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Analysis of English Translation Based on Cloud Computing (CC) Technology - Cloud Translation Platform

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Abstract: With the continuous development of computer technology and electronic technology, CC technology is widely used in all aspects of life, especially in English translation, which greatly improves the efficiency and accuracy of English translation. Cloud translation platform is a collaborative translation platform based on cloud platform. The platform not only integrates advanced computing technology and language processing technology, but also can realize collaborative translation, that is, multiple spatially dispersed translators are organized to complete a translation task together, so as to improve the efficiency of the whole translation industry. Based on the English translation of CC technology, this paper discusses the dynamic sharing module of CC in cloud platform translation and the English translation design of CC technology. According to the cloud execution translation algorithm, this paper compares the running time and actual running time of different running paths of CC English translation, and measures and compares the translation speed and accuracy of CC English translation, traditional translation and artificial English translation. The test results show that both the time optimal path and the energy optimal path are path four, that is, text positioning and recognition are processed in the cloud. Through the calculation sharing of CC, under the condition of consuming a certain amount of traffic as the cost, the running time and energy consumption of the two steps of text positioning and text recognition in the real-time translation program are reduced by 89% compared with the local operation; In the same running environment, the program can correctly and independently select path 4 as the path with the best time and energy consumption for actual operation. The translation accuracy of CC English translation proposed in this paper is the highest, reaching 97%, followed by traditional translation, and the translation speed is also the fastest. It fully proves the practicability of English translation based on CC.

1. Introduction

Mobile CC uses CC technology to store or process data in intelligent devices, so as to solve the

problem of resource constraints of mobile devices. It will organically combine intelligent mobile devices with CC, and truly extend the tentacles of CC to every corner of the real world, so that users can access the services provided in the CC environment anytime, anywhere and on demand through the mobile Internet.

Many scholars at home and abroad have studied the English translation based on CC technology. Javed a proposed an intelligent controller model combining Internet of things with CC and web services. A wireless sensor node for monitoring indoor environment and HVAC air intake and a wireless base station for controlling HVAC actuators are developed. The sensor node and the base station communicate at a frequency of 915 MHz through a radio frequency transceiver. The stochastic neural network (RNN) model is used to estimate the number of residents and to estimate the set value based on the predicted average vote to control the heating, ventilation and cooling of buildings [1]. The broader context adopted by K LIS is a book as a whole, rather than a single text in the book, with the printing environment as the background. First, a brief survey of the lives and occupations of the three persons related to the two transfers was conducted to try to determine whether these provided reasons for differences. Trace back to the history of misunderstandings surrounding the early modern English version of orelen's law. The analysis also juxtaposes the content, layout and actual text of the relevant translation to determine the relationship between them and whether this can explain the confusion surrounding translation [2].

The high development cost of traditional mobile application server, cumbersome upgrade, maintenance and management, and difficult expansion have become the key to the application performance of computing intensive mobile terminals. Through the effective management of various virtual resources, mobile CC mode can provide a highly available and dynamically scalable system mode, so that the tentacles of CC can be extended to all corners of real life, Effectively solve the situation that the mobile devices represented by smart phones are limited in their own resources when facing computing intensive and data intensive applications, expand the processing capacity of mobile devices, eliminate regional restrictions, and enable users to access the services provided in the CC environment on demand through the mobile Internet anytime, anywhere [3, 4]. Realize the functions of online picture and character recognition, online translation and online search, and realize the function of fast and accurate English translation. The feasibility of mobile CC model in English translation application is verified.

2. English Translation of CC Technology

2.1. Cloud Translation Platform

With the rapid development of science and technology, the communication between different languages is becoming more and more important, and the communication between different countries is becoming more and more important. At present, the translation market is still dominated by manual translation, pure manual translation, and translation work in individual units. Although it can fully show the level of translators, it has low efficiency and high cost. Therefore, computer-aided manual translation is generally used now. Cloud translation platform is a collaborative translation platform based on cloud platform. The platform not only integrates advanced computing technology and language processing technology, but also can realize collaborative translation, that is, multiple spatially dispersed translators are organized to complete a translation task together, so as to improve the efficiency of the whole translation industry. Better coordinate the relationship between different translators and translation projects, and use the auxiliary translation input method as a bridge between translators and collaborative translation platform to share translation information between different translators in real time, so as to effectively improve the translation efficiency of translators [5].

