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A New Classification Scheme for Autonomous Software Agent

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Abstract—Software agents are expected to take an important role in the information technology world for solve the complex problems in the real world and a number of related works have been done mainly in the research fields of artificial intelligence, software engineering, database, and network computing. They behave like human intelligently, autonomously, cooperatively, and socially to solve problems or to support human users. The goal of this paper is to classify the different types of agents under the one root .A the autonomy is the key property of software agent, this paper also focus on different autonomous agents.

Keywords-- Software agent, Agent Classification, Autonomous software agent architectures

I. INTRODUCTION(PROPOSED CLASSIFICATION)

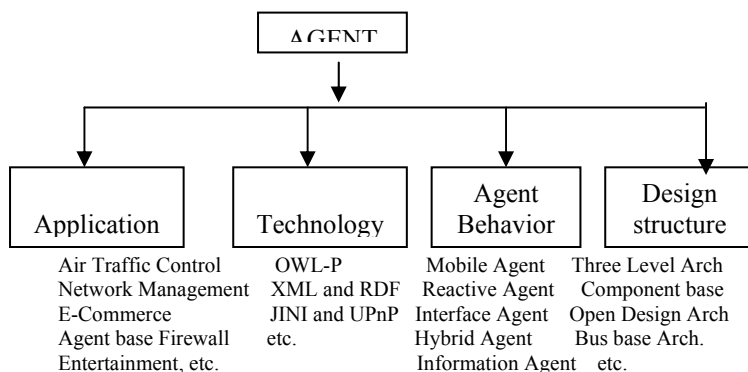


Figure.1 Classification of Autonomous Agent Architecture

A. Agent Application

Network Management

It is used for preventing unauthorized access to corporate information systems is essential for many organizations. In which a core software agent resides on a server and user end software agents reside at each use workstation. This permits security detection to continue even when the core agent fails to operate [2].

Air traffic-flow management

Air traffic controllers and airline personnel are limited resources in air traffic management. To compensate for their scarcity, Autonomous agents can be employed both in simulations (i.e. human operators) and in actual operations (assisting their human counterparts)[3].

Agent Base Firewall

Distributed firewall uses the autonomous agents to coordinately control the traffic on the network. Agents to

implement a distributed firewall to improve the performance of classic firewalls [4].

Agent Technology

WOL-P

It has been recommended as a technology that will contribute to software agents' interaction with Web services and standard Web service technologies [5].

XML and RDF

XML technologies are being used in the presented agent architecture. The use of agent and XML technologies in autonomous architecture can help secure the interoperability and reusability factors [6].

Resource Description Framework (RDF), it provides interoperability between applications that exchange machine understandable information on the Web. RDF emphasizes facilities to enable automated processing of Web resources. [7].

JINI

Jini technology can be used to build adaptive network systems that are scalable, evolvable and flexible as typically required in dynamic computing environments.

UPnP

Universal Plug and Play (UPnP) technology is a distributed, open networking architecture that employs TCP/IP and other Internet technologies to enable seamless proximity networking, in addition to control and data transfer among networked devices in the home, office, and public spaces.

Agent Behavior

a) Mobile agent: It has the ability to move around some network.

b) Reactive agent: It shows a reaction or response to the user, which should not wait to be told what to do next.

c) Interface agent: It is a personal assistant who is collaborating with the user in the same work environment.

d) Hybrid agent: It refers to those whose foundation is a grouping of two or more agent philosophies within a singular agent.

e) Information agent: It performs the role of managing, manipulating or collating information from many distributed

sources; essentially, they help manage the vast amount of information in wide area networks like the internet [8].

Design Structure

a) Symbolic and Behavioral Architecture

An architecture for Autonomous Agents Integrating Symbolic and Behavioral Processing Chella et al [9] investigate the autonomous agent which links together in a principled way of the two different research traditions i.e. functional and behavioral approaches of robot architectures. In this they make use of the three levels of representation of new architecture for autonomous.

b) The Behavior-Based Architectures of Autonomous Agency

Amol Mali [10] presented the three dominant classes of architectures for autonomous agency and describes key features of several architectures from these classes by reactive/behavior-based component in their architectures; interact with their environments continuously.

c) The goal autonomous agent architecture

Z.SHEN et al [11] modeled the goal autonomous agent architecture that act as an "anytime" autonomous agent.

