ANDRONIC APPLICATION FOR AGENT BASED URBAN TRANSPORTATION SYSTEM USING CLOUD COMPUTING

1SALEHA ANSARI, 2LOVINA HAJIRAWALA, 3KRISHNALI PAWAR, 4RAJESH KOLTE

1,2,4 Student, UMIT-Mumbai, 3Ass.Prof IT, Department,UMIT-Mumbai
E-mail: 1saleha.ansari27@gmail.com, 2lovinabosc3@gmail.com, 3krishnalipawar@gmail.com, 4raj_kolte@rediffmail.com

Abstract - With the advent of advanced technology and methodology, a user oriented approach can be used as a specification of requirement for the effective management of urban areas. This paper “Android Application for Agent based urban Transportation system” illustrate the use of autonomy, mobility and adaptability of mobile agents to deal with dynamic vehicular traffic over the cloud environment. Cloud computing can help such system to cope with large amount of storage and computing resources required to use traffic strategy agents and mass transport data effectively. This paper also reviews the history of the development of traffic control and management system within the evolving computing paradigm and shows the state of traffic control and management system based on mobile multiagent technology.

Keywords- Adapts, ATS, MA, multiagent, PtMS.

I. INTRODUCTION

In today’s 21st century, India’s transportation system is the most heavily used with one of the largest road networks in the world. With increased transport comes traffic congestion and pollution. The traffic congestion and pollution plays a very important role from the death rates to the economic costs. In early 1992, agent technology was used in traffic management system but was later replaced by multiagent traffic management system [1]. However, all these systems focus on negotiation and collaboration between static agent for coordination and optimization. In 2004, the mobile agent technology. In 2004, mobile agent technology began to attract the attention of the transport field. The characteristics of the mobile agent include autonomy, personality, communication, mobility, high performance and fault tolerance. These characteristics make them suitable to handle the uncertainties and inconstant states in a dynamic environment [2]. In this paper, the mobile agent is a program or a person owned by a government or an authorized body that would be present on all the prime locations and would update about the traffic to the users through an android application. In mobile agents where the agent moves through the network to reach control devices and implement appropriate strategies in either autonomous or passive modes when faced with different requirements of dynamic traffic sense, a multiagent system taking advantage of mobile agents will perform better than any static agent system.

II. LITERATURE SURVEY

A. History of Traffic Control and Management Systems

When an IBM 650 computer was first introduced to an urban traffic-management system in 1959, the control and management system in 1959, the traffic control and management paradigm closely aligned with the computing paradigm in IT science [3]. This paradigm has five distinct phases that mirror the five stages in the deployment of the traffic control and management paradigm. The history of computers commences with its first phase where computers were huge and costly, so mainframes were usually shared by many terminals. In 1960s, a whole traffic management system always shared the resources of one computer in a centralized model. Thanks to the large-scale integrated (LSI) circuits and the miniaturization of computer technology, the IT industry welcomed the second transformation in computing paradigm. At this point, a microcomputer was powerful enough to handle a single user’s computing requirements. At the time, the same technology led to the appearance of the traffic signal controller (TSC). Each TSC has enough independent computing and storage capacity to control one intersection. During this period, researchers optimized the control modes and parameters of TSC offline to improve control. Traffic management systems in this phase, such as TRANSYT, consisted of numerous single control points. In phase three, local area networks (LAN) appeared to enable resource sharing and handle increasingly complex requirements. One such LAN, the Ethernet, was invented in 1973 and has been widely used since. During the same period, urban-traffic-management systems took advantage of LAN technology to develop into a hierarchical model. Network communication enabled the layers to handle their own duties while cooperating with one another. In recent years, the research and applications of parallel transportation management systems (PtMS), which consist of artificial systems, computational experiments, and parallel execution, has become a hotspot in the traffic research field [3]-[8]. Here, the term parallel describes the parallel interactions between actual transportation systems and one or more of its corresponding artificial or virtual counter parts [4]. Such complex systems make it difficult or
even impossible to build accurate models and perform experiments, so PtMSs use Artificial Transportation System (ATS) to compensate for this defect. Moreover, cloud computing caters to the idea of “local simple, remote complex” in parallel traffic system. Such systems can take advantage of cloud computing to organize computing experiments, test the performance of different traffic strategies, and so on. Thus, only the optimum traffic strategies will be used in urban traffic control and management systems. This helps enhance agent were proposed to handle this vexing problem. Only requiring a run time environment, mobile agents can run computations near data to improve performance by reducing communication time and costs.

This computing paradigm soon drew much attention in the transportation of urban traffic management systems performance and minimizes the system’s hardware requirements to accelerate the popularization of parallel traffic systems.

B. Modules in the existing systems

a. Agent-Based Traffic Management Systems:

Agent technology was used in traffic management system as early as 1992, while multiagent traffic management systems were presented later. However, all these systems focus on negotiation and collaboration between static agents for coordination and optimization [6]-[5]. Urban Traffic Cloud system (UTC) based on Agent technology that is able to adapt and respond to traffic conditions in real-time and still maintains its integrity and stability within the overall transportation system and in the meantime gets a system that makes better use of the capacity of intersections.

UTMS using intelligent traffic clouds have overcome the issue we’ve described. With the support of cloud computing technologies, it will go far beyond than any other multi agent system scalability, an appropriate agent management scheme, reducing the upfront investment and risk for users, and minimizing the total cost of ownership. Cloud computing provides on demand computing capacity to individuals and business in the form of heterogeneous and autonomous services [5]-[7].

