

Research on Exploring High-Quality Network Education Resource Based on Agent Structure Model

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Abstract: Network quality education resources is a huge distributed digital information space, since its birth, with its rich content to attract a large number of users, and the number of pages is still growing at an alarming rate. At the same time, it is also an open global distributed network. Resources are distributed in different parts of the world, and there is no unified management and structure of online resources, which leads to difficulties in information search. How to quickly and accurately find the needed information from the vast information resources has become a big problem to Internet users, although search engines partially solved the problem, but traditional network quality education resources search engine does not take into account the user's interests and hobbies, to search a large amount of information. And the theme of the search and form a single largely confined to the integrated retrieval, and because the retrieval accuracy is not high, the effect is far from being satisfactory. Information mining of network quality education resources is an effective use of existing resources. Its main goal is to mine the information needed by users from the semi-structured network quality education resources scattered on the Internet to form structured data. The structured result data can be used for subsequent information processing such as database mining and text generation.

1. Introduction

In recent years, the research on network quality education resource mining based on intelligent technology has become a hot spot, and various specific application systems have emerged one after another, such as Skill and Webern, Web Watcher, etc. This article absorbs the current information retrieval, the intelligent autonomous ability, social skills and ability to respond to characteristics and the latest ideas and techniques, using artificial intelligence technology, especially machine learning technology, multi Agent technology, on the basis of the syntax analysis primarily, add to the use of the semantic information content, proposed a network of high quality education resources mining system framework based on the Agent model, according to the Agent reference semantic knowledge to take action, and interaction between the Agent and improve contain intelligent and accuracy of information mining.

Web data mining is a high quality education resources data mining technology in the network application of high quality education resources environment, it applies data mining technology on the network quality education resources, from a large number of network quality education resource collection and found within the site to view the relevant data of implication, unknown, has potential application value, the modes of nontrivial process. The objects processed include static web pages, databases, structures, user usage records and other information. Through the mining of this information, we can get the information which can't be got only by the text retrieval. It should be noted that data mining based on online quality education resources has different meanings from traditional data warehouse-based data mining. General data mining refers to the extraction of knowledge that people are interested in from the data of large databases, which is implicit, previously unknown and potentially useful information. It focuses on the extraction of regular knowledge from existing information. The research object of mining is based on semi-structured and unstructured documents. There is no unified pattern for these data. The content and presentation of data are interwoven with each other. In order to analyse and process such semi-structured data, mining must be combined with its research methods. As it involves many knowledge fields,

network quality education resource mining is now the intersection of multiple research directions, including database, information acquisition, artificial intelligence, machine learning, pattern recognition, statistics, and natural language processing and so on.

Intelligent Agent was proposed by Minsky, who are one of the pioneers of artificial intelligence. He once integrated the view of society and social behavior into the computing system of “social psychology”. In this paper, the intelligent Agent is considered to be a software entity that operates in a specific environment, ADAPTS to and responds to environmental changes, has planning and reasoning ability, and is able to independently adjust its behavior to complete a set of target operations according to environmental changes, and obtain user goals, intentions and knowledge representation in the operation process. At present, the research of intelligent Agent is mainly embodied in the intelligent Agent theory, architecture and communication language.

The research of intelligent Agent theory is mainly reflected in the construction of Agent structure, including sensing the changing state of the environment, interpreting the inductive information through reasoning, executing actions affecting the state, solving the target, and executing reasoning and decision-making. It is capable of reasoning and planning in the process of action execution and selection. Characteristics of intelligent Agent: autonomy, Agent is able to control its own behavior, its behavior is spontaneous, active, goal-oriented, able to formulate short-term action plan in accordance with high-level goals and external environment requirements; Communication ability: agents can communicate and exchange information with each other, and use a certain communication language to interact with other agents; Planning and reasoning ability, Agent can predict and reason in a rational way on the basis of existing experience and knowledge; sustainability, the Agent program can keep running for a long time after starting, rather than stop running immediately when the operation stops; Collaboration, collaboration and negotiation ability: agents collaborate to solve problems that cannot be solved by individual agents, with the purpose of enhancing problem processing ability. Reactivity and perception, the Agent can sense the state of the environment in real time, and quickly respond to state changes; socially, agents are able to communicate, interact and exchange information with other agents in a certain communication language in the MA social environment. Adaptability and evolutionarily, agents interact with the environment dynamically, sense the state of the environment they are in, and respond to the changes of the environment with the results of their behaviors. And the newly created Agent is aggregated into the system without re-designing the original MAS, which has strong adaptability and scalability.

