focusing on scenarios such as tourism, shopping and daily chat, the core demand is convenience, real-time performance and understandability, and users expect to achieve rapid information interaction through simple operations to improve the efficiency of daily cross-cultural communication.

The above differentiated demands indicate that single-function translation software can no longer meet the market demand, and the development of software for authentic cross-cultural communication that can adapt to multiple scenarios and balance accuracy and cultural awareness is in line with the actual development needs of the market.

3.2 Market Scale and Competitive Landscape

The global machine translation market scale has shown a sustained growth trend according to data from professional market research institutions, and it will still maintain a high growth rate in the next few years driven by both the development of artificial intelligence technology and the rising demand for globalization communication [6]. On the one hand, the demand of individual users in scenarios such as tourism, studying abroad and daily communication is constantly increasing, forming a mass foundation for market growth; on the other hand, the professional demand of enterprise users in fields such as transnational business and international cooperation is rising steadily, providing a core driving force for market growth, which means that cross-cultural communication related software has broad market development space.

At present, the global machine translation market presents a multi-subject competitive landscape dominated by leading technology enterprises and with start-ups laying out in segmented fields. International technology giants such as Google and Microsoft occupy an important share of the global market by virtue of technological advantages, while domestic enterprises such as Baidu, iFlytek and Tencent form strong competitiveness in the domestic market relying on localized advantages. All enterprises continue to increase R&D investment, focusing on improving translation quality, diversifying functions and adapting to scenarios to compete for market share. However, the products of existing market participants still take “translation” as the core, with insufficient layout in authentic cross-cultural communication, cultural transmission and social interaction, which provides an entry opportunity for new software for authentic cross-cultural communication in the segmented market. Through differentiated product positioning and functional design, it is possible to form a unique core competitiveness in the existing competitive landscape.

3.3 Characteristics and Usage Habits of User Groups

Through market research and analysis, the user groups of machine translation software show the core characteristics of being younger, highly educated and having diversified usage scenarios, and there are significant differences in usage habits under different scenarios. The user groups are dominated by young people, who have a high interest and demand for foreign language learning and cross-cultural communication, are willing to accept new technologies and tools, and are ready to try intelligent communication software to improve their cross-cultural communication ability. Most users have a bachelor's degree or above, with a good foreign language foundation and cross-cultural communication awareness, having high requirements for the translation accuracy, professionalism and intelligence of the software, and paying attention to the product experience. The usage frequency and operation methods of users vary significantly in different scenarios: in tourism scenarios, users are more inclined to use the real-time voice translation function of mobile APPs; in business scenarios, they prefer to use professional software for accurate document translation; and in daily communication scenarios, they focus on the real-time text/voice dialogue function.

The above characteristics provide a clear user orientation for the functional design, interface development and scenario adaptation of software for authentic cross-cultural communication, requiring the product to balance convenience, professionalism and intelligence to adapt to the usage needs of different scenarios.

3.4 Future Market Demand and Changing Trends

Combined with the development trend of globalization and the progress of artificial intelligence technology, the market demand for cross-cultural communication software will show three core changing trends in the next 5-10 years, which are also the core directions for product development and upgrading. The demand for personalization is growing: users are no longer satisfied with standardized translation results, but need personalized services that fit their own usage scenarios, language habits and communication needs, such as professional term banks for business people and daily communication templates for tourists. The demand for multimodal translation is increasing: single text and voice translation can no longer meet the needs, and users' demand for multimodal translation such as pictures, videos and real-time dialogue is rising steadily, requiring the software to realize intelligent recognition and translation of multi-form information. The demand for cross-language communication is expanding: the scenarios of cross-cultural communication will fully expand from traditional tourism and business to education, entertainment, social interaction and other fields, and the demand for cross-language communication is upgrading from “instrumental demand” to “social demand”, requiring the software to have both translation functions and social attributes.

4. Product Design of Software for Authentic Cross-Cultural Communication

With artificial intelligence technology as the core support and the ultimate goal of realizing barrier-free and authentic cross-cultural communication, the software for authentic cross-cultural communication developed in this study integrates four core functions of language translation, intelligent assistance, social interaction and cultural experience, balances multi-scenario adaptability and user experience, and makes up for the shortcomings of traditional translation software [7]. This paper introduces the product from three dimensions: main functions, product innovation points and product characteristics.

