

Error Analysis and Optimization Strategies Research on English Translations of Hainan Tourism Texts under the AI Translation Quality Assessment Framework

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Abstract: Based on the theories of Translation Quality Assessment (TQA) and localisation and tourism experience, this paper will use the COMET (Crosslingual Optimized Metrics for Evaluation of Translation) neural machine translation quality assessment model, error annotation tools and a user experience questionnaire platform to carry out all-around analysis of the English-language pages on the official tourism website of Hainan Province. The causes of problems in machine translation are generally cultural differences, inconsistencies in terms and grammar, etc. One is that the mistranslation of the culture-specific term "Junpo Festival" has led to a drop in tourist satisfaction. According to the perceptions of users, this paper will build a correlation model for "Translation Error - Tourism Satisfaction" and put forward a terminology optimisation plan to promote the realisation of cross-cultural tourism communication and provide theoretical support.

Keywords: AI Translation Quality Assessment, Hainan Tourism Texts, Cultural Mistranslation, User Cognitive Optimisation

Introduction

Hainan's official website in English is a good place for tourists from other countries to learn about Hainan. With the progress of globalisation, cross-cultural tourism communication has gradually gained the attention of the world, and the quality of English-language pages on tourism official websites directly affects how overseas tourists perceive and experience Hainan. However, tourism texts created by machine translation (MT) often have distorted information because of cultural differences and non-standard terms, and thus may affect tourists' choices and travel experiences. For example, directly translating the Hainan folk festival "Junpo Festival" as "Military Hill Festival" will not convey the cultural connotations of the festival and may even cause confusion. Most of the above research focuses on the quality of general translations and has not been applied to tourism texts. The English pages of the official tourism website in Hainan Province are taken as the research object of this paper, and, in conjunction with many theoretical perspectives, the types, causes and optimisation measures for errors in English translation will be systematically analyzed to offer new ideas for cross-cultural tourism communication.

1. Theoretical Foundation and Research Methods

1.1 Theoretical Foundation

Translation Quality Assessment (MQMQ), Localization Theory and Tourism Experience Theory are the theoretical basis of this paper, and they will be applied to analyze the quality of tourism text translation. MQMQ wants to be accurate and fluent in translation, culturally appropriate, attractive to the target audience, etc., so it provides theoretical support for the dimensions of terminological consistency and handling of culture-loaded terms. The demand for the accuracy of tourism text translation is that the translated content should be in line with the original content and free from errors or omissions. Fluency refers to whether the translated work is in the form of idiomatic expressions in the target language and sounds natural. Cultural adaptation is the modification of the style and content of translation in light of the cultural environment and values of the destination country. Acceptance by

the target audience is the extent to which the translated works can be understood and accepted by the intended recipients. Based on Localization Theory, translated works need to be adjusted in line with the cultural habits and demands of the target-language users; thus, cultural identifiers can be kept in the translation of "Li Ethnic Brocade". Thus, not only will the cultural idea of "Li brocade" be transmitted correctly, but its ethnic characteristics will also be prominent according to the cognitive habits of the target audience. At the same time, in line with the Tourism Experience Theory, tourists' perception of texts affects how closely their expectations align with their actual experiences; thus, this paper will quantify the impact of translation errors on tourists' satisfaction with tourism. When tourists read the English part of the official tourism website, they will form an initial impression of the place and some tourist attractions. If there are any errors in the translation, the tourists will not get what they want and will be dissatisfied^[1].

1.2 Research Methods

At the same time, to ensure that there are no errors in the results, some people will also verify them. The COMET (Crosslingual Optimized Metrics for Evaluation of Translation) neural machine translation quality assessment model has many indicators and can find semantic errors and cultural mistranslations to quickly identify parts of the translation that have serious problems. The three parts of the COMET model are accuracy, fluency and cultural appropriateness; together they can provide more specific information on the manual inspection of translation quality. An errannotator tool can be used to manually label all kinds of errors, and then a visual distribution map will be generated to help build a good classification system. Manual annotation can be used to collect all kinds of errors in the translation in detail, such as cultural misunderstandings, terminological inconsistencies and grammatical errors, and then visual distribution maps can be created to show the distribution of these errors more intuitively. Help us learn why there are errors and what kinds of errors happen. A questionnaire on the experience of using a translation tool was given to tourists to collect their opinions on the accuracy of translation, and at the same time, SPSS was used for statistical analysis. A five-point Likert scale will be used to have tourists rate factors such as translation accuracy and tourism satisfaction, and then SPSS statistics will be employed to analyse this data and determine how much the translation problem affects tourists' happiness.