2.2. English Translation Design of CC Technology

The English translation module of CC mainly includes five function points: image acquisition, text positioning, text recognition, text translation and result display.

(1) Image acquisition: collect the scene image information captured by the current hardware camera in real time. You can get the data information of the image without pressing the fast port, and display the current preview image information on the mobile phone screen at the same time. By calling the andiord camera interface, the scene image information captured by the current hardware camera is collected in real time to obtain the image data information. The number of bytes of the current image pixels is saved by rewriting the function, and the RGB values of each pixel point are obtained by analyzing the array, and the values are stored in the h-dimensional array [6, 7].

(2) Text location: analyze and adapt the scene image, accurately and quickly locate the position of the text contained in the image with complex background, and return the vertex coordinates of the smallest circumscribed rectangle of the text area in the original image. This design uses a combination of image morphology and connected domain analysis to analyze and locate the text region. After image preprocessing, locate the text region according to the characteristics of English text, mainly including six steps: graying, expansion and corrosion operation, hole filling, connected domain marking and connected domain analysis.

Grayscale: the grayscale image can greatly reduce the amount of data and better represent the morphological characteristics of the image. The grayscale value of the grayscale image is calculated through the RGB value of the original image and represented by a grayscale level of 0 to 255.

Correction of edge missing: in the process of edge detection, some unclosed edges may be missing and there are small gaps. If the holes are filled directly, the areas that are not completely agglomerated will not be filled, affecting the positioning accuracy [8]. Through closed operation, expansion operation and seedling Jin corrosion operation to correct the missing edge, these gaps can be filled to a certain extent, the boundary can be smoothed, the shape edge can be more closed, and the accuracy of text positioning can be improved.

Hole filling: the purpose of hole filling is to skillfully fill the inner contour of the image and optimize the extraction of the image target area. A real connected domain is formed, and the 0 surrounded by 1 in all binary images is set to 1 to fill the hole.

Connected domain marking: mark the connected area of each pixel in the binary image as the same number, instead of the image data array with only two values of 0-1. The original position of 0 is still 0, and the original position of 1 is marked as an integer starting from 1 according to the coincidence connection relationship. Therefore, each connected domain is uniquely marked for analysis.

Connected domain analysis: according to the shape characteristics of human characters and the general habit of image sampling, divide the connected regions of connected domains with different numbers. Delete the connected domain whose length width ratio obviously does not meet the requirements, and then analyze the relationship between the connected domains to make the independent "letter connected domain" form the "word connected domain".

(3) Character recognition: recognize the data information of the text area in the image. Recognize the image data into English character data, so as to carry out character processing [9-10]. In the process of character recognition, optical character recognition technology is mainly used to recognize character images into character information.

(4) Text translation: by calling Baidu cloud translation API, the identified English content will be translated into synonymous Chinese content, and the text to be translated, the original language and the target language will be transmitted to the translation API according to the interface form provided by Baidu, so as to w obtain the JSON character string storing the translation results and

realize the translation function.

(5) Result display: through the text positioning results and text translation results, the translation result text is dynamically added at the specified position on the preview image to cover the original image, so as to realize the function of real-time translation display. Lai's translation results are displayed through a method similar to augmented reality. The real image obtained by the camera is superimposed with the virtual image obtained from the translation results to obtain the final result.

The result of the translation result is a set. Each object in the set includes the position information of each text area and the result of processing and translation. The text area information is a rectangular space, which is composed of the two-dimensional scale of the point with the smallest horizontal coordinate and the two-dimensional coordinate of the point with the largest horizontal and vertical coordinate. Through these two coordinates, a rectangular area can be uniquely determined, Add the translation result text in this rectangular area to get the result [11, 12].

3. Cloud Translation Algorithm

According to the dynamic changes of the computing environment, including the application runtime environment and device conditions, applications can migrate between mobile devices and the cloud to make them execute flexibly between mobile devices and servers.

