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Online literature translation system based on mobile cloud computing research

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ABSTRACT

This paper aims to put forward constructive views to the design of online literature translation system based on the cloud computing model. This can make full use of the advantages of mobile cloud computing. Relatively, the cost of traditional translation server-side development is high, and it's tedious to upgrading, maintenance, management, and the difficulties of extend impact the key problems compute-intensive mobile terminal applications performance. Make cloud computing to reach every corner in real life, can effectively solve the problem of the own limited resources of mobile device for the use of computationally intensive and data intensive, represented by smart phone. It can extend the processing capacity of mobile equipment, and eliminate the regional restrictions. Through this, user can access the services provided by the cloud computing environment through the Internet, anytime and anywhere.

KEYWORDS

Cloud computing; Online translation system.

INTRODUCTION

Cloud computing is the increase of the related services based on Internet, use and delivery mode, usually involves using the Internet to provide dynamic easy extension and often virtualized resources[1]. A cloud is a network, a metaphor of the Internet. Cloud computing system can not only provide hardware, software, services, data services, but also can be provided to the user to be able to configure the platform service[2]. Literature that cloud computing system is to provide various services to users in the form of paid use of distributed computing systems, the system is transparent to users, its essence is to dynamically deploy virtualized computing and storage resources pool, dynamic distribution and redistribution, real-time monitoring system, so as to provide the user with computing platform service, data storage and service[3]. General sense, cloud computing was thought to be the Internet as the center, by some cheap server, or cluster system consisting of common machine, and organically will be distributed in the various resources of the organization in[4], to provide users with based on safe, reliable, rapid, convenient and transparent data storage, access, and a variety of computing services.

This paper expounds a kind of online translation system based on mobile cloud computing model of related process.

ONLINE LITERATURE TRANSLATION BASED ON THE PATTERN OF MOBILE CLOUD COMPUTING SYSTEM DESIGN

Whether translation system based on local thesaurus way, or based on the way to realize online translation system, typically require the user to manually enter queries to translation system-provided user interface, to a certain foundation in query language users, in this way is not too big problem, but some users query languages do not have required foundations, they do not know how to input the language, or the phone doesn't support this kind of language input method, this paper puts forward a mobile cloud computing environment, the design goal of this system are as follows:

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Front-end input first, mobile phones use images from a mobile phone camera, users can query to the need of words, with the method of mobile phones, recorded in the form of pictures, through the OCR process query, so regardless of the language of the written word, the user can smoothly the required content of the query input to the system gives the user interface. Not only can just picture taken as input of queries, you can also save the original as input, the picture in the mobile phone can set the source language and target language, the translation results and the extracted text in the form of text file stored in the phone. Interested in the translation results, the content of the call.

Secondly, to integrate the service on the server side, by calling the online translation functions, which is today's most popular translation engine, its length can be any one may mouth out a passage from one word to translation. As long as the source language and target language have been set, the input need translation of the source language, will soon give specifies the result of the target language. Translation methods called "statistical machine translation, and combined with the United Nations documents as corpus content source, translation result is quite accurate, and support a variety of translation between languages, overcome the local translation thesaurus single.

Finally, consider most of today's mobile phone is still belonging to the group of resource-constrained devices, so the online translation system based on the thin client mode, as far as possible will be treated as complex task migrated to the backend server, and in view of the traditional architecture, the server maintenance and management is tedious, and extend the difficulties, low utilization rate of resources, the use of open source cloud platform to realize the application of electronic

dictionary flexible deployment server based on cloud platform, users can dynamically part application resource, on-demand access to computing power, storage space and information services, to improve efficiency, reduce the cost.

THE SYSTEM ARCHITECTURE DESIGN

System overall design, architecture is adopted, and the thin client model, with the rapid development of electronic information technology and the technology of hardware, represented by the smartphone mobile device while in computing power, storage capacity, battery power supply ability has a great progress, but compared with the fixed equipment such as desktops, mobile devices in all aspects of their own resources is still the resource-constrained[5], so we in the design the client use thin client - will handle function as far as possible when moved to the server, the client only keep taking pictures, simple image processing, send the request and pictures, receive and display the results. Every time after the translation the client will automatically break began to connect to server, until the next time request translation to reconnect. Since the client need not always connect to the server, also reduced the energy consumption for the client, the whole system structure is shown in Figure 1.