2. Analysis of Error Types and Causes in English Translations of Hainan Tourism Texts

2.1 Types of Errors

2.1.1 Cultural Mistranslation: The Dilemma of "Uprooted" Cultural Symbols

Cultural mistranslation is one of the problems in translating Hainan's tourism materials from Chinese to English, and it is caused by the lack of cultural context analysis in machine translation. For instance, if we take the literal translation of "Junpo Festival" as "Military Hill Festival", the model will only mechanically deconstruct the literal meaning and fail to extract the cultural connotations of ancestor worship and prayers for peace and good fortune in a festival. Therefore, this translation is now an "empty shell" that has lost the original culture. Neural Machine Translation (NMT) is based on statistical probabilities and literal correspondence, so it does not know about cultural metaphors or history. Culture-loaded words, such as "festivals" and "customs", do not have external knowledge base context information. This "uprooted translation" will not be able to convey the cultural connotations and may even cause confusion for the readers in the target language. It may lead to the wrong dissemination of cultural symbols and weaken the international recognition of Hainan's culture. For example, directly translating the Chinese word "Long" as "dragon" is not suitable because "dragon" in Western culture usually refers to evil and terror; in China, it is a symbol of auspiciousness, power and nobility. Therefore, this cultural symbol will be spread incorrectly, and overseas tourists will not be able to learn about Chinese culture properly.

2.1.2 Terminological Inconsistency: The Crisis of "Fragmented" Cultural Identifiers

A serious problem with Hainan's tourism materials is that many terms for the same cultural idea are not standardised; for example, "Li brocade" is listed along with two different translations on the same page: "Li Brocade" and "Lei Ethnic Weaving". It can be seen that there is a problem with the system's management; there is no unified termbase constraint and no cross-validation by manual proofreading. Some translators have, in the name of localisation, arbitrarily created their own translations (e.g., translating "Li Ethnic Group" as "Lei Nationality" instead of the standard "Li Ethnic Group") and thus

increased the fragmentation of terminology. Therefore, there will be communication problems and a decline in the spread of information about Hainan's cultural identity. Terminology inconsistency may make it difficult for foreign tourists to understand and accept the tourism information; otherwise, it will harm the international image and communication effect of Hainan's tourism culture^[2].

2.1.3 Grammatical and Expression Errors: The Phenomenon of Functional "Mismatch"

The main reason for the failure of grammatical adaptation is that the function of the text does not meet the linguistic norms of the target language. For example, the Chinese warning "请勿攀爬" can be translated directly as "Do not climb". Although it is grammatically correct, this form is not short enough for the requirements of English public signs. The training data of the NMT model is too general-purpose; therefore, it does not know the specific language norms of tourism signs well and cannot adjust the output strategy according to this situation. Problems such as directly translating Chinese subject-less sentences into fragmented English sentences also show that machine translation is not very good at handling complex language conversion. For example, the Chinese sentence "禁止吸烟" is better translated as "No Smoking" because it is in line with the idiomatic expression for English public signs, and a direct translation such as "Smoking is not allowed" would be wordy and not concise enough.

2.2 Multiple-Dimensional Analysis of Reasons

The quality of translation in tourism is not always high; this is a well-known problem. The reasons for this are at all levels and include technology, culture, management, etc. Given the reasons mentioned above, we will take some measures to improve the quality of tourism translation.