4.1 Core Functions of the Software

The core functions of the software focus on authentic cross-cultural communication, covering four modules: real-time communication, intelligent assistance, social interaction and cultural experience. The real-time dialogue function supports two-way real-time voice/text communication, adapts to various scenarios such as daily chat, business communication and tourism consultation, realizes real-time cross-language information interaction, and solves the problem of communication delay in traditional translation software. As the core function of the software, the artificial intelligence assistance function includes four sub-functions: context judgment, pronunciation correction, predictive input and language loophole supplement. It uses AI technology to judge the user's chat context and provide multiple versions of adapted translation results for users to choose from; the AI intelligently listens to the user's voice expression, prompts and corrects the pronunciation that deviates from the standard; it intelligently predicts the user's expression intention through the analysis of preceding and following sentences and provides "predictive input" options; at the same time, it automatically supplements the loopholes in the user's language expression to make the communication more authentic and fluent. The social function inserts an interesting interaction module, supports direct chatting and daily sharing among users from all over the world, helps users establish social connections based on cross-cultural communication, upgrades the software from a "tool-type product" to a "social-type product", and improves user stickiness. Relying on the folk stories, cultural customs, regional characteristics and other content spread in various countries, the cultural experience function transmits the cultures of various countries through pictures, texts, audio and other forms, allowing users to understand the cultural connotation behind while communicating, realizing the dual goals of "language communication + cultural dissemination" and reducing cultural misunderstandings in cross-cultural communication. In addition, the software also sets up a bad speech shielding function, which intelligently identifies and shields extreme remarks, insulting remarks and other inappropriate content, creating a civilized and harmonious cross-cultural communication environment and reducing communication conflicts.

4.2 Product Innovation Points

Compared with traditional machine translation software, the core innovation points of this software for authentic cross-cultural communication are reflected in the upgrading of three dimensions, realizing an essential transformation from a "translation tool" to a "communication platform". The innovation of translation mode is to upgrade from "single literal translation" to personalized translation with AI context intelligent recognition, which is no longer limited to the direct conversion of words, but provides multiple versions of adapted translation results combined with context, emotion and communication scenarios, making the translation more in line with actual communication needs and realizing "authentic translation". The innovation of functional positioning is to upgrade from "single translation function" to a comprehensive function of "translation + social interaction + culture". While meeting the needs of language communication, it integrates social interaction and cultural experience modules, conforms to the market trend of upgrading to "social demand", and improves the differentiated competitiveness of the product [8]. The innovation of communication goals is to upgrade from "realizing language conversion" to realizing barrier-free emotional communication across cultures. Through functions such as cultural connotation transmission, emotional expression restoration and pronunciation correction, it solves the problem of "translation without effective communication" in traditional translation software, making cross-cultural communication not only "communicable" but also "empathetic".

4.3 Core Characteristics of the Product

Combined with functional design and innovation points, this software has four core characteristics: intelligence, authenticity, diversification and socialization. It is intelligent because it deeply integrates artificial intelligence technology, realizes intelligent functions such as context recognition, pronunciation correction and intention prediction, provides intelligent assistance for users' cross-cultural communication throughout the process, reduces manual operations and improves communication efficiency. It features authenticity with the core goal of "authentic language communication", making cross-language expression more in line with the usage habits of the target language through functions such as context judgment, loophole supplement and multiple translation options, avoiding rigid literal translation and realizing authentic cross-cultural communication. It is diversified as it adapts to the needs of various fields such as

science and technology, business, daily life and regional culture, supports multi-form communication such as voice and text, balances the diversified needs of individual and enterprise users, and realizes coverage of multiple scenarios and groups. It has the characteristic of socialization by integrating social interaction and daily sharing functions, allowing users to establish social connections in communication, and at the same time enhancing users' understanding of different cultures through the cultural experience module, turning cross-cultural communication from “one-time tool use” into “sustained social behavior” and improving user stickiness and product vitality.

4.4 Core Value of the Product

The core value of this software lies in promoting the in-depth realization of cross-cultural communication starting with AI intelligent services, and its ultimate goal is to enable people who do not understand foreign languages to achieve barrier-free and authentic cross-cultural communication with foreigners. It solves the problem of “communication barriers” through the intelligence and authenticity of language translation, and solves the problem of “cultural misunderstandings” through cultural experience and social interaction, truly realizing effective cross-cultural communication and providing a convenient and professional intelligent tool for international exchanges under the background of globalization.

5. Marketing Strategy of Software for Authentic Cross-Cultural Communication

To promote the market promotion and user accumulation of the software, combined with market analysis and product characteristics, a comprehensive marketing strategy covering four dimensions of social media promotion, cooperation and alliance, data analysis and user experience optimization is formulated. The specific implementation strategies of each dimension are designed to enhance the market popularity and user recognition of the software and form core competitiveness through the coordinated efforts of multiple dimensions.

5.1 Social Media Promotion

Based on the characteristic that young people are the core user group, social media is taken as the core promotion channel, and the product functions, advantages and actual usage scenarios are displayed through content marketing to improve the product's exposure and attractiveness. Attractive short video content is produced to restore the actual usage process and effects of the software in scenarios such as tourism, business and daily communication, allowing users to intuitively feel the convenience and practicality of the product. Detailed product introductions with pictures and texts are released on platforms such as WeChat Official Account, Zhihu and Xiaohongshu, interpreting the core functions, innovation points and usage skills of the software in detail to accurately reach the target users who are highly educated and young. Real user cases and positive reviews are collected and shared to enhance the credibility and attractiveness of the product through users' actual experience and achieve word-of-mouth communication.