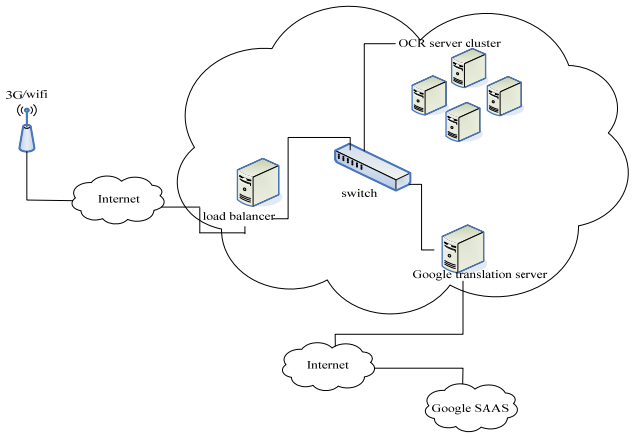

Figure 1 : System structure

Can be seen from the Figure 1, the system will load the heavier task allocation in the backend server based on the cloud platform, including the handler, integration to realize online translation, this online translation system based on the engine to the collection of image data on image recognition and word processing, belong to computationally intensive application, the application would consume large amounts of system resources, so keep the engine in the backend server, and because is the bottleneck of the performance of the system, so need more than one processor, so also need a responsible for distribution job load balancer, so the server has three parts: the processor load balancer, a processor and a translation.

Dynamic change quantity according to the application access request processing server, thus translation server and load balancing server configuration change dynamically according to the workload. Client is responsible for data collection, data on the client based on the images of mobile phone camera, or based on the original images stored in the phone, and, according to need to simple processing of acquisition of data, and then ask the server sends the translation based on the cloud platform, the collection of image data sent to the server, the carry the relevant parameters in the request, mainly in the types of clients to the original language and the target language Settings. Server after receiving the client's request, through the load balancer, distributed image scanning operation to handle the server, processing server traffic and decide the number of users, processing server will after image recognition, word extraction of text information to translation server, translation server to invoke the service, the request of its translation, text information on just received service will translation results

back to the server, the final translation server will return to the client, translation of the target language to realize online translation, the above as this is the whole system structure a general process.

Combined with the client's requirements analysis and its working process, its main functions can be divided into camera, image editing functions, images and text file storage, translation, search functions, set up functions, the client with such as shown in Figure 2.

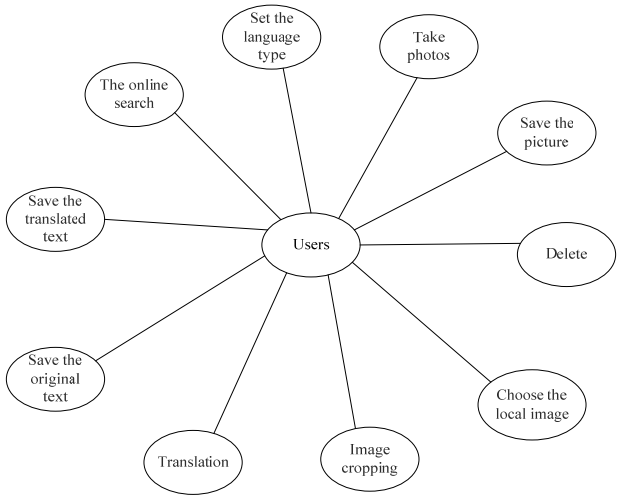

Figure 2 : Client sample figure

TRANSLATION PROCESSOR DESIGN

Translation server integration services, namely the call to translate to extract text processing server, is a kind of automatic launch of Google translate texts from one language to another language services, support languages, not only provide online translation service, users can provide components, copy and paste to your page, select the corresponding language, users will be redirected to the translation, and see the front of the translation results also provide a set of very powerful users can use Google to programmatically in your own web page or application translated text[6]. Translation server to provide online translation system function, through the integration services, calls to realize online translation function. Using multi-threaded mechanism, the user request processing in the different threads, each connection request by a thread, so when processing the request, the main thread to continue to accept the request of the other users. Processing is as shown in Figure 3.