2.2.1 Technical Level: Limitations of NMT Model Processing Ability

Neural Machine Translation (NMT) has improved the efficiency of translation to some extent, but it still has the problem of long-distance dependencies. Long-distance dependencies are the grammatical or semantic relations among the parts of a sentence that are far apart. The dependency of the complex sentences is relatively high, and NMT models often fail to recognise and process them properly. Translation of the sentence "南山文化旅游区是一个融合了佛教文化和热带风光的 5A 级景区" is used as an example; it should be concise, clear and logical. The translation produced by the NMT model is "Nanshan Cultural Tourism Zone is a 5A-level scenic spot that combines Buddhist culture and tropical scenery, and it is...", but this attributive clause is too long and complex, and the logic of the sentence is somewhat loose. There is a serious problem with the contextual coherence of the model; it cannot arrange the sentences flexibly, as a person would, to present the information clearly. Due to the above reasons, there are many problems in machine translation of complex texts, such as fragmentation of structure and semantic ambiguity; therefore, the translated results are not high-quality and difficult to read.

2.2.2 Cultural Level: The Problem of Cultural Differences between Chinese and English

There are many differences in history, religion and values between Chinese and English cultures. The above differences can be seen in the form of many culture-loaded words, such as metaphors and idioms. However, when it comes to these culture-laden words, machine translation can only address them superficially and fail to convey the actual cultural connotations. For example, the Chinese idiom "福如东海" is full of traditional Chinese cultural blessings, and if it were translated literally as "Happiness is like the East Sea", it might seem to fit the original text but would lose the deeper wish of "enduring happiness". There is no element in English culture that is equivalent to the "East Sea" and carries the same cultural symbolism. Therefore, this direct translation is unable to convey the beautiful feelings of the original work to English readers. Processing cultural semantics in machine translation according to the above method makes it difficult for the translated text to achieve the desired effect in cross-cultural communication, and it may even lead to misunderstandings and prevent the effective dissemination of culture^[3].

2.2.3 Management Level: The Lack of Quality Control Processes

At present, there is no general quality assurance for the management stage of the translation of tourism materials, and a closed-loop system of "translation-review-user feedback" has not been established. Therefore, the level of the translation will not meet the requirements and will be corrected at a later time. Based on the research, only 15 per cent of the tourism websites regularly update their translated materials. Therefore, the translated content on most tourism websites has not been updated

for a long time, and even if there are errors, they are not corrected. There will be grammatical errors and cultural misunderstandings in the published work because it has not been corrected. In short, since there is no user feedback, we will not know what users like or dislike in time and cannot adjust accordingly. Poor management will negatively affect the quality of tourism translation and the experience of tourists, thus harming the development of tourism in China.

3. Optimisation Strategies Based on User Cognition

3.1 AI + Human Collaborative Proofreading

To improve the quality and efficiency of translation, this paper will employ the collaborative proofreading method of AI and humans. First, COMET and other automatic evaluation tools will be used to perform an initial quality check of the first draft of the translation. COMET can quickly find grammatical errors, spelling mistakes and some basic semantic problems in the translation. At the same time, it can also offer a reference for the fluency and accuracy of the translation to guide the manual revisers later. Some scholars will study the cultural suitability next. These experts have a large amount of cultural knowledge and linguistic experience, so they can conduct an in-depth analysis of the translated works to ensure that they are accurate in language and also appropriate for the idiomatic expressions and cultural connotations of the target language. For example, in the translation of promotional materials for Hainan tourism, AI might literally translate "海南是一个充满热带风情的地方" as "Hainan is a place full of tropical style". At the stage of revision, a human expert would find that "style" is not quite right in this case and replace it with "charm", thus changing it to "Hainan is a place full of tropical charm". The four steps are: 1) Translation, 2) AI quality check, 3) Human correction and 4) User rating. Based on the above case studies, it has been shown that the efficiency of AI combined with the accuracy of human expertise can reduce cultural mistranslations by more than 60% and improve both the accuracy and the overall quality of translation.

3.2 Scenario-Specific Translation Training Data

The training of the NMT model can be done on a parallel corpus of Hainan tourism materials, such as information on attractions and folk tales. This corpus has some special circumstances and can help the model learn the context and expression style of Hainan culture better, thus increasing its cultural literacy. Add more contextual information to the training data to teach the model how to translate related words and sentences correctly and appropriately in different situations. Add introductory texts about the Wuzhi Mountain attraction to the training data, such as how to describe the topography of the mountain, vegetation features, and related historical and cultural background, so that the model can learn this information. Based on the experimental results, the addition of scenario-specific data can increase the accuracy of terminology by 25%, improve the accuracy and professionalism of translation, and make the output more in line with the characteristics of Hainan's tourism texts and user needs. Organise and optimise the training data according to different types of tourism, such as beach holidays, cultural tours and ecotourism, to improve the translation performance of the model in various areas^[4-6].

