Building an Intelligent Traffic Clouds Technology in Urban Traffic Sector

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***Abstract*-Transport issues such as mobility, accessibility and increased traffic congestion are acknowledged problems in many cities which is making every one to think quick changes in traffic process and procedures. This paper titled " Building an Intelligent Traffic Clouds Technology in Urban Traffic Sector " offers a user oriented approach to substantially increase the road throughput and improve its performance and also evaluates the history of progress of a traffic control and managing a system within the evolving computing paradigm and also shows the state of a traffic control and management systems based on the mobile multi agent technology. Here Intelligent Transportation clouds technology could provide services such as mobility, autonomy, decision support and a standard development environment for traffic stratergies[1]. Although with mobile agent technology, an urban traffic management system will be dependent on an Agent-Based Distributed and Adaptive Platforms for Transportation Systems(Adapts) is both realistic and effective. Use of large scale mobile agents will leads to an appearance of a complex, powerful organization which require large computing and power resources[1]. To handle such a problem we propose a framework urban traffic management system using an Intelligent Traffic Clouds.**

Keywords—Intelligent transportation ,Agents, Mobile agents

1.INTRODUCTION

Urbanization has been one of the dominant present-day processes cos of the growing share of a global population lives in urban cities. Urban transportation issues are of primary importance to support the passengers and mobility requirements in a large urban assemblage. It plays a crucial role in the development of the urban cities. Creation of IT jobs in Bangalore has increased the automobile ownership from 2.5 million to 3.55 million signifying a 12.2% increase annually from the year 2003 to 2008.Due to rise of traffic snarl-up a number of vehicles which will be blocking one another until they can scarcely move and pollution associated with it pushing/making every one to think about changes in traffic management. IBM introduces an urban traffic management system in the year 1956. Cloud computing control the traffic allocation process and provides an optimal solution with five stages. During the initial stage, computers were being large and were expensive, so mainframes were usually being shared by many terminals and it also welcomes the second transformation in computing paradigm and here microcomputer was being powerful enough to handle a single user's computing requirements. In the third phase, local area networks (lans) appeared to allow resource allocation and manage the growingly complicated demands. One of the such lan is ethernet, which was been invented in 1973 and has been widely used. In the following internet age, users able to recover data from an remote sites and can process them locally, but this actually wasted a lot of valuable network bandwidth. Agent-based computing and mobile agents were put forward to manage this annoying issue. Mobile agents can run computations near data to improve performance by decreasing communication time and costs. Currently, the IT industry has showed in the fifth computing paradigm that is cloud computing. Cloud computing provides an demand computing capacity either to an individual or to a businesses in the form of heterogeneous and autonomous services

1.2 Agent-Based Traffic Management System

Urban Traffic Control system (UTC) is based on agent technology which are a specialist form of traffic management which can integrate and co-ordinate traffic control over a broad area in order to control the traffic on a road network. UTMS is more of a open approach to Intelligent Transport Systems to overcome the issues we've described. With the help of cloud computing technology, we can go beyond the multi agent traffic management systems, approaching issue like infinite system scalability, an agent management plan, decreasing the advance investment and also risk for users, and minimise the total cost of ownership. Cloud computing can also provide on demand computing capacity either to an individual or business in the form of heterogeneous and independent services and also users need not believe the feature of the infrastructure in the "clouds" they just need to know what resources they require and how to obtain an appropriate service. The main purpose

of the system is that it can autonomously can adapt to changing environments.

2. RELATED WORK

Agent-based distributed and adaptive platform for transportation systems (adapts) is one of the prior agent-based systems which is being positioned for real-world UTC. In the adapts platform, an UTC system is being divided into three levels: organization, coordination and execution. Here we need to send the agent-distribution map and relevant agents to ATS for experimental evaluation, so we can test the cost of operation during the runtime of Adapts. Here both running load and communication volume increases with the number of intersections. When the time to complete the experimental evaluation exceeds a certain threshold, experimental results become pointless and futile. As a result, the carry capacity for experimental evaluation of one PC is been limited. In our test, we used a 1.66-GHz PC with a 2-Gbyte memory to run both ATS and Adapts. The number of intersections we tested increased to maximum 24. When the number of traffic-control agents is 40, the experiment takes 2,260 seconds. If we set the time threshold to 1200 seconds, the maximum number of intersections in one experiment is only 24.But this is insufficient to handle model major urban areas such as Bangalore where there as many as 106 intersections in Central Bangalore. So we need various PCs or a high performance server to handle the experimental scale of several hundreds of intersections[1].

