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An Agent based Recommender system for Knowledge Transfer in Organizations

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Abstract

Our world is in a hurry in globalization to compete with each other so as to gain more power fame and adding more luxuries to life for the ease and progress of mankind. In the world of management a very fast and easy to adapt modality called "multi-agent system" has recently been proposed to help achieve bigger goals in collaboration. This system has greatly modified our working environment as well as the output of different projects that are being carried out all over the world. In this paper I have discussed how the multi-agent system has modified and benefited our organizations to help achieve bigger goals and better solutions to the problems in our society.

Keywords: Knowledge management, multi-agent system, organizational management, knowledge engineering, knowledge and data based systems, technology in business.

Introduction

This paper describes the importance and benefits that multi-agent system incorporation provides to the business and marketing by making work and organizational memory easier for the employees as well as for the peers, project members and other business partners by saving data and knowledge through software programming.

Agent-based systems have provided us with a lot of benefit and positive modification in our working environment. Multi-agent systems comprise of multiple interacting computers called agents. These agents are in part capable of autonomous actions to decide what is good and what is bad to achieve satisfactory design objectives. They are also capable of interacting with other agents so as to share data as well as engaging in sort of various social activities as we do in our day to day life like negotiation, cooperation, coordination etc. Most obvious example of this agent based system is internet which is a type of an open system that is capable of changing dynamically at various places at various points of times by various people using various agents and thus is being used globally to connect people in various ways. These systems offer modularity i.e. if a problem arises in a single agent system it co-ordinates with the other agent to overcome the encountered problem so as to maintain autonomy in all the agents that are connected together.

As it is discussed above that internet is viewed as a large open agent system that distribute information resource with different network designed and implemented by various organizations and people all over the world and as it is an open environment the information sources, communication links, and agents are subject to change unexpectedly. At present, agents on the internet mostly perform filtering and information retrieval. It is hypothesized that the next generation of agent system will work to gather information for sophisticated reasoning in problem solving. All these functions require agents to work in co-ordination with each other so as to allow these systems to increase their problem solving capacities and capabilities. Such functions will demand the techniques based on co-operation or negotiation which is firmly associated with the domain of multi-agent systems (MASs). (Sun, 2011).

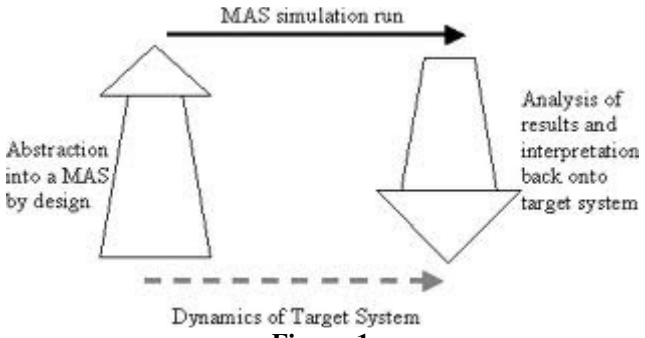

Figure-1
Dynamics of target System Source (Bergenti, et al., 2004)

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Methodology

This chapter put highlight on the research approach, design, and research process and followed by the secondary literary analysis which covers related issues.

The qualitative method has been used in this study. The secondary research has involved the data collected through previous studies for the analysis of the study. Exploratory and descriptive research will be taken place in this research; exploratory research will conduct to find out about the topic and

gain better understanding of multi-agent system and its effectiveness organizations. This has been done through conducting a search of the literature in the topic.

Data has been extracted from previous researches and literary analysis. For this purpose, credible sources have been used such as ProQuest, Sage, and Gale etc.

Discussion

Multi-agent system is strongly related to knowledge engineering and its application in organizations. Therefore, it is necessary to evaluate and model out each and every aspect of this field as well to gain an effective incorporation of this modality for use in organizations.

Knowledge engineering (KE) is defined as all the technical, scientific as well as social aspects that are essential in creating, maintaining, and incorporating knowledge-based systems. It is a multidisciplinary field that brings conceptualization, and learning methodology from various computer science domains like that of artificial intelligence, expert systems, systems that support decision making, various databases and data mining, expert systems and systems bringing about geographic information. One such related field of knowledge engineering is ontology that aims at creating reusable semantic structures that can include casual vocabularies, various glossaries and catalogues as well as some of the more complex definitive formal structures defining the entities within a domain and the relation among those entities as well.

