

Research Paper

Computer Science

A Survey of New Application Development And Resource Allocation Paradigm By Mobile Agents

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ABSTRACT

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Abstract - Mobile agents system appeared to have limited resources however by proper resource allocation with the rise in high bandwith and low accessing cost this myth was vanishing over the years. The growth of Internet, storage capacity, network bandwith, processor performance have led to the development of small devices and hence increase in the tasks. A number of application development which help to assist the task has been discussed in this paper. A growing need of Mobile Agent System which help in numerous tasks like booking tickets, automation in checking groceries list, turning on music and lights has grown over a period of time. It has been found by the study that the topology of mobile agents varies with time. The change in topology depends on the state of set of agents that are within certain locality. This paper deals with the allocation of resources which has been done previously to deal with smooth working of agent systems.

KEYWORDS : Mobile systems, resource allocation, dynamic control, topology

I INTRODUCTION

The concept of Mobile agents comes from migration of code and data as a small programs from one system to the other throughout the network . The agent will do it faster and probably better. Many of these applications using mobile agents run on systems with limited resources. It can migrate through the network from one computer to another along with the code, data and execution context .As progresses in computing technology have expanded the usage of computers from desktops and mainframes to a wide range of mobile and embedded applications therefore it is not necessary for the user to remain stuck to the computer. It is considered that the topology of control interconnections is fixed and not variant with time . There are study showing that it can be achieved in dynamic topology. When distance is maintained in interactions of dynamic agent it can help in avoidance of collision. Another factor avoiding interactions is by using switching as the control laws. A Software Agent is a software entity that continuously performs tasks given by a user within a particular and restricted environment. A software agent can be a simple program, a software component or a simple object. However, a true software agent must be interpreted in a more general concept in which a software object is passive and agents are active. [1]

Some of the definitions of software agent has been deabatable for years and a common understanding of software entity has been established . Some of these features are

- 1) Autonomy The tasks by agents are received by the user.
- 2) Reactivity The agents interact with sensors .

3) ProReactivity- The agents can show reaction to stimuli related to environment.

4) Social Behaviour - Common features for a software agent to qualify as an agent.

The Resource allocation provides solution to mobile systems by migration of computation to more resourceful computers .This provides a difference from traditional client server computing

A great amount of research has been performed on resource allocation. The difference between computation offloading and grid computing is with migration of programs, first transfers programs to servers outside of the users and the second deals with process migration from one computer to another within the same computing environment.

Allocation of Resources required access to resourceful computers through networks. To protect different programs and data the servers may use virtualization to provide offloading services. The development of infrastructures Java RML, NET remoting, and RPC (remote procedure call) are several mechanisms which allow resource allocation at the class and object level.

The mobile processes allow the mobile agents in capturing the virtual machine being used. This idea got derived from the area of the distributed systems. A process can move to other computers to create a allocation of resources of the distributed system.



Figure 1 - Mobile agent migration through heterogeneous networks [12].

II. Application Development of Mobile Agents

Many mobile agents platform are available like Aglets, Voyager, Grasshopper, Tryllian, JADE, Tracy, and SPRINGS.

This section deals with some of the mobile agent platforms . As per their characteristics some of the platforms are TCL - the first framework that can be considered as a mobile agent platform, Aglets - the most known of the mobile agent platforms , JADE- a newer and popular platform with an active community, Tracy - platform that considers the publication of the most recent book on mobile agents [10], and SPRINGS -a recently developed and maintained platform mainly used for academic purposes.

TCL

It is a scripting language which can run in standard hardware . It can support multiple languages .It offers fault tolerance and security through standard mechanisms. It can be used in other applications because of its simplicity.

Aalets

Probably Aglets is the most popular mobile agent platform developed so far. The significance of AGLETS platform has been significant in the field of mobile agents. This platform was widely used before, later on an many more platform came into existence. The concept of dynamism has been introduced in the recent concept .

JADE

It is a mobile agent platform developed by Telecom Italia . It offers a number of tools to monitor agents. The advantage of this software is in can be integrated with other. It is used for delaration of rules to be used in integration of software , hence it is also called rule enaine.

Tracy

This platform was developed in Germany. It allows a number of plugins to be added which allows to add more features. It does not support remote communications. It allows migration of agent from one platform to the other. The remote communication is not offered by this platform as such it can not be useful in agent migration.

SPRINGS

SPRINGS is a mobile agent platform. This platform scores high in terms of reliability and scalability. It allows transparency of location whenever it moves. It tries to mitigate the problem of locking when movement of agents is very frequent.

