AN INFORMATION AGENT SYSTEM FOR CLOUD COMPUTING BASED LOCATION TRACKING

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Abstract: This paper proposes the complete information agent system in the cloud computing environment based on a location tracking mechanism using GPS techniques on Android platform. This information agent system is collaborated with a related activity diagram to telecast the exact location the user procures in the cloud computing environment. The ontology which is being supported with the ubiquitous information agent system and its related activity diagram in cloud computing environments has been proposed. The construction of an activity diagram of cloud computing for extensively and seamlessly entering related web information agent systems through modern mobile equipment’s in ubiquitous environments is under our investigation. User makes the query to the main server, in which Cloud Computing Process is executed. This system provides an enhanced experience and is feasible to the user.

Keywords: Ubiquitous Computing; Information Agent systems; GPS; Cloud Computing.

INTRODUCTION

The Information agent systems are software products for assisting the users to reach their goal of information retrieval in accordance to the need. So far however, maximum of Web information agent systems are closely knitted to the traditional information equipment’s that cannot directly apply to the modern mobile equipment’s. This study exactly focused on how to construct a ubiquitous interface agent with the mobile equipment’s in an ubiquitous environments for the location tracking using the GPS (Global positioning System). Ubiquitous computing is a post-desktop model of human-computer interaction in which information processing has been thoroughly integrated into everyday objects and activities. Cloud computing is also integrated into this technique where the cloud is used as an Infrastructure as a Service which is based on developing and utilization of computer technology. Furthermore, the construction of an activity diagram of cloud computing for extensively and seamlessly entering related web information agent systems through modern mobile equipment’s in ubiquitous environments is under our investigation. This paper provides the advantages of simpler accessibility and an enhanced experience to the users.

II. TECHNIQUES FOR DEVELOPING THE SYSTEM

(A) Culture

Culture can also be said as Ontology and it’s a theory in philosophy which primarily aims to explore the knowledge and characteristics of real objects. A complete semantic model can be determined in sharing and reusing the characteristics, thus the ontology plays a vital role in the information system [10].

(B) Ubiquitous Computing

Ubiquitous computing (ubicomp) is a post-desktop model of human-computer interaction in which information processing has been thoroughly integrated into everyday objects and activities. More formally Ubiquitous computing is defined as machines that fit the human
environment instead of forcing humans to enter theirs. Computers will exist in our lives as hidden, popularized, and in ubiquitous ways. Many examples of applications in previous studies [1, 3, 4, 6, and 7] showcase the use of the ubiquitous computing. A future enhancement is always possible in the ubiquitous environment for software system applications. This an influential and significant study related to web information systems.

(C) Cloud Computing

Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a metered service over a network. Cloud computing providers deliver applications via the internet, which are accessed from web browsers and desktop and mobile apps, while the business software and data are stored on servers at a remote location. Google opposed the concept of cloud computing that also start the huge business opportunity of cloud computing, including IaaS (Infrastructure as a Service), PaaS (Platform as a Service), and SaaS (Software as a Service). In this paper, Cloud Computing is used as “Infrastructure as a Service” (IAAS), where the entire server is managed with the Location Information in its database.

(D) Android Location Based Services Application - GPS Location

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather, anywhere on or near the Earth, where there is an unobstructed line of sight to four or more GPS satellites. The advances in technology and new demands on the existing system have now led to efforts to modernize the GPS system and implement the next generation of GPS III satellites and Next Generation Operational Control System (OCX). With the incorporation of GPS (Global Positioning System) devices in Smartphone’s, Location Based Services (LBS) have become pretty hot the past few years [2]. Bluetooth wireless technology is a short-range radio standard that provides new opportunities for wireless devices. A Bluetooth device can support one or more profiles. The four basic profiles are the Generic Access Profile (GAP), the Serial Port Profile (SPP), the Service Discovery Application Profile (SDAP), and the Generic Object Exchange Profile (GOEP) [8]. Android employed the specific Java defined by Google to write programs. When the developers used the Google Map, they need to go through the MD5 code to get API key from the Google authority [5].

![MD5 Code and API Key](image)

Figure 1: MD5 Code and API Key

Registering for a Maps API Key is simple, free, and has two parts:

A. Registering the MD5 fingerprint of the certificate that you will use to sign your application. The Maps registration service then provides you a Maps API Key that is associated with your application’s signer certificate.

B. Adding a reference to the Maps API Key in each Map View, whether declared in XML or instantiated directly from code. You can use the same Maps API Key for any Map View in any Android application, provided that the application is signed with the certificate whose fingerprint you registered with the service.

Because Map View gives you access to Google Maps data, you need to register with the Google Maps service and agree to the applicable Terms of Service before your Map View will be able to obtain data from Google Maps. This will apply
whether you are developing your application on the emulator or preparing your application for deployment to mobile devices.

III. ARCHITECTURE OF THE UBIQUITOUS INFORMATION AGENT SYSTEM

Figure 2 illustrates the architecture of ubiquitous information agent system to satisfy the basic requirements of seamless information services in ubiquitous computing, whose related interaction diagrams contain the following actions: OntoIAS actively provides related local information according to the current position information, the system transforms the specific information requirements entered by users and then triggers OntoIAS to return query information, users directly query OntoIAS to provide commonly used hot information, etc.

When users key in specific information queries, the system divides the user queries into three types of commands for fast processing, including Query, Simple Command, and Conditional Command. We modified FURRL (Formalized User Request Representation Language) [5] to design a CURRL to represent the above user commands [11].