With cloud computing users do not need to understand the details of the infrastructure in the “clouds,” they need only know what resources they need and how to obtain appropriate services which shields the computational complexity of providing the required services [15]. ADAPTS, Adaptive Platform for Transportation systems [4] during its runtime need to send the agent-distribution map and the relevant agents to artificial transportation systems (ATS) for experimental evaluation, which increases with the number of intersections [10].

Currently, Adapts is part of PtMS, which can take advantage of mobile traffic strategy agents to manage a road map. The organization layer, which is the core of our system, has four functions: Agent oriented task decomposition, agent scheduling encapsulating traffic strategy and agent management. The organization layer consist of a management agent (MA), three database (control strategy, typical traffic scenes, and traffic strategy agent), and an artificial transportation system. As one traffic strategy has been proposed, the strategy code is saved in the traffic strategy database. Then, according to the agent’s prototype, the traffic strategy will be encapsulated into a traffic strategy agent that is saved in the traffic strategy agent database. Also, the traffic strategy agent will be tested by the typical traffic scenes to review its performance. Typical traffic scenes, which are stored in a typical intersection database, can determine the performance of various agents. With the support of the three databases, the MA embodies the organization layer’s intelligence.

b. Intelligent Traffic Cloud

With the development of intelligent traffic clouds [11], numerous traffic management systems clouds’ infinite capability, thus saving resources. Moreover, new traffic strategies can be transformed into mobile agents so such systems can continuously improve with the development of transportation science.
c. Traffic-Strategy agent Module
The more typical traffic scenes used to test a traffic-strategy agent, the more detailed the learning about the advantages and disadvantages of different traffic strategy agents will be. In this case, the initial agent-distribution map will be more accurate [12]. To achieve this superior performance, however, testing a large amount of typical traffic senses requires enormous computing resources. Researchers have developed many traffic strategies based on AI [13]. Some of them such as neural networks consume a lot of computing resources for training in order to achieve satisfactorily performance [5]. However, if a strategy trains on actuator, the actuator’s limited computing power and inconstant traffic scene will damage the performance of the traffic AI agent. As a result, the whole system’s performance will deteriorate. If the traffic AI agent is trained before moving it to the actuator, however, it can better serve the traffic management system.

d. Intelligent Traffic Cloud storage
Urban traffic management systems using intelligent traffic clouds to overcome the issues we’ve described so far. With the support of cloud computing technologies, it will go far beyond other multi agent traffic management systems, addressing issues such as infinite system scalability, appropriate agent management scheme, reducing the upfront investment and risk for users, and minimizing the total cost of ownership [14]. There are some existing applications available in the android market. One of them is Traffic Road Alerts Traffline. Traffic road Alert Traffline is a feature on Google maps which displays the traffic conditions in real time on major roads and highways. It can be viewed using Google maps applications on a handheld device. It works by analyzing the GPS determine locations transmitted to them by a large number of cell phones users. By calculating the speed of users along a stretch of road. It’s also able to generate a live traffic map. This application requires high speed internet connection which is generally impossible in some remote areas. Also requirement of 3G connection is necessary.

III. CHALLENGES
The following are some of the notable challenges associated with cloud computing [9], and although some of these may cause a slow down when delivering more services in the cloud. Most also can provide opportunities if resolved with due care and attention in the planning stages

a. Security and privacy
These issues are generally attributed to slowing the deployment of cloud services. These challenges can be addressed for example by storing the information internal to the organization, but allowing it to be used in the cloud.

b. Lack of standards
Clouds have documented interfaces; however no standards are associated with these. And the Open Cloud Consortium is working on Cloud computing standards and practices. The findings of these groups will need to mature, but it is not known whether they will address the needs of the people, deploying the services and the specific interfaces theses services need.

c. Continuously Evolving:
User requirements are continuously evolving, as are the requirements for interfaces, networking and storage. This means that a cloud, specially a public one, does not remain static and is also continuously evolving.

IV. PROPOSED SYSTEM
This android application would be working on cloud. The architecture can be divided into three modules. As per the characteristics of the agents, described earlier, here, agents are location-based. They can be also termed as dynamic agents. These dynamic agents are supposed to update the traffic status through the android application to the end users. These agents can be any authorized or government body.

The commuters (end users) must be authorized. The next is the Traffic Strategic manager, which is a remote based application in the cloud. The manager is supposed to handle the agents. It also has the authority to add and delete agents from the cloud environment. It has the responsibility to authenticate the agents and the users. It also maintains the multiple kinds of database for storing various traffic strategies.

V. RESULTS
The following are the snapshots of our android application:

![Fig (a). Agent side application-login page](image-url)
Fig (b). Agent updates the traffic status.

Fig (c). Users’ side application: login page

Fig (d). User gets the traffic updates

CONCLUSION

In this system, we have developed an android application for the agent based urban transportation system which would update the users regarding the traffic updates through agents using cloud computing. Here, the approach for the agents is different. The agent is an application or a person owned by an authorized or a government body which would update the traffic status. It can be termed as a dynamic agent system which would be much effective with different requirements of dynamic traffic senses.

FUTURE SCOPE

This system can be made more advanced by incorporating many new features like information regarding the toll charges, providing customer support centre (toll free numbers), information about parking spots in and around the destination area, and providing details about nearby visiting places like hotels, multiplexes, religious places and others.

REFERENCES