5.2 Cooperation and Alliance

By establishing alliances with partners in different fields, integrating resources from all parties, the scenario-based promotion of the product and the sharing of user resources are realized to rapidly expand the market coverage. Cooperate with cross-border tourism platforms, study abroad institutions, transnational business service companies and other entities to jointly hold offline/online activities, display the actual application effects of the software in tourism, study abroad, business and other scenarios, and accurately reach users with actual needs. Promote the product on the partners' platforms such as official websites, APPs and mini-programs, and realize the rapid reach of target users relying on their existing user resources. Joint promotional materials are made with partners, highlighting the advantages of bilateral cooperation and the scenario-based adaptability of the product to improve promotion effects. Jointly release case analyses of product use with partners, reflect the practical value of the software through actual application cases and enhance market recognition.

5.3 Data Analysis-Driven Precision Marketing

With data analysis as the core, the accurate control of user behavior, marketing effect and market dynamics is realized, and the marketing strategy is adjusted in a timely manner according to the data analysis results to improve marketing efficiency and pertinence. User behavior analysis is carried out to deeply understand users' usage habits, frequency, functional preferences and so on by tracking their operation records in the software, providing data support for product function upgrading and precision marketing. The effect of marketing activities is evaluated, the marketing activities on different social media and cooperation channels are quantitatively analyzed, the input-output ratio of each channel is judged, and resources are tilted towards high-efficiency channels. Competitor analysis is carried out to study the dynamic changes of competitors such as product function upgrading and marketing strategy adjustment in real time, grasp the market development trend, and optimize the positioning and promotion strategy of the product in a timely manner. A real-time monitoring and feedback mechanism of data is established to capture data changes in a timely manner, and the marketing strategy is adjusted rapidly according to user feedback and market dynamics to realize the dynamic optimization of marketing.

5.4 Continuous Optimization of User Experience

The core competitiveness of a product is ultimately reflected in the user experience. The user experience is continuously optimized from three dimensions of performance, stability and interface interaction to improve user satisfaction and loyalty, and realize the word-of-mouth communication and user precipitation of the product. Efficient product performance is guaranteed, the running speed of the software is optimized, the timely response of functions such as voice/text translation and real-time dialogue is ensured without obvious delay, and the user experience is improved. The stability and reliability of the software are enhanced, the occurrence of problems such as software crashes and translation errors is reduced through continuous technical debugging and bug fixes, and the normal use of users is guaranteed. A good user interface and interaction logic are designed in accordance with the principle of “simplicity, convenience and ease of use”, allowing users of different age groups and computer operation levels to get started quickly and realize an interactive experience with smooth operation and timely feedback.

6. Conclusions and Prospects

6.1 Research Conclusions

Based on the development of artificial intelligence, this study conducts a comprehensive research on the development of software for authentic cross-cultural communication, and draws the following core conclusions through the systematic analysis of the research background, market demand, product design and marketing strategy. The demand for authentic cross-cultural communication is continuously rising under the background of globalization, and the shortcomings of traditional translation software in context recognition, cultural transmission and emotional communication provide a broad market space for cross-cultural communication software empowered by artificial intelligence. The machine translation market presents the characteristics of differentiated demand across various fields, younger and highly educated user groups, and the upgrading of demand towards personalization and socialization, which requires software development to balance multi-scenario adaptation, intelligent assistance and diversified functions. The software for authentic cross-cultural communication designed based on artificial intelligence technology, which integrates real-time dialogue, AI intelligent assistance, social interaction and cultural experience, can effectively make up for the defects of traditional translation tools, realize the comprehensive value of “translation + social interaction + culture”, conform to the market development trend and have unique differentiated competitiveness. Formulating a comprehensive marketing strategy combining social media promotion, cooperative alliance, data analysis and user experience optimization can accurately reach target users, rapidly accumulate user resources, improve the market popularity and recognition of the product, and provide effective support for the market promotion of the software.

In general, the in-depth integration of artificial intelligence technology into the development of software for authentic cross-cultural communication is an important development direction in the field of machine translation. Such products can truly solve the problems of language barriers and cultural misunderstandings

in cross-cultural communication, realize authentic and barrier-free cross-cultural communication, and have significant practical application value and market development prospects.

6.2 Future Prospects

Combined with the development trend of artificial intelligence technology and the changes in the demand of the cross-cultural communication market, the future development and upgrading of this software for authentic cross-cultural communication can focus on three directions. Technological upgrading: keep up with the development of artificial intelligence technologies such as natural language processing, large language models and computer vision, realize multimodal translation including pictures, videos and real-time images, more accurate emotional analysis and cultural connotation restoration, and further improve the intelligence and authenticity of the software. Function expansion: based on the analysis of user behavior data and combined with the needs of different fields, develop personalized functional modules such as a professional business term bank for business people, local cultural strategies for tourists and a foreign language learning module for students to realize the refined operation of the product. Market expansion: on the basis of domestic market promotion, gradually expand to the overseas market, adapt to the translation and cultural communication needs of more languages, build an international cross-cultural communication platform, and truly realize “borderless authentic communication”.

At the same time, in the future, it is also possible to further strengthen academic cooperation with the fields of artificial intelligence and cross-cultural research, promote the in-depth integration of technology and theory, provide theoretical and technical support for the continuous upgrading of software for authentic cross-cultural communication, and make the product play a greater role in the global cross-cultural communication.

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Conflicts of Interest

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