

Intelligent Fire Control System

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Abstract: The proposed system architecture presents a fire control system using a distributed mobile agents. In recent years, mobile agents have attracted considerable interest in distributed systems. In mobile agent technology, a program, in the form of software agent, can suspend its execution on the host computer and transfer it on the agent enabled host and continue its execution. In this paper the multi mobile agent system is presented to reduce the time delay and loss of resources as compared to the traditional fire control system.

Keywords— Mobile Agent , BAS, Intelligent Agent

I. INTRODUCTION

The emergence of distributed intelligent systems and smart fire detection systems has changed the traditional fire control system. Building Automation Systems (BAS) are concerned with the automatic control of building services, key areas being Heating, Ventilation and Air Conditioning (HVAC), lighting and shading. Mobile agent technology offers a new computing paradigm in which a program, in the form of a software agent, can suspend its execution on a host computer, transfer itself to another agent-enabled host on the network, and resume execution on the new host. The use of mobile code has a long history dating back to the use of remote job entry systems in the 1960's. Today's agent incarnations can be characterized in a number of ways ranging from simple distributed objects to highly organized software with embedded intelligence. Agents comprise a powerful technology for the analysis, design and implementation of autonomous intelligent systems that can handle distributed problem-solving, cooperation, coordination, communication, and organization in a multiplayer environment. It's also a promising computing paradigm for dealing with system complexities such as openness, distribution, human involvement, societal characteristics, and intelligence emergence. In this paper I am presenting an automated approach for a Fire control System using Autonomous Intelligent Agents.

Artificial intelligence (AI) is the intelligence of machines and the branch of computer science that aims to create it. AI textbooks define the field as "the study and design of intelligent agents" where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success. John McCarthy, who coined the term in 1956, defines it as "the science and engineering of making intelligent machines."

The most widely used accepted definitions for this term is "an agent acts on behalf of someone else, after having been authorized". An agent is a physical or virtual entity, which runs approximately as follows: which is capable of acting in an environment, which can communicate directly with other agents, which is driven by a set of tendencies, which possesses resources of its own, which is capable of perceiving its environment, which has only a partial representation of this environment, which possesses skills and can offer services, which may be able to reproduce itself, whose behaviour tends towards satisfying its objectives, taking account of the resources and skills available to it and depending on its perception, and the communications it receives. The definition given by Wool ridge & Jennings is as follows: "An agent is a computer system that is situated in some environment, and that is capable of autonomous action in this environment, in order to meet its design objectives." Agent is the birth and development of AI technology and network technology development in the inevitable result of the artificial intelligence knowledge in the field of engineering, Expert systems, decision-making theory and methods, such as the development. Direction has made the development of intelligent applications possible.

II. INTELLIGENT AGENT

III. EXISTING FIRE CONTROL SYSTEMS FOR (BAS)

Building Automation Systems (BAS) use computerbased monitoring to coordinate, organize and optimize building control sub-systems such as security, fire/life safety, elevators, etc. Common applications include equipment scheduling (turning equipment off and on as required). Tremendous advances in computer technology are reflected in the sophistication and falling costs of Direct Digital Control (DDC) systems for buildings. DDC systems are now affordable for all but the smallest and simplest of buildings, and allow much finer control and energy savings than pneumatic controls. Besides flexible control of lighting and HVAC systems, DDC can also integrate fire and intruder alarms, security and access systems and local and wide area computer networks. The following figure will explain the design of BAS.

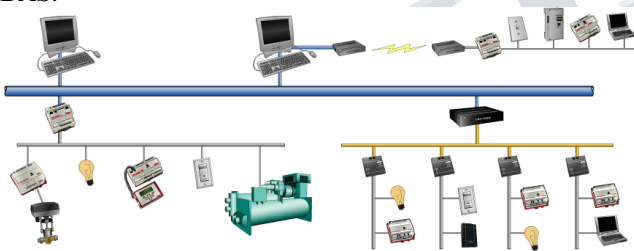


Fig. 1 BAS Design

IV. ARCHITECTURE OF NEW BAS SYSTEM BASED ON EXISTING BAS SYSTEM

Agent generally refers to calculation entity with characteristics, such as independence, duration, sociality and acting as agent under certain environment. Multi-Agent system (MAS) is a system composed of a lot of Agents, and generally these Agents exchange information through network infrastructure. In order to succeed in communicating, a certain Agent needs to cooperate and consult with other Agent. In MAS, the ability of an individual Agent is limited, but multi-Agent can finish a lot of complicated tasks through cooperation. The existing Fire Control System can only turn on/off the appliances and generate the alarm signals. The architecture (Fig.2) proposed in this paper will extend the existing Fire Control system functionalities by making use of intelligent mobile agents. The Fig.2 represents the flow of system for

the improved BAS. This new design contains following entities.