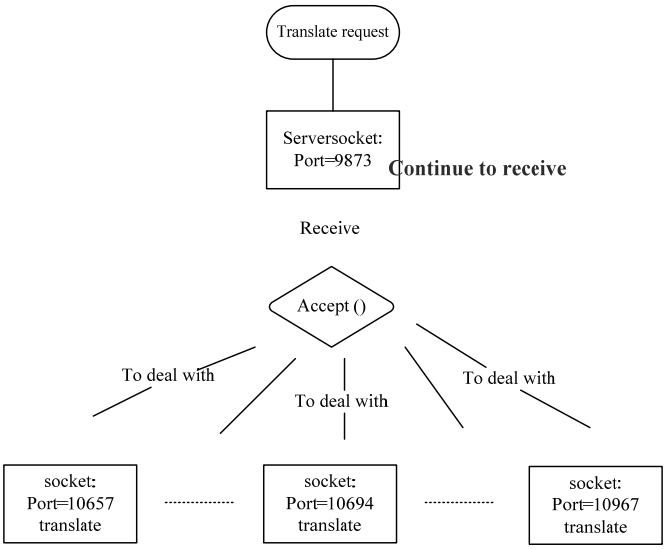

Figure 3 : Translation server process

LOAD FLEXIBILITY TO PERFORM

In either model, for mobile devices and the server, are static model, facing the complicated network environment and a wide variety of mobile devices, it is often difficult to make reasonable division of application in advance. These application developers a lot of energy consumption, the corresponding cost cannot be calculated. In order to solve this problem, the elastic model is a better choice for developers, but also can give the user a better user experience[7]. Elastic model refers to between thin client model and fat client model, different from the direct download the application to run on mobile devices, these applications that can run on a mobile terminal, can also run on cloud platform, according to the dynamic changes of the computing environment, including the application runtime environment and equipment conditions, the application can be in migration between mobile devices and cloud, make its elasticity between mobile devices and the server performs as shown in Figure 4.

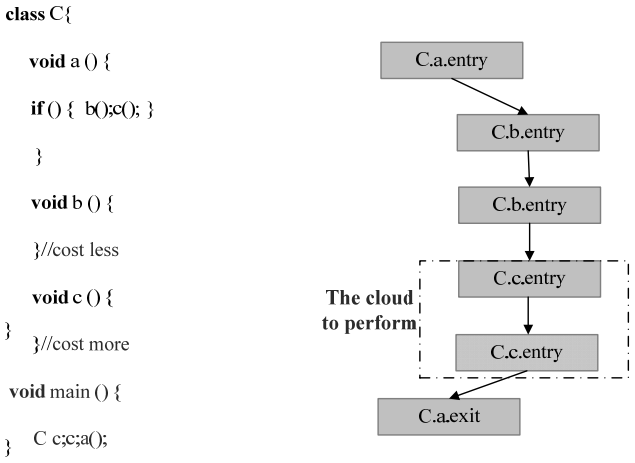

Figure 4 : Load elastic execution concept map

When online translation system to image recognition, text extraction step, you need to call the Tesseract - OCR, can through dynamic analyzer, perception from mobile devices and the cloud data, including equipment end battery level, quality, equipment load, the cloud loads connected to the wireless network and the current network latency performance data, the data as a response to measure, build cost model, such as an online translation system response time and the energy consumption at the expense of client measurement, dynamic construction cost model[8].

Expressed in T [I] Tesseract - OCR method required execution time. And Tesseract - OCR method between calls to the data used to remember one can measure the size of the quantity, used to calculate transfer price. For a Tesseract - in the OCR each execution call i, define the computing cost $C_C(i, f)$, transfer price for $C_S(i)$, as the location of the call, then $f = 0$, said call sites on mobile devices, $f = 1$ at that time, said calls occur in the cloud, according to the dynamic data set $C_C(i, f)$ value of perception, $C_C(i,0) = T[i]$ is call methods on the mobile end i which said the consumed time for the for the calculation of the price.

Migration costs a is one way to hang in the sum of the recovery of this method and migration costs, suspend/resume price is where this method is thread to suspend and resume the time required to, transfer the cost of this method is associated with the state the size of this method, this method involves state size here is the migration of the related data. Transfer the cost of this method to capture, serialization, transfer, deserialization, instantiate a specific state the size of the time it takes to include all the relevant data, for the sake of simplicity, can assume that all relevant data objects have the cost of each byte is the same, can be calculated in advance Tesseract - the price of each byte in the OCR, the cost of each byte can measure from various angles, such as memory, processor, storage, speed, network

latency, bandwidth, etc., in this article, for the price of each byte adopt no longer specify what kind of way.