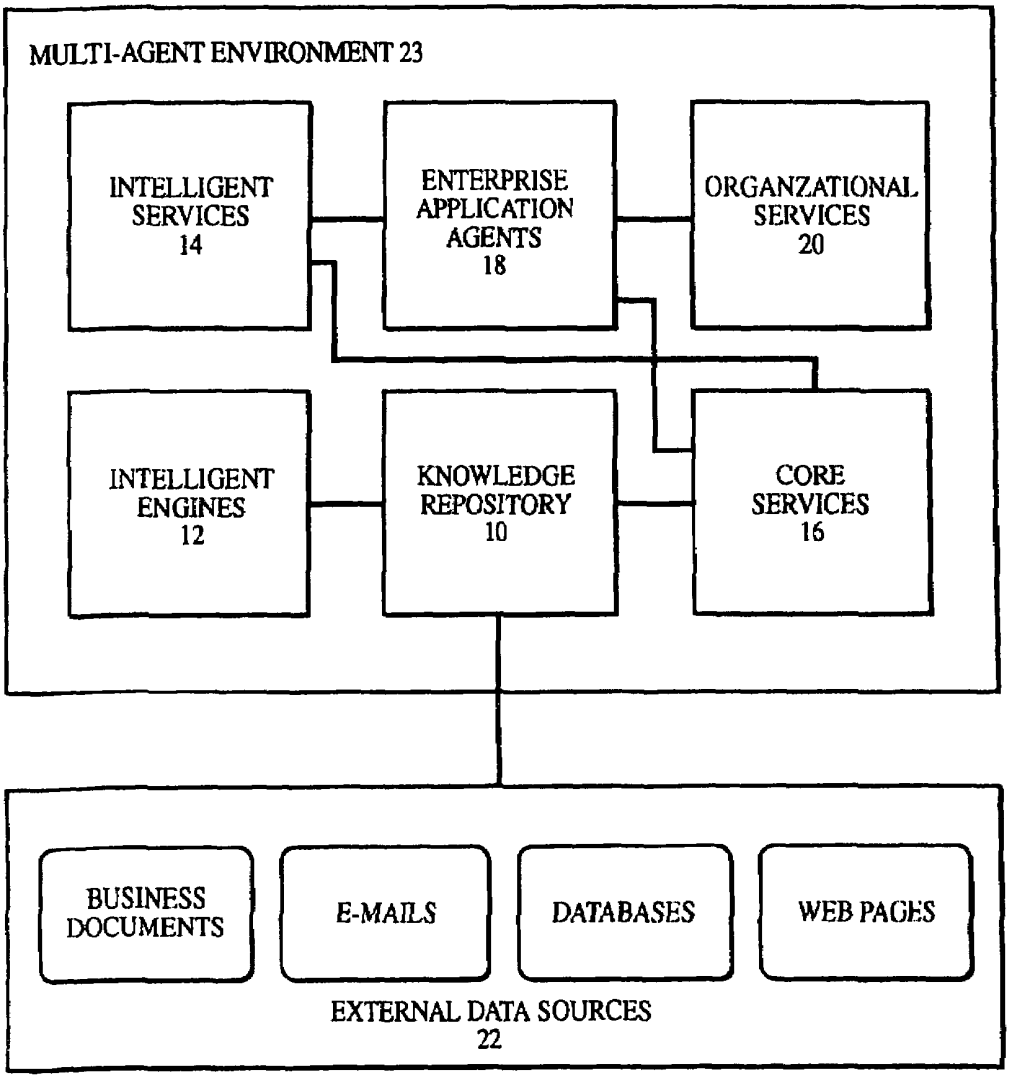

Figure-2
Enterprise Multi Agent System: Source

The field of ontology has been increasingly gaining interest and acceptance in recent ages among computer related individuals. A great number of applications are emerging with special emphasis on the current web demands, including all such relative programs like library science, e-commerce and business, ontology-enhanced search, and others. As it is apparent that knowledge engineering (KE) involves all the efforts in incorporating knowledge into processor system so as to get solutions to complex problems within no time and with much ease that otherwise would normally require high level human expertise and a significant span of time. The field of knowledge engineering is also significantly associated with mathematical logics, as well as strongly associated with cognitive science and the socio-cognitive part of engineering in which the knowledge is formed by socio-cognitive collectives and is essentially structured accordingly to the understanding of human reasoning and various logics and how they work. Different aspects of knowledge engineering (KE) particularly to develop a knowledge-based system are as follows: i. The first and foremost is the assessment of problems before problem solving. ii. Development of o knowledge-based system structure that provides with information for the problem solving. iii. Acquisition and structure forming of related knowledge, information, and specific preferences so as to enhance the problem solving process. iv. Execution of the planned knowledge system into knowledge bases for proper reasoning and control. v. Timely evaluation and substantiation of incorporated knowledge for proper assessment of system work. vi. Incorporation and system maintenance by timely review, assessment, and alternating according to the demand of the integrated system.