1. Interface Agent (On Home Machine)

This is a local agent which will keep on receiving information from all the sensors connected with the home electrical appliances. If there is an alarm or fire smoke is caught by the agent then it will put off all the appliances and immediately move to closest fire station to give the address, owner details etc. The interface agent will send a SMS alert to the owner of house.

2. MAS (Multi Agent System)

This is a collection of agents and they can communicate with each other to complete the task. After receiving the information from the interface agent, the MAS will activate the Database agent to check whether Fire Vehicle and Driver is available. On receiving details it will send the information to the Transfer Agent. The Transfer agent is suppose to send SMS alert to the driver and to the Vehicle agent to activate the system. Next the Vehicle agent is suppose to take out the vehicle from the parking slot and keep ready to go.

3. Master Controlling Agent

This agent is suppose to control all the agents as well as to activate the agents on all the machine with the network. Also this agent is suppose to check whether the driver and vehicle is available at the requested fire station, otherwise it will activate Selection agent, to select the next closet fire station and it will send the details to that station.

The proposed design is possible to implement in intranet but not in an open environment as the present technologies still working on security issues of mobile agents.

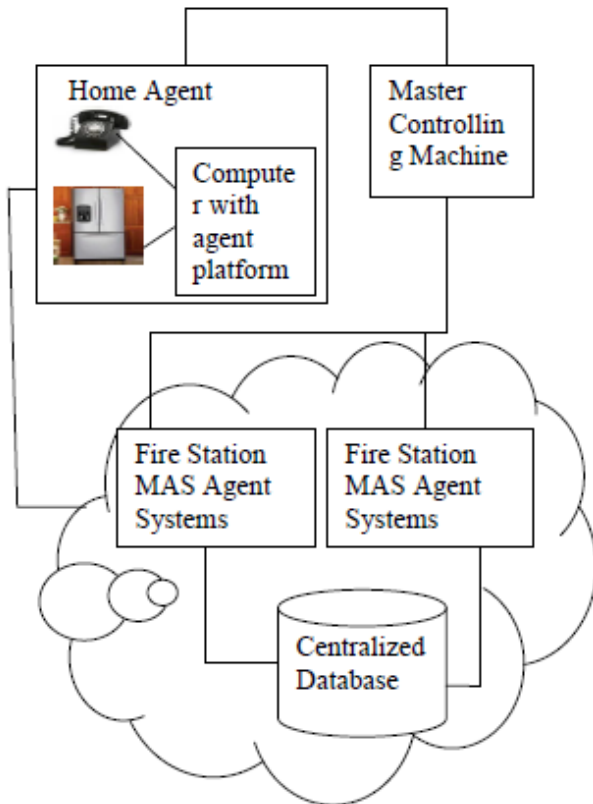


Fig. 2 Intelligent Fire Control System(Improved BAS Design)

V. THE WORK PROCESS OF SYSTEM

- 1) The Master Controlling agent will receive the request from home agent and register the agent Id in the database also the owner details and invokes the database agent from MAS.
- 2) The database will find out the available vehicle numbers and driver information and convey that information to the transfer agent.
- 3) The transfer agent is designed to send the message to the driver and activate the vehicle agent.
- 4) The Vehicle agent will check the status of the vehicle and it will take the appropriate actions to make the vehicle ready for the work. Also this agent will take out vehicle from parking slot.
- 5) When the task is completed, the driver is suppose to send the status sms back the fire station and accordingly the master controlling agent will update the database.

VI. ADVANTAGES OF NEW DESIGN

1. This system is fast as compared to the manual process.
2. This can reduce the loss by substantial amount and can save lot of life's
3. System is not restricted to any particular station, instead it can actually transfer the data to other stations as fast possible to reduce the loss.
4. This is an fully automated approach where there is hardly human interface, so the valuable time can saved.
5. This system records all the information causing the fire , so this information can be also used to minimize the fire causing reasons.

VII. CONCLUSIONS

The design will actually help to reduce the burden caused by manual working. The Intelligent mobile agent system can improve existing system by distributed the data across the network as fast as possible and connects to the closest fire station. The use of Artificial intelligence can actual taking the world into new era where most of the work will be handled by such intelligent systems.

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