A Cooperative Multi-Agent Approach-Based Clustering in Enterprise Resource Planning

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ABSTRACT

With the rapid development of information technology and the gradual extension of information technology to enterprise, enterprise resource planning system has become a tool that enables uniform and consistent management of information system (IS) of the company with a large single database. In addition, knowledge discovery is a technology whose purpose is to promote information and knowledge extraction from a large database. This paper proposes a cooperative multi-agent approach based clustering in enterprise resource planning for extract unknown knowledge in the enterprise resource planning database. To achieve this, the authors call the paradigm of multi-agent system to distribute the complexity of several autonomous entities called agents, whose goal is to group records or observations on similar objects classes using the clustering technique. This will help business decision-makers to take good decisions and provide a very good response time by the use of multi-agent system. To implement the proposed architecture, it is more convenient to use the JADE platform while providing a complete set of services and agents comply with the specifications FIPA.

Keywords: Agents Technology, Clustering, Enterprise Resource Planning, FIPA-ACL, Knowledge Discovery

1. INTRODUCTION

Today, the companies' access to new technologies, Internet in particular, tends to alter the communication between the various actors in the business. Particularly between the company and its customers (Business to consumer, B2C), the inner workings of the business (Business To Employees, B2E) and business relationship with its various partners and suppliers (Business to Business, B2B). We also mean by "e-Business", the integration within the enterprise of tools based on information technology and communication, it's called the Enterprise Resource Planning

(ERP). This software Baudry, S. (2005) helps to manage the whole process within a company by integrating a set of functional modules covering human resources management, accounting and financial management, Logistics, production, marketing and sales, which shared the same single database, Philippe (2006).

In this epoch, with developments in information technology, many new tools have carried out revolutionary developments and applications in the business world such as artificial intelligence, soft computing techniques, internet, data warehouse, and data mining technology. One of these tools, data mining technology is buried in large databases in order to enhance the information and extraction of new decision-making knowledge and / or forecast knowledge. Therefore, the data mining technology can dig up information buried within the massive amounts of data ERP.

Several approaches and works have been offered in the context of integrate data mining module to ERPs systems, in order to achieve decision-making objectives, but they remain insufficient. For this reason, The aim of this research is to integrate the multi-agent paradigm within the data mining process to ERP platform, in order to distribute the complexity of this process on several autonomous entities called agents, the goal of these agents is to group records or observations on similar objects classes using the clustering technique, which will cooperate and collaborate to achieve the reduction in execution time due to knowledge extraction from a large ERP database. This will help business decision-makers to take the right decisions at the right time.

In this overview, our work will be organized as follows.

A general introduction followed by a presentation of emerging technologies such as ERP systems and data mining. We will describe later, the related work, the proposed approach for extracting knowledge from ERP and agents modeling of Data Mining based clustering. Then, we describe the JADE platform adapted to implement the proposed approach and finally,

a conclusion and perspectives of study will conclude this work.

2. EMERGING TECHNOLOGIES

2.1. Enterprise Resource Planning (ERP)

In the first, The ERP is a software package incorporating the main functions needed to manage the flows and procedures of the company (accounting and finance, logistics, payroll and human resources....etc) Benchikh & Renard (2004).

Moreover, the definition proposed by Willis-Brown seems to be the most complete, "ERP is an integrated system that allows the company to standardize its information system to link and automate its core processes. It provides employees with the information needed to direct and control the core activities of the company from the supply chain, to the product delivery to the customer. Employees enter the information just once, which is then made available to all systems of the company Chaabouniimp (2006).

In addition, one of the important characteristics of ERP is the use of what is called a WorkFlow engine which, when data is stored in the Information system, the spread in modules that have utility, according to a predefined programming Blain (2006) (see Figure 1).

Lequeux J-L. (1998) Summarizes all the characteristics of an ERP as follows:

1. Effective management of several domains of the company with integrated modules;
2. Existence of a single data reference;
3. Rapid adaptation to the rules (professional, legal or outcome of the internal organization of the company);
4. Uniqueness of directors of the application subsystem (applications);
5. Standardization of man-machine interfaces (same screens, same buttons, etc.);
6. Existence of development or customization tools of additional applications.

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