The goal autonomous agent model support both behavior autonomy and goal autonomy that was base on Goal Net.

d) Service-Oriented Architecture

Tsai W. T et al [12] SOA provided new way of creating software architectures, where architecture is determined in time of application execution and can be dynamically changed for fulfillment of new software requirements.

e) Model-Driven Architecture

Sheng and Benatallah [13] design the Model-Driven Architecture, is using of UML language for specification of static interfaces and also dynamic behavior of components in platform-independent models. One of the principal goals of MDA is support for platform independent application development.

f) Component-Based Architecture

Sriraman and Radhakrishnan [14] suggested the Component-Based Architecture that is base on distributed component architectures and includes mechanisms and techniques for development of coarse reusable business/technical implementation units by considering environment/container and decomposing service to more SBBs (Service Building Block), which are connectable distributed parts associated with: presentation logic, business logic, resource management logic, integration logic, logic of net events, security logic and other logics.

g) Open Design Architecture

Miroslav Beliĉák [15] design the Open Design Architecture it should provide better facility for modification of Information System, because it prescribes tight coupling of IS design with executable binary elements of IS.

h) Software Bus Based Autonomic Agent Architecture

Zhou Chuan-Sheng [16], It is based on software component and software reuse technology, through certain standards and specifications, by creating generic bus interface, communication protocol and corresponding software components, to implement the software components plug and play in the software bus.

II CONCLUSION

Agent technology is very innovative topic for keeping the both academia and industry peoples quit busy. This paper describes a proposed classification for Autonomous agent architecture. It draws upon several existing classifications, but provides an all-inclusive classification that takes into account the various aspects of agent research. Due to the wide variety of approaches toward software agents, a simple classification method that assigns each agent to a single grouping is insufficient.

REFERENCES

- [1] Gopal Sakarkar, Dr.V.M. Thakare" Revolutionary Architecture for Autonomous Software Agents " International Advance Computing Conference (IACC'09), IEEE March 6-7, 2009, India
- [2] Pikoulas J, Mannion M, Buchanan W" Software Agents and Computer Network Security", 2000 IEEE
- [3] Shawn R. Wolfe" Supporting Air Traffic Flow Management with Agents", 2006, American Association for Artificial Intelligence
- [4] Dalila boughaci1, Habiba drias, Brahim oubekal, Abdelkader aissioui1, Belaid benhamou" A Distributed Firewall using Autonomous Agents", Proceedings of the International Conference on Dependability of Computer Systems (DEPCOS-RELCOMEX'06), 2006 IEEE
- [5] Dominic Greenwood, Margaret Lyell" The IEEE FIPA Approach to Integrating Software Agents and Web Services " AAMAS'07 May 14-18 2007, Honolulu, Hawai'i, USA. 2007 IFAAMAS.
- [6] Marcos Dias de Assunção, Carlos Becker Westphall, Fernando Luiz Koch" XML in Multi-agent based Applications for Network Management"
- [7] Ora Lassila " Introduction to RDF Metadata"
- [8] Erlin, Yusof Norazah, Abdul Rahman Azizah" overview on agent application to support collaborative learning interaction" Jan. 2008, Volume 5, No.1 (Serial No.38) US-China Education Review, USA
- [9] A.Chella, S.Gaglio, G. Sajeva, F.Tortorola "An Architecture for Autonomous Agents Integrating Symbolic and Behavioral processing ", 1997,IEEE pp.-45-50
- [10] Amol Dattatraya Mali, Member, IEEE" On the Behavior-Based Architectures of Autonomous Agency ", IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART C: APPLICATIONS AND REVIEWS, VOL. 32, NO. 3, AUGUST 2002
- [11] Z.SHEN, R.GAY, Y.MIAO AND C. MIAO"Goal Autonomous Agent Architecture", Proceeding of the 28th Annual Int. Conf. COMPSAC' 04,IEEE
- [12] Tsai W. T., Fan Ch., Chen Y., Paul R., Chung J.-Y.: Architecture Classification for SOA-based Applications, in Proc. of ISORC'06, April 2006, pp. 295-302
- [13] Sheng Q. Z., Benatallah B.: ContextUML: A UML-Based Modeling Language for Model-Driven Development of Context-Aware Web Services, In Proc. of the (ICMB'05), July 2005, pp. 206-212
- [14]] Sriraman B., Radhakrishnan R.: Component-based Architecture Supplementing SOA, Sun Microsystems, March 2005
- [15] Miroslav Beliĉák" Open Design Architecture and Artificial Intelligence Agent Application in Information Systems Practice" 5th Slovakian-Hungarian Joint Symposium on Applied Machine Intelligence and Informatics Jan 25-26, 2007pp-349-359
- [16] Zhou Chuan-Sheng" Research and Design of Autonomic Software Agent Architecture" International Conference on Intelligent Information Hiding and Multimedia Signal Processing, 2008 IEEE.