

## DEVELOPING A MULTIAGENT SYSTEM FOR ASSISTING CITIZENS

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### Abstract

We present a multi agent system aiming at assisting citizens in the current e-government scenario characterized by a huge amount of heterogeneous services that makes it difficult to quickly answer citizen queries. We show that the adoption of intelligent agent technology makes our system capable of helping a citizen in his search of services in such a way as to satisfy his interests and to face his needs. Moreover, this technology ensures a high level of pro-activity because it can identify services potentially relevant to a citizen even though he has never required them explicitly. Finally, it can enhance citizen participation to decisional processes because it can encourage citizens to form communities who can debate in such a way as to propose the activation of new services of interest to them. An intelligent agent is a computer system capable of flexible action in some environment. Pro-activeness is generating and attempting goals not solely by events and also taking initiative recognizing opportunities. Multi-agent system aiming at assisting citizens in their access to services delivered by heterogeneous agencies. Communities are set up on the basis of shared interests/needs of their members rather than on demographic data. Our system with a knowledge discovery process like Hierarchical clustering algorithm.

### 1. Introduction

Our The TERM “e-government” indicates the exploitation of information and communication technology (ICT) in order to both simplify and improve the interaction between citizens and government agencies. In the last few years, both local and national governments worldwide have begun and encouraged e-government programs. These initiatives have been generally appreciated, and several studies point out that many citizens and businesses are increasingly requiring online services to their governments. The current usage of e-government systems is just a prelude for a wider and more

radical change of the citizen–public administration relationships.

In this scenario, two particularly challenging issues are: the provision of highly personalized services and the need of revitalizing democratic processes by strengthening citizen participation to decisional processes. As for the former issue, we observe that government agencies handle a large variety of services encoded in different formats. The heterogeneity of service representation is a particularly relevant problem because each government agency is usually the only responsible of its own services and can individually choose a specific format to both represent and handle information about them. At the same time, in order to submit their queries, citizens need friendly and transparent tools, capable of masking service heterogeneity and localization. These two requirements are often conflicting, and consequently, a suitable tradeoff must be found in order to ensure the real usability of an e-government system. As a further difficulty to face, an e-government system should provide citizens with tools allowing a quick choice of interesting services and a rapid access to them. As a matter of fact, currently, citizens are beginning to experience difficulties in locating and accessing services capable of satisfying their needs; in fact, they should manually formulate their requests, contact, and query a large number of agencies in order to retrieve and combine services of interest to them.

We call this activity Brute Force search or, briefly, BF search. BF search could lead to network congestion since each citizen could interact with a large number of government agencies, and consequently, he could exchange a large number of messages over the network, and this could cause a high traffic volume. In

addition, this form of search is often characterized by scarcely accurate and incomplete results. In fact, a network of government agencies' sites is a complex and rapidly evolving system, since the corresponding contents are continuously updated; in this scenario, the presence of domain-expert users is uncommon, since user knowledge about information distribution is quickly out-of-date.

## **2. Preliminaries**

### **2.1.AGENTS**

The term 'agent', or software agent, has found its way into a number of technologies and has been widely used, for example, in artificial intelligence, databases, operating systems and computer networks literature. Although there is no single definition of an agent, all definitions agree that an agent is essentially a special software component that has autonomy that provides an interoperable interface to an arbitrary system and/or behaves like a human agent, working for some clients in pursuit of its own agenda.

Even if an agent system can be based on a solitary agent working within an environment and if necessary interacting with its users, usually they consist of multiple agents. These multi-agent systems (MAS) can model complex systems and introduce the possibility of agents having common or conflicting goals.

These agents may interact with each other both indirectly (by acting on the environment) or directly (via communication and negotiation). Agents may decide to cooperate for mutual benefit or may compete to serve their own interests. Therefore, an agent is autonomous, because it operates without the direct intervention of humans or others and has control over its actions and internal state. An agent is social, because it cooperates with humans or other agents in order to achieve its tasks. An agent is reactive, because it perceives its environment and responds in a timely fashion to changes that occur in the environment. And an agent is proactive, because it does not simply act in response to its environment but is able to exhibit goal-directed behavior taking initiative. Moreover, if necessary an agent can be mobile, with the ability to travel between different nodes in a computer network. It can be truthful, providing the certainty that it will not deliberately communicate false information.

## **3. Literature Review**

### **3.1.Introduction To The Special Issue On Digital Government**

This paper aims at studying the exploitation of the Intelligent Agent technology for supporting citizens in their access to e-government services. It appears particularly suited in the present e-government scenario characterized by a huge amount of heterogeneous data and services, delivered by government agencies, that makes difficult to quickly answer citizen queries. In this paper we show that the exploitation of the Intelligent Agent technology facilitates the search of information on government data sources in such a way to completely and precisely satisfy citizen queries. Our system creates and maintains suitable profiles of involved users, representing their preferences and exigencies; in addition, it adopts suitable algorithms that exploit information stored in citizen profiles for producing recommendations.