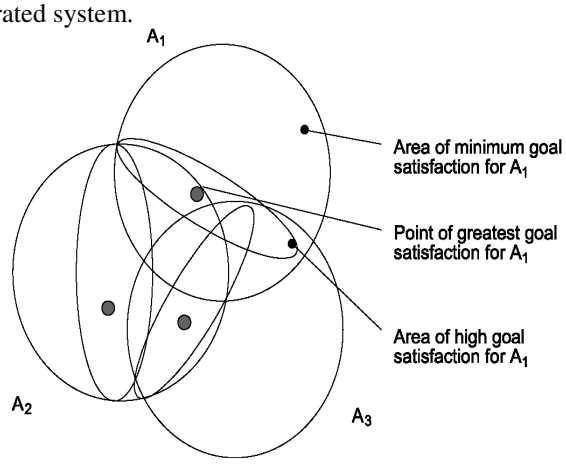

Figure-3
Outcome of Knowledge engineering: Source

This illustration shows the outcomes of knowledge engineering according to management and implementation. The more skilfully one handles the incorporation the better the outcome will be and the easier it gets to apply it within any field of need. Knowledge engineering is still more of an art rather than engineering and it is not as perfect all the time in practice as all the above aspects describes it to be. The phases described above may overlap, the overall process might be a little iterative, and many challenges may appear during the function. One of the renowned practical forms of this field is Data and Knowledge Engineering (DKE) which is described below.

Knowledge-based and Data-based Systems: These two systems have many principle aspects of functioning in common. Data and knowledge engineering (DKE) comprises of a system that works on the basis of exchanging ideas through interaction between these two linked fields of concern. This field is popular world-wide among the audience of computer sciences either they be researchers, web designers, managers or users. (Pawlowski, 2012) The principle aim of this system is to identify, analyze, and then investigate the causal main beliefs in the proposed design as well as the effective incorporation for practical purposes. This is achieved by publishing the original research results, new items and technical advances that are being made as well as the concerning data about data engineering and knowledge engineering along with the interface between these two. DKE comprises of topics discussed below: i. Depiction and Management of Data and Knowledge: to conceptualize data models, management of knowledge representing techniques through various manipulations by languages or different techniques. ii. Designing of expert, databases, or knowledge-based systems: newly invented methods for databases, expert system, knowledge-based systems, designs and their implication techniques, user interface and the languages used as well as disseminated architectures. iii. Formation of data and knowledge bases: data and knowledge bases are designed using effective methodologies and tools according to the demand of system along with data and knowledge acquisition methods and their integrity, security, and maintenance is effectively looked upon for proper functioning system. iv. Case studies, applications, and management: everything related to data administration problems, knowledge engineering with performance in office and engineering applications is dealt under this field. v. Important principles for developing and specifying knowledge and data bases by using tools that rely on linguistics or that of human machine crossing point principles. vi. Communication skills that are required in implementation, designing and manipulating knowledge based systems (KBSs) in cyberspace along with the calendar events, various book reviews, or conference reports etc.

All this contributes to the effectiveness of this working system. In the last decade to personalize the data more for better security and outcomes personal information agents appeared as a substitute to assist users in coping up with the increasing amount of information that is present on web. To provide the audience with secured backing, these agent systems provide user profiles which works on the basis of user information preferences, habits, and interests. Personal agents can greatly improve knowledge assistance in a community of users with same interests by extracting and collecting knowledge from the assessed common aspects of users. Agent-based recommender system also supports collaborative web search in group of users that have partial similarity of interests. The empirical

assessment shows that the interface between personal agents raises the overall outcome of the recommender system[8].

Knowledge Engineering in Organizations: As the world is globalizing faster and faster and as the changes continue in technology, learning, organization, business, and various other aspects of life the provision of right knowledge at the right place and right time is getting more and more difficult. As we see that software development is facing a rapid technological change in recent ages due to its high demand in most of the technological marketing field, so that it is also necessary to keep it up to date and well functioning for the better products and fulfilment of the demands of the market[9]. For this purpose it is essential to meet up the requirements of knowledge that is required to make it effectively functional in the market so as to avoid any system corrupts, leaking of data, or any other form of malfunction that can put the customer to any sort of loss or harm. Incorporation of knowledge system in organizations no doubt put a great relief for both the producer and the consumer but, the process of bringing it to that level requires human expertise and significant amount of knowledge. For this purpose knowledge management skills are applied which are those skills that manage essential knowledge for the working of system to facilitate creation, access, reuse of knowledge along with learning from its application to the practical field while using advanced technology[10]. All this requires seven important aspects of knowledge management: i. Identification, ii. Acquisition, iii. Development, iv. Dissemination, v. Usage, vi. Preservation, vii. And evaluation of knowledge.

All these components can help build a good organizational memory of members of an organization which they can activate to solve any sort of encountered problem in the process of production for better results and good customer care.