For the calculation of energy consumption, this article selects the combination of three variables of the online translation system to measure the consumed energy, the three variables are respectively, the state of the CPU, is processing the data or is in the idle state; Display equipment status, it is on or off; Is the state of the network, sending or receiving data or is in the idle state. For the convenience of description, define a function with a triple P a for energy consumption per unit time value, for P function, by way of experiment, to measure these three variables in the P value under different conditions. $C_C(i,0) \equiv P(CPUOn, SCROn, NETIdle) * T[i]$, $C_C(i,0)$, said in a CPU use state display in an open position, network idle $T[i]$ time under the condition of consumption of energy. $C_C(i,0) \equiv P(CPUOn, SCROn, NETIdle)$ said when the method is executed in the clouds, i on a mobile device CPU idle, at this point we don't care of energy consumption in the cloud, and only care about when the application is processed in the cloud, the energy dissipations of the mobile terminal.

Through optimization, then the output result is a binary decision variables $R(m)$, as $R(m)$ result there are only two, either 0 or 1,1 express that the method for m to be migrated to the cloud, 0 represent that the method should be placed on local implementation. According to the following three formulas:

$$C(E) = Comp(E) + Migr(E)$$

$$Comp(E) = \sum_{i \in E, m} [(1 - L(m) I(i,m) C_C(i,0)) + L(m) I(i,m) C_C(i,1)]$$

$$Migr(E) = \sum_{i \in E, m} R(m) I(i,m) Cs(i)$$

$Comp(E)$ is to calculate the cost, $Migr(E)$ is the price of migration, $L(m)$ is a set of binary decision variables, $L(m)$ is used to describe the position of each method in the local or the cloud, the final output optimization object is $R(m)$ which is a binary, can pass the integer linear programming mathematics method, and then make the smallest $C(E)$ work out $R(m)$, namely each method m whether to migrate to the cloud server.

In the face of uncertain computing environment, it is difficult to advance the Tessera - OCR, Tessera - OCR integration in the front or back end can give more effective shorten the system response time, combined with sensory data from mobile devices and cloud as input (such as the battery level, quality, equipment load, the cloud loads connected to the wireless network and the current network latency performance data), and by performing as an integer linear programming execution of the application of the optimization algorithm to dynamically generate configuration[9].

CONCLUSION

Translate cloud application platform for multilingual translation industry in China, gather resources effectively, improve the level and quality of translation, and through the scale effect, reduce the cost of individual make via the Internet, in the form of on-demand, easy extension allow the user to obtain the rich variety and convenient and efficient service[10]. At present, based on the cloud dictionary translation platform, the cloud electronic dictionary technology has been gradually mature and has been applied. For example: Microsoft's bing dictionary and netease youdao dictionary, they use is based on the architecture of the cloud and cloud service mode, synchronous search on the Internet can appear a lot of new words; Can realize the website words and sentences, and the double neutralization in more accurate translation; Can facilitate users to browse the English web site and read 80% of the web

content. But the real high quality translation and carry the best carrier is far from realization, in the true sense of cloud translation platform also need to have a long way to go. Fortunately, in the Internet and cloud computing propelled, hope dawn has emerged, which requires the multilingual computer aided translation, computer support collaborative work, cloud computing, optical recognition, unified communications, the Internet application development and continuous data center and other technical research and development.

REFERENCES

[1] H.Y.Yao, E.Tian; Cloud computing, the era of big data systems engineering, Electronic industry press, Beijing, **(2013)**.
[2] Y. Lu; Crowdsourcing translation mode study, Journal of Shanghai translation, **3**, 74-78 **(2012)**.
[3] Z.H.Yu, Y.H.Wu, J.Deng, J.Wang; Hadoop and XMPP-based translation system and its implementation, Computer and Digital Engineering, **2**, 239-260 **(2014)**.
[4] S.Marstona, Z.Li, S.Bandyopadhyaya, J.H.Zhanga, A.Ghalsasib; "Cloudcomputing - The business perspective", Decision Support Systems, **51**, 176-189 **(2011)**.
[5] S.Snbashini, V.Kavitha; "A survey on security issues in service delivery models of cloud computing", Journal of Network and Computer Applications, **34**, 1-11 **(2011)**.
[6] Y.F.Huang, Q.Yan; "electronic dictionary based on the android platform design and implementation, Computer Application, **31**, 228-231 **(2011)**.
[7] B.Groauer, T.Walloschek, E.Stock; "Understanding Cloudcomputing Vulnerabilitiesa", Security&Privacy, IEEE, **9**, 50-57 **(2011)**,
[8] D.Anastasiou, R.Gupta; Comparison of crowdsourcing translation with machine translation, Journal of Information Science, **37(6)**, 637-659 **(2011)**.
[9] L.Muzii; Cloud Translation, Russia forum **(2011)**.
[10] M.A.Serhani; Enterprise web services-enabled translation framework, Journal of System E-Business Management, **9(4)**, 497-517 **(2010)**.