Windows Speech Recognition

This is developed by Microsoft. It results in the Speech API. It allows user to interact via voice commands which tries to speech the tasks to text and text to speech with the most accuracy possible. It not only supports the voice commands but also allows the user to interact with other programs.

Microsoft enhances the functionality of voice recognitions It is possible to convert the speech by the computer and the speech is converted to text. This might help people who have some degree of disability.

Google Speech Recognition

This technology was brought by Google. It supports the base Android ,many more services, API's are used. This helped in the growth of software .It considered number of libraries and Google is always supporting it from the front.

CMUSphinx4

This is a speech recognition system developed by Carnegie Mellon University .CMUSphinx is also known as only Sphinx. It is a speech recognition system. It was made open source in 2000. CMUSphinx4 inspired its development from Sun Microsystems laboratories, Mitsubishi Electric Research Labs, and Hewlett-Packard's Cambridge Research Lab.

Works with Voice Recognition and Synthesizer

Developers have always eyed on the area of voice recognition and synthesizer. It is an area of research that has gained publicity recently. It tries interaction with voice commands which includes a number of software and libraries. It requires Internet connections and some remote engines for conversion of the voice to text and vice-versa.

Nowadays with the increase in number of smartphones and tablets, the interaction with the devices using voice has been a major concern. Hence a focus of development which lead to the development of new software and libraries. These features make voice recognition libraries work as little personal assistants and some of them are widely known by the users.

Some of them are SIRI from Apple, Google Now from Google and Cortina from Microsoft.

SIRI

Siri is a software application which works as a personal assistant .lt allows the user to ask questions .Then SIRI will answer or tasks will be performed by SIRI.

Google Now

Google Now is a software application .It works as a personal assistant. It tries to listen to the natural voice of user .It the answers the questions and tasks offered by user request. This application came into existence from Google Voice Search. It tries to keep alive the voice recognition capability.

Cortana

It is a software developed by Microsoft.. It has the capability of synthesizing natural voice and recognizing it.

III. Resource Allocation

There are N agents moving on the plane . An undirected graph consists of a vertex set I and an edge set E, where an edge is an unordered pair with the number of vertices. If x, y ϵ v the objective of control is to generate coordinated motion in one direction using number of control action.

The control objective is to generate coordinated motion in the same direction with constant pairwise distances using local, decentralized control action.

$$u_i = a_i + \alpha_i$$
. (3)



Fig. 2. Control forces acting on Agent [11]

The graph which is undirected contains vertex set v and an edge set e. Here an edge is an unordered pair of distinct vertices in graph. If x, y ε V, and (x, y) ε V, then x and y are said to be adjacent, or neighbors and we denote this by writing x y. A path of length r from vertex x to vertex y is a sequence of r +1 distinct vertices starting with x and ending with y such that consecutive vertices are adjacent. If there is a path between any two vertices of a graph , then the graph is said to be connected. The graph B is oriented as the assignment of a direction to each edge. Thus the edge (i, j) is now an arc from vertex i to vertex j. We denote by B the graph B with orientation U. The incidence matrix B(B") of an oriented graph B" is the matrix whose rows and columns are indexed by the vertices and edges of B respectively, such that the i, j entry of (Q) is equal to 1 if the edge j is incoming to vertex i, -1 if edge j is outcoming from vertex i, and 0 otherwise.

The symmetric matrix defined as:

 $L(G) = B(B^{\circ})B(B^{\circ})T$ [9,12,14] is called the Laplacian of G . It is independent of the choice of orientation U. It is known that the Laplacian matrix captures many topological properties of the graph. Among those, is the fact that L is always positive semi definite It has zero as a single eigen value whenever the graph is connected. The associated eigen-vector is the n-dimensional vector of ones 1. The second largest eigenvalue A1 tries to convey a lot of information about the structure of the graph. It also provides s connectivity and so it is also known as "algebraic connectivity"[8,12] The problem is to determine the input components so that the group exhibits a stable, collision free flocking motion. This is being understood technically a convergence property on the agent velocity vectors and their relative distances[3,9,6]. Here a realization of the control law tries to achieve the control objective. The movement policy of each agent is based only on local state information from its nearest neighbors.

IV. Conclusion and Further Work

A continuous work for application development of mobile agents is a need of time to meet various objective like initiation of sensors. The resource allocation should be taken care of to meet efficiency of the agent system. Moreover implementation of such mobile agents with lower cost is need of time.

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