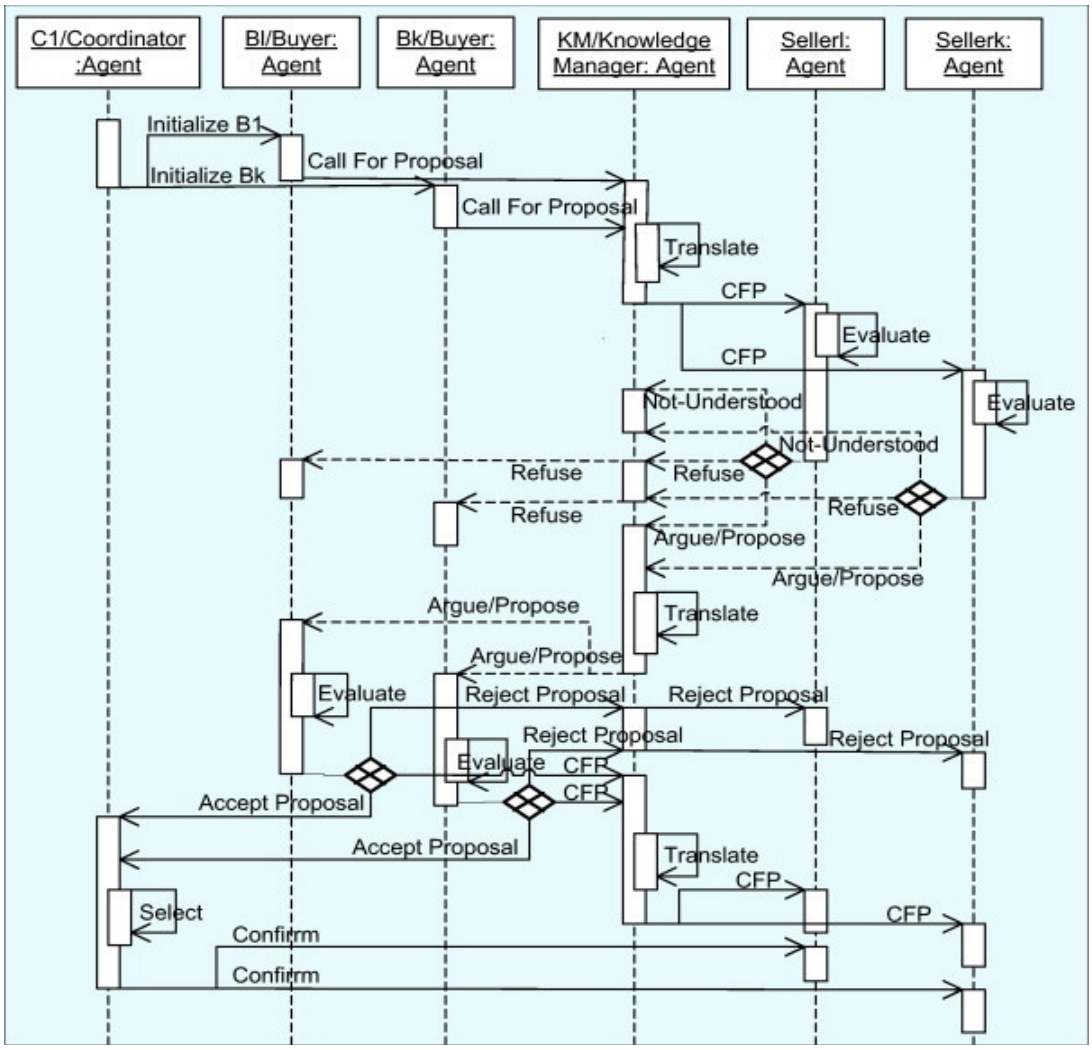

Figure-4
Computational model of multi agent system: source (Pérez, 2013)

This illustration is a computational model of a multi-agent system which is the principle basis of application of these systems in any organization which wish to use it. It works on the basis of call for principles (CFP). As it is apparent from the above illustration that multi-agent e-commerce negotiations are greatly linked with adaptive negotiations so that organizing of one component will greatly affect the other one and ultimately on the negotiation flexibilities of software agents. So, it is very important to idealize the negotiation protocols, issues, and strategies to overcome the gaps in better functioning of software program.

Conclusion

Globalization trends have given advancement ways to software programming and thus ultimately to multi-agent systems. Application of these systems has made life easier and better. These systems has followed an exponential trend in the last decade, ranging from online auction, scheduling of tasks, and multi-sensor networks. These systems designed for all such applications require some optimization so as to achieve their goal. This technology has been a great achievement in human life that has completely transformed the way of living in our world by providing hands on safe data and knowledge anywhere and at any time so as to use it effectively with great ease.

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