2.1 Existing System

The function of the agents' scheduling and agent-oriented task decomposition will be based on the MA's knowledge base, which actually consist of the performance of different agent in various traffic scenes. If an urban management system cannot handle a transportation scene with its existing agents, it will be sending a traffic task to the organization layer for assist. So the traffic task will be contain details about the condition of urban transportation, so a traffic task can be disintegrated to a combination of several typical traffic scenes. With having the information about the most appropriate traffic strategy agent to be handling with any typical traffic scene, then the organization layer collects the traffic task, the MA would be returning a union of agents and there will be a map about the spread of agents to explain it.

Disadvantages:

a.)Complex systems makes it difficult.

b.)Its even impossible to build precise models and conduct experiments.

2.2 Proposed system

Agent-based computing and mobile agents were been offered to control this irritating problem. We need a runtime environment, mobile agents which can run calculations near data for better performance by minimizing communication time and costs. This kind of computing model soon drew much notice in the transportation field. From the multi agent systems and agent structure to the ways of compromising between agents to control agent strategies, all these fields have had changing degrees of success.

Advantages:

a.)The strategy agent to supervise a road map.

b.)The initial agent-distribution map will be more precise.

By the proposed system we can improve the performance to generate, store, manage, test, optimize and conveniently use a large number of mobile agents. Besides, we need a decision-support system to communicate with traffic managers. A inclusive, powerful decision- support system with a friendly human-computer interface is an certain trend in the development of an urban-traffic management systems which require huge amount of data about the state of urban transport. Here the future systems must have the following capabilities. Computing Power must be able to testing a large amount of typical traffic scenes requires lot of computing resources. If a traffic strategy trains on an actuator, it will damage the performance of the traffic AI agent hence its better to train AI agent before moving it to the actuator. Storage where vast amount of traffic data like arrangement of traffic scenes, rules and information about agents in ATS need vast amount of storage. Two solutions can fulfill this requirements:

a.) Implement a super computer with all centers of urban traffic management systems

b.) We can use cloud computing technologies.

For eg: Google's Map-Reduce, IBM's Blue Cloud and Amazon's EC2 [1]

Building an Intelligent Traffic Clouds Technology in Urban Traffic Sector have overcome the issues we have described. With support of Cloud Computing technology we can surpass other multi agent traffic management systems Intelligent traffic Clouds Technology in Urban Traffic Sector has two roles: Service Provider and Customer. Service Providers generally include ATS, traffic strategy database and traffic strategy agent database. They are all in system's core intelligent traffic clouds and Customers

include urban-traffic management systems and traffic participants which exist outside the clouds. They could also give traffic-strategy agents and agent-distribution maps to the traffic management systems and numerous traffic management systems could connect and share cloud thereby we can save the resources and by this new strategies can be converted to mobile agents

3. MODULES OF PROPOSED SYSTEM

a) Agent-Based Traffic Management Systems

b) Intelligent traffic Module

c) Traffic-strategy agent Module

d) Intelligent Traffic Clouds Storage

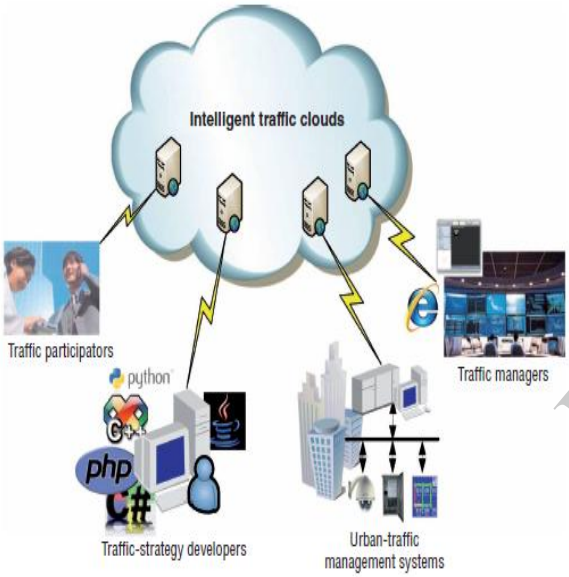

Fig 1. Overview of urban-traffic management systems based on cloud computing.