IV. AGENT SYSTEM MODULES

(A) Android Mobile User Registration

In the Location base query system the user has to register to get the connection with the cloud server to determine the GPS information. Without registering a user cannot access the clocking agent. For registered users should give his details such as his name, address, age, sex, etc., once a user register his details he can get useful information from the clocking server. Each user will identify by a unique username and password. Once the registration is being done the clocking server has to move onto the next step of security. Figure 3. The activity diagrams give a detailed explanation of the agent information system and its functioning.

(B) User Authentication and Query Process

This step is carried out to provide a level of security by determining whether a user is an authenticated user or not. If a client want to arise a query first he should be authenticated by the server for this the user has to login by the user
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name and password that was registered in the earlier step, this will provide the user with a query to the server. This query will go to the clocking agent and the clocking agent will send the query to the Cloud server.

(C) User Location Identification

The clocking agent will provide the user location and then it will help in determining whether the user is moving towards a location or moving outwards from the location. The current location obtained using the GPS from the mobile user. The mobile user will be provided with the GPS for getting the longitude & latitude values. These values are obtained via satellite link communication. So once the user sends the query to the Clocking Agent, the Clocking agent will get the exact location of the user via GPS values of the user.

(D) Safe Region Manipulation

Whenever a clocking agent receives a query from the client it will check the query and find the safe region for the client. Safe region is calculated from the exact user location. First we have to fetch the direction of the user. If the direction of the user is towards forward then the clocking agent will calculate the safe region with respect to the main location. For example whenever a user sends a request from Mount Road and the user is moving towards Anna Square, then the Safe region is Anna Square, if the user is moving in the opposite direction then the clocking agent will specify the safe region as Egmore. After finding the safe region the clocking agent will send the request to the Cloud server. The Cloud server will send the result to the safe region and the clocking agent will receive the result from the Cloud server which will then determine the nearest location from the result and forward the location to the client.

(E) Query Request to the Cloud Server

The Clocking agent manipulates the Safe region for the client and the forwards the query to the Cloud server. The Cloud server checks the query and retrieves the results according to the safe region and then sends the result to the clocking agent. If the user has requested for ATM Bank around Mount Road, first the query is sent to the Clocking Agent. Clocking agent will manipulate the safe region as Anna Square, and then the query is forwarded to the Cloud Server.

(F) Retrieval of Results I According To Safe Region and Ontology

Clocking agent will send the query to the Cloud server. The Cloud server manipulates the user query and it will send the results to the clocking server based on the Area and Ontology. The main Cloud will retrieve the results with respect to the nearest place of the user as well as the Ontology Process. Ontology is the study of relativities. Using Ontology Cloud Server can get relevant information’s and that information is also retrieved back to the user. If the query for Bank from the Anna Square as safe Region, then the Cloud Server will find the nearest bank as well as the relative ATM with respect to Anna Square.

(G) Finding the Nearest Location

After getting the query result from the Cloud server, the clocking server will filter the results in accordance to the user exact location. The flow of the information agent system is being shown in the above diagram. The Cloud server will retrieve the bank information or ATM whichever is nearest to the user in accordance to Anna Square to the clocking agent. But the clocking agent knows the user who is present at Mount Road, so the clocking agent will apply KNN (K Nearest Neighbor) Query Algorithm to fetch the nearest ATM or bank in accordance to Mount road. The nearest neighbor algorithm has some strong consistency results. As the amount of data approaches infinity, the algorithm is guaranteed to yield an error rate no worse than twice the Bayes error rate. [9]. So user will be receiving the exact information, as well as providing the requested user’s Location Privacy is still maintained, hence the Cloud server will update in its table as the query is from Anna Square not from Mount Road. By this way we ensure Privacy in the user’s location. The above block diagram shows the flow of the process in which the nearest location can be determined.

At a glance the execution of the ubiquitous information agent system in accordance with the
GPS techniques and related activity diagrams in cloud computing environments are explained with the Android simulator and detailed as following:

1. At the Client end the user will starts the GPS, and then the system can start executing the functions that are required to determine the user authentication.
2. The connecting technology which is used to configure with the system starts the transmitted program and sends the related information of the earlier step in the CURRL format to the cloud computing provider OntoIAS for finishing the pre-process of the cloud computing, including internal message processing with related recording and statistical processes, corresponding decision making.

V. ADVANTAGES OF THE PROPOSED SYSTEM
1. More simpler accessibility.
2. It will provide an enhanced experience.
3. Decision making can be done at a faster rate

VI. CONCLUSION
In this paper, the ontology which is being supported with the ubiquitous information agent system and its related activity diagram in cloud computing environments has been proposed. User makes the query to the main server, in which Cloud Computing Process is executed. Here in this paper, Cloud Computing is used as Infrastructure as a Service (IAAS), where the entire server is managed with the Location Information in its database. As the user makes the query along with his GPS values to find out the Exact Location to the main server, the main server maps the query with its database along with the Location, and then only the results are retrieved back to the user. Ontology is also implemented in this Project for the Relative Key word Search. Assuming User makes a query for Bank, and then the Main Server will retrieve the nearest Location of the Banks as well as some ATMs also. All our Previous will retrieve only the exactly matched Keyword search from the database. But in our System, we also retrieve Closely Associated Keywords which is called as Ontology Process.

We are implementing this in the Android Platform using GPS for Location Finding and Cloud Computing for IAAS Data Process and Ontology for Effective Data Retrieval. There will be everlasting research in the future for the cloud computing techniques such as corresponding experimental verification, continuously improving the performance efficiency, expanding database of ontology and its related linking interface.

References
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