### **3.2.A Personalized Queries Under A Generalized Preference**

Query personalization is the process of dynamically enhancing a query with related user preferences stored in a user profile with the aim of providing personalized answers. The underlying idea is that different users may find different things relevant to a search due to different preferences. Essential ingredients of query personalization are: (a) a model for representing and storing preferences in user profiles, and (b) algorithms for the generation of personalized answers using stored preferences. Modeling the plethora of preference types is a challenge. In this paper, we present a preference model that combines expressivity and concision. In addition, we provide efficient algorithms for the selection of preferences related to a query, and an algorithm for the progressive generation of personalized results, which are ranked based on user interest. Several classes of ranking functions are provided for this purpose. We present results of experiments both synthetic and with real users (a) demonstrating the efficiency of our algorithms, (b) showing the benefits of query personalization, and (c) providing insight as to the appropriateness of the proposed ranking functions.

### 3.3. An Ambient Intelligence Application Integrating Agent And Service-Oriented Technologies

In this paper they propose a methodology for integrating a FIPA-complaint agent platform with the OSGi service oriented framework for certain aspect. Agent based system that is related to the integration of ambient intelligence in personal travel assistance and focus in showing how we integrate an agent platform complaint to the FIPA standard.

### 3.4. Developing Jade-Based Multi-Agent E-Commerce Environment:

This paper they created 2 agents and they made interaction between two agents. They focused only on price negotiation. They used jade for creating the agents and FIPA standard where used communication purpose. Quality and speed has to be improved between agents.

### 3.5. Formal Architectural Model For Logical Agent Mobility:

This paper proposes a two-layer approach for the formal modeling of logical agent mobility (LAM) using predicate/transition (PrT) nets. We view a mobile agent system as a set of agent spaces and agents could migrate from one space to another .They use a system net, agent nets, and a connector net to model the environment, agents, and the connector, respectively. In particular, agent nets are packed up as parts of tokens in system nets, so that agent transfer and location change are naturally captured by transition firing (token game) in Petri nets. In this paper there are several nonfunctional strengths. It is worth investigating how to enhance LAM to formally model nonfunctional properties, particularly high performance.

### 3.6. Development And Specification Of Reference Model For Agent-Based Systems

This paper provides an overview of a reference model for agent-based systems. The agent systems reference model is the result of the multiyear effort studying software systems built with agents and software frameworks for implementing these systems. This paper introduced the ASRM [1] and provides a set f detailed examples of how the ASRM can be used to better understand and to integrate agent-based systems. Completely compatible with FIPA, the ASRM enables developers to map FIPA and other standards are best used in the context of a large heterogeneous agent-based

system. Need to used some advance technology to improve the learner quality.

## 4. Existing System

Heterogeneity of service representation. Difficulties in locating and accessing services capable of satisfying user needs. Brute Force search - manually formulate their requests, contact, and query a large number of agencies in order to retrieve and combine services of interest to them. Network congestion since each citizen could interact with a large number of government agencies, and consequently exchange large number of messages.

## 5. Proposed System

A hierarchical clustering algorithm can be fruitfully exploited to improve the quality of citizen community management. The output of this algorithm would be a tree-like data structure whose nodes represent potential citizen communities. This data structure would allow specialization/generalization relationships among communities to be handled; in fact, nodes placed at the top of the hierarchy would represent wide communities of loosely linked citizens (e.g., the community of students), whereas nodes at the bottom would be associated with narrow communities of tightly linked citizens (e.g., the community of working students). This hierarchical community organization could be extremely useful in the proactive suggestion of services, carried out by our system.

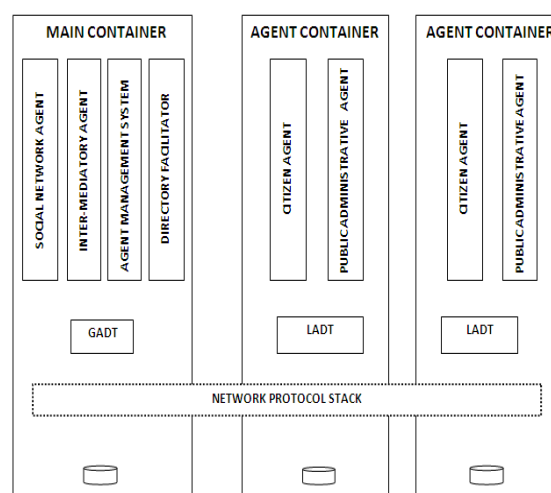


Fig 5: System Architecture

## 6. Conclusion:

The hierarchical community organization could be extremely useful in the proactive suggestion of services, carried out by our system. In fact, in order to find the citizen communities potentially interested to a service, our system could run across the hierarchy, starting from its root, in such a way as to find the widest community potentially interested to it. More public sector services can be added like pre poll and post poll services, birth and death certificates registrations, passport application and verification etc.

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