I. AGENT-BASED TRAFFIC MANAGEMENT SYSTEMS

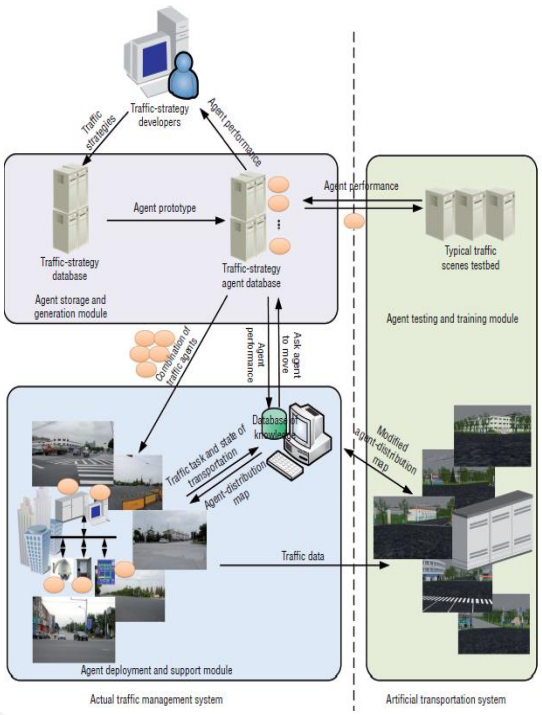

Figure 2. Shows managing the agent architecture

In the Intelligent traffic clouds will be having four architecture layers: Application, Platform, Unified Source, Fabric. In the application Layer it will contain all applications that run in the clouds. It will give assistance to the application such as agent generation, agent management, agent testing, agent optimization, agent oriented task decomposition, and traffic decision support[2]. Here in the organization layer which consist of a management agent (MA), three databases (control strategy, typical traffic scenes, and traffic strategy agent), and an artificial transportation system(ATS). As one traffic strategy has been put forward, the strategy code would be retained in the traffic strategy database. Then, corresponding to the agent's prototype, the traffic strategy would be enclosed into an traffic strategy agent that will be retained in the traffic strategy agent database[2]. Also, the traffic strategy agent will be tested by the typical traffic scenes to examine its performance and typical traffic scenes, which are retained in a typical intersections database, can ascertain the performance of various agents. With the support of the three databases, the MA incorporate the organization layer's intelligence.

II. INTELLIGENT TRAFFIC MODULE

With the building of an intelligent traffic clouds, many traffic management systems could connect and share the clouds unlimited capability, and thus we can save resources[3]. Besides, new traffic strategies can be changed into mobile agents so such system can constantly get better with the progress of transportation science.

III. TRAFFIC-STRATEGY AGENT MODULE

The more representative traffic scenes which is used to test a traffic-strategy agent, the more inclusive is the study about the advantages and disadvantages of dissimilar traffic strategy agents will be. In this case, if the existing agent-distribution map will be more precise[4] and then we can achieve a superior performance, regardless we will be testing a large amount of typical traffic scenes which requires an extensive computing resources. Here researchers have been developed numerous traffic strategies which is based on AI and some of them such as neural networks utilize a plenty of computing resources for training in order to attain a satisfactory performance. Nevertheless, if a traffic strategy trains on an actuator, the actuator's restricted computing power and variable traffic scene will in turn damage the performance of the traffic AI agent. As an effect of this , the entire system's performance will worsen. Hence if the traffic AI agent is been trained before moving it to an actuator, then it can better serve the traffic management system.

IV. INTELLIGENT TRAFFIC CLOUDS STORAGE:

Here we put forward the Intelligent Traffic Clouds Technology in Urban Traffic Sector which will deal with the issues we've described so far. By the support of cloud computing technologies, we can go far beyond any other multi agent traffic management systems, by addressing issues such as infinite system scalability and an suitable agent management scheme, also decreasing the advance investment and risk for users, and there by we can minimize the total cost of ownership.

4.CONCLUSION

Building an Intelligent Traffic Clouds Technology in Urban Traffic Sector is based on cloud computing. The intelligent traffic clouds will be providing a traffic strategy agents and an agent-distribution maps to a traffic management systems, traffic-strategy performance to the traffic-strategy developer, and the state of an urban traffic transportation and the consequence of a traffic decisions to the traffic managers. We could also deal with different customers appeal for services such as an storage service for traffic data and strategies, mobile traffic-strategy agents, and so on. Hence with the progress of intelligent traffic clouds, traffic management systems we could connect and share the clouds unlimited capacity, thus we can save the resources.

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