When the online translation system performs the steps of image recognition and text extraction, it needs to call the research on the key technologies of the development of the online translation system based on mobile cloud. Take these data as the response cost measurement to build the cost model. For example, take the response time and client energy consumption of the online translation system as the cost measurement to dynamically construct the cost model. Then, through the optimizer, the output result is the binary decision variable K (n), that is, there are only two results of K (n), either 0 or 1. 1 indicates that the method n needs to be migrated to the cloud for execution, and 0 indicates that the method n needs to be executed locally. The calculation method is shown in formula (1) (2) (3):

$$C(H) = Comp(H) + Migr(H) \tag{1}$$

$$Comp(H) = \sum_{r \in H, n} \left[(1 - L(n)) R(r, n) Cc(r, 0) + L(n) R(r, n) Cc(r, 1) \right] \tag{2}$$

$$Migr(H) = \sum_{r \in H, n} k(n) R(r, n) Cs(r) \tag{3}$$

Among them, comp (H) is the calculation cost, migr (H) is the migration cost, and l (n) is also a set of binary decision variables. L (n) is used to describe the location of each method n (locally or in the cloud). The object of the final optimization output is K (n) - binary. The value of K (n) that minimizes C (H) can be solved through the mathematical method of integer linear programming, that is, whether each method n should be migrated to the cloud server for execution. Facing the uncertain computing environment, it is difficult to divide in advance. Whether it is integrated in the front end or the back end can more effectively shorten the system response time, which is a better choice for the CC English translation system designed and implemented in this paper.

4. CC Translation Test Analysis

Firstly, this paper compares the running time of different running paths of CC with the actual running time. Running path: running location of each task path 1: local image acquisition - local text location - local character recognition - cloud translation - local face-to-face display results; Path 2: local image acquisition - local text location - cloud text recognition - cloud translation - local

display results; Path 3: local image acquisition - cloud text location - local character recognition - cloud translation - local display results; Path 4: local image acquisition - cloud text location - cloud text recognition - cloud translation - local display results.

By manually setting the operation path, the observed values of the actual operation time of the four different operation paths under the current operation environment can be obtained, and the error comparison between the estimation of other path time consumption and the actual dolphin operation time consumption based on the operation results of path I. The measurement results are shown in Table 1 and figure 1.

Table 1: The expected operation time is compared with the actual operation time

Running path	Path 1	Path 2	Path 3	Path 4
Average actual total local operation time / MS	3639.7	1164.8	2464.1	0
Total actual operation time / MS	3639.8	1311.9	2500.2	248.1
Estimated total operation time / MS	-	1161.0	2669.2	253.8
Estimated total time error	-	11.55%	-6.79%	-3.22%