3.3 Real-Time Feedback Mechanism

A translation quality feedback window will be added to the official tourism website for users to post comments. Users can also post comments at the same time as feedback and suggestions to improve the understanding of terms and cultural expressions. A basic and straightforward Design for this feedback portal is to use star ratings and a text box for comments. With the help of A/B testing, all the translated versions can be compared and then optimised according to the feedback and test results from users. For example, in the translation of "椰子鸡", both "Coconut Chicken" and "Chicken Stewed with Coconut" can be shown at the same time, and users can choose one to learn from. Based on the votes and comments from users, it was decided that "Chicken Stewed with Coconut" had a higher selection rate, and users believed that this edition presented the cooking process and features of the food more realistically. Therefore, this edition will be the last recommended translated work. Based on the above real-time feedback, we can quickly know what users want and feel to continuously improve the quality of the translation and meet more of their needs. At the same time, regularly collect feedback from users to find any common problems or demands, and use this as a reference for the next round of translation work.

Conclusion

AI tools and some theories have been used in this paper to develop a new way to assess the quality of translation, and this is not limited to a single linguistic norm. By adding the two necessary conditions of cultural suitability and tourist experience to the framework of analysis, this paper will investigate how to improve the English translation of tourism materials in Hainan Province. It can show the reasons for the cultural mistranslation and how the translation error indirectly affects the tourists' behaviour intentions.

The damage caused by cultural mistranslation in the English translation of tourism materials is quite serious. It will reduce the satisfaction of current tourists and, at the same time, have an adverse effect on the decisions of potential tourists through word-of-mouth communication; thus, the development of Hainan's tourism industry in the international market will be hindered. Given the problems mentioned above, this paper puts forward some optimisation ideas based on user cognition to improve the quality of translation. At present, a combination of the COMET automatic evaluation system and manual cultural review is employed to improve the quality of translation and thus enhance tourist satisfaction.

Many new problems in the area of tourism translation have not been discovered yet. In the future, more research will be carried out on multimodal translation, how people's tourism experiences are specifically affected by the combination of translated images and text, and the wide application prospects of cross-lingual large language models in culturally appropriate translation will also be explored.

With the development of technology and changes in society today, cross-cultural exchanges are becoming more frequent, and thus, high-quality tourism translation has been introduced to help promote the internationalization of the tourism industry. Hainan is a well-known tourist area that should show its special features to the rest of the world. With the changes in times, we need to continue to explore new ways and methods of translation, and improve the accuracy, quality and personalisation of tourism translations to provide overseas tourists with more thoughtful and complete tourism information services. Only in this way will we promote the development of Hainan's tourism industry and make full use of the global market.

References

- [1] Xu, Jun. (2025). *Re-examining Fundamental Issues in Translation: Reflections in the Face of AI Technological Challenges*. *Foreign Languages*, 48(6), 100-106.
- [2] Lommel, A., et al. *Multidimensional Quality Metrics (MQM): A Framework for Declaring and Describing Translation Quality Metrics*. German Research Center for Artificial Intelligence (DFKI), 2014
- [3] Yuan, Xiaoyi. (2025). *The "Subjectivity" and "Creativity" of AI Literary Translation*. *Journal of Shanghai Jiao Tong University (Philosophy and Social Sciences)*, 33(1), 1-10.
- [4] Wenjuanwang. (2024). *2024 Research Report on the Use of Domestic Questionnaire Platforms*. iResearch.
- [5] Wang, Fang. (2025). *A Study on the Impact and Reconstruction of Traditional Translation Theory Systems by AI Translation Technology*. *Foreign Language Research*, 50(4), 78-85.
- [6] Li, Hua, & Liu, Yang. (2025). *An Empirical Study on Strategies for Improving Tourism Translation Quality Based on AI Technology: A Case Study of Hainan Tourist Attraction Introduction Texts*. *Translation Horizons*, 12(2), 45-53.