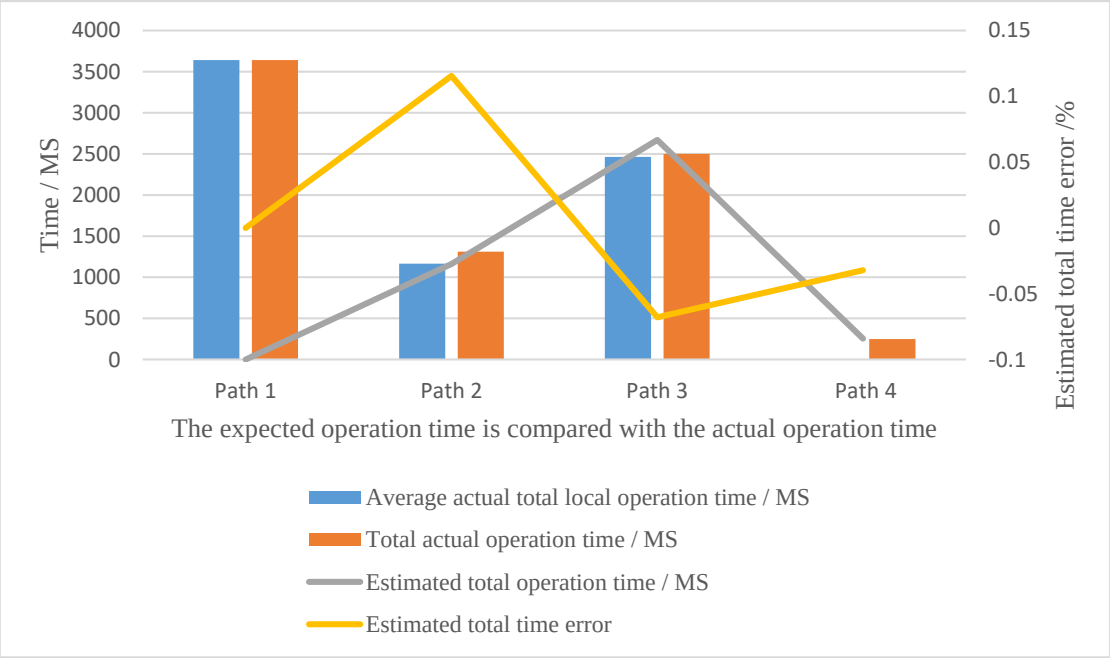

Figure 1: The expected operation time is compared with the actual operation time

Next, the translation speed and accuracy of English translation, traditional translation and artificial English translation of CC are measured. The measured data are shown in Figure 2.

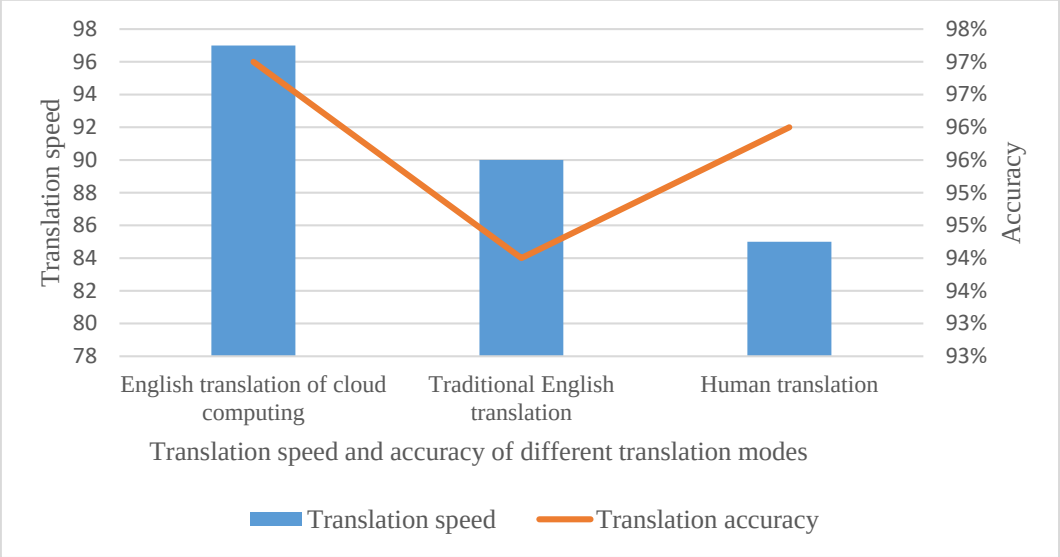

Figure 2: Translation speed and accuracy of different translation modes

According to the test results in the above chart, in this test environment, the optimal path of time and energy consumption is path four, that is, text positioning and recognition are processed in the cloud. Through the calculation sharing of CC, under the condition of consuming a certain amount of traffic as the cost, the running time and energy consumption of the two steps of text positioning and text recognition in the real-time translation program are reduced by 89% compared with the local operation; In the same running environment, the program can correctly and independently select path 4 as the path with the best time and energy consumption for actual operation. The translation accuracy of CC English translation proposed in this paper is the highest, reaching 97%, followed by traditional translation, and the translation speed is also the fastest. It fully proves the practicability of English translation based on CC.

5. Conclusions

Due to the complexity of the image signal processing algorithm, the algorithm used in this paper has low efficiency. Although the performance can be improved through mobile CC sharing, the local operation in extreme environments can not get a good user experience. In the future, the same image processing based on C language can be used to improve the lifting efficiency of the algorithm, and there is still room to improve the accuracy of recognition; At present, the display of translated text results is relatively rough, which is only the realization of function. We hope to optimize the display results in the future; This paper only records the historical operation data when the current program is running. In the future, the operation history records of all mobile phones connected to the cloud can be recorded and stored in the database, so as to improve the accuracy of prediction; At this stage, there are still large errors in the time consumption and energy consumption of each task running locally and in the cloud, which can only be roughly predicted. In the future, we hope to put forward a more accurate prediction model to improve the correctness of the actual path selection.

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