The Agent model focuses on the construction of some models that emerge key CAS characteristics through individual codes of conduct. ABMS is an available, useful, and applied tool that provides many services to organizations. The usefulness of Agent simulation is that it can transform the experience based on detailed process into the knowledge of the overall behavior of the organization. More and more enterprises begin to use ABMS to solve practical problems. The powerful function of Agent modelling is that it can show the interaction caused by the interaction of system construction, so as to transform the experience based on the detail level into the knowledge at the system level, and then identify the unpredictable results of conventional thinking. That is to say, the small and simple actions of agents at the micro level may lead to large-scale complex results.

2. Experimental Procedure

Agent technology and MAS are one of the research hotspots in the fields of computer science and technology, communication and information engineering. Agent is often called Agent in the computer field. It is a kind of computing entity and can play a role autonomously in the distributed system. Jennings described standardized MAS. Agents in the system interact with each other through communication and act in the environment. Heterogeneous agents have different “action categories” and there are dependencies between agents, as shown in figure 1.

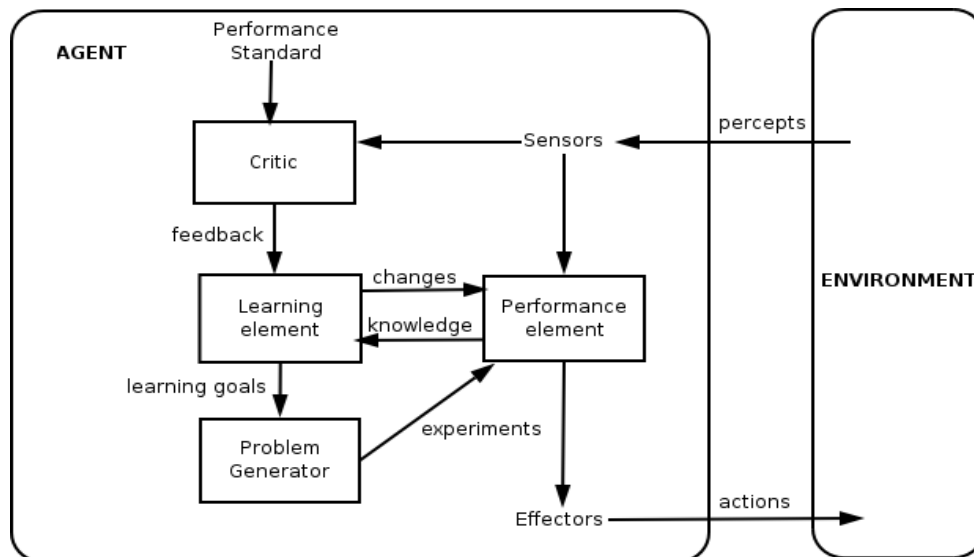


Fig.1 the Dependency between Agents

MAS mainly studies the AO programming method, Agent architecture, organizational form, behavioural constraints and the interaction between agents, etc., which is a computing system to achieve complex goals through multi-agent collaboration. At present, multi-agent technology has been applied in many fields, such as flexible manufacturing system, enterprise and social economic system, multi-agent robot cooperation, coordination expert system, traffic control, concurrent engineering, Internet and other fields.

Multi-agent theory mainly studies how agents make reasoning and decision-making based on various, and how to use symbols to represent agents in the real world. It mainly includes the research of Agent cognitive model and related theories, such as Agent's belief, desire, intention, negotiation, collaboration, commitment, Agent plan and reasoning, etc.

The self-adaptability of Agent means that Agent is able to adapt to the requirements of environmental changes, so that Agent behavior can adapt to the changes of system resources, solution and available external information. The research is mainly reflected in the improvement of the adaptability of individual agents, the dynamic organization of agents and the reconstruction and learning of agents.

In the distributed system, an Agent can only realize its own intention by influencing the behavior of other agents. The influence on the behavior of other agents is realized by a special behavior (communication action). Communication actions are implemented by one Agent to another Agent. The mechanism for performing a communication action is the mechanism for sending a coded action message.

Agents should consider the unpredictability of the environment and the uncontrollability of Agent activities. Therefore, agents communicate with each other in order to achieve their own intentions, enhance their ability of action and predict environmental changes. Agent communication can be regarded as the process of conveying thinking state between agents at the semantic layer. The functions of Agent communication are :(1) the forecast. When Agent A gets the Belief of Agent B through communication, it can infer and speculate the behavior of Agent B. In particular, when A gets the Intention and Belief of B, he can immediately know the action that B will perform (2) control. In the planning of Agent A, the Intention of Agent B should be conveyed to Agent b. if B accepts it; its action will be constrained by A, that is, a controls B in specific actions.

The Agent communication components include :(1) semantics. In the process of Agent communication, it is necessary to understand message semantics (including the content and knowledge of message semantics), which is one of the core problems to be solved in solving complex adaptive system problems. (2) speech act, communication language is also a kind of action, speaking is to make the state of the world change.(3) interaction protocol, a typical mode of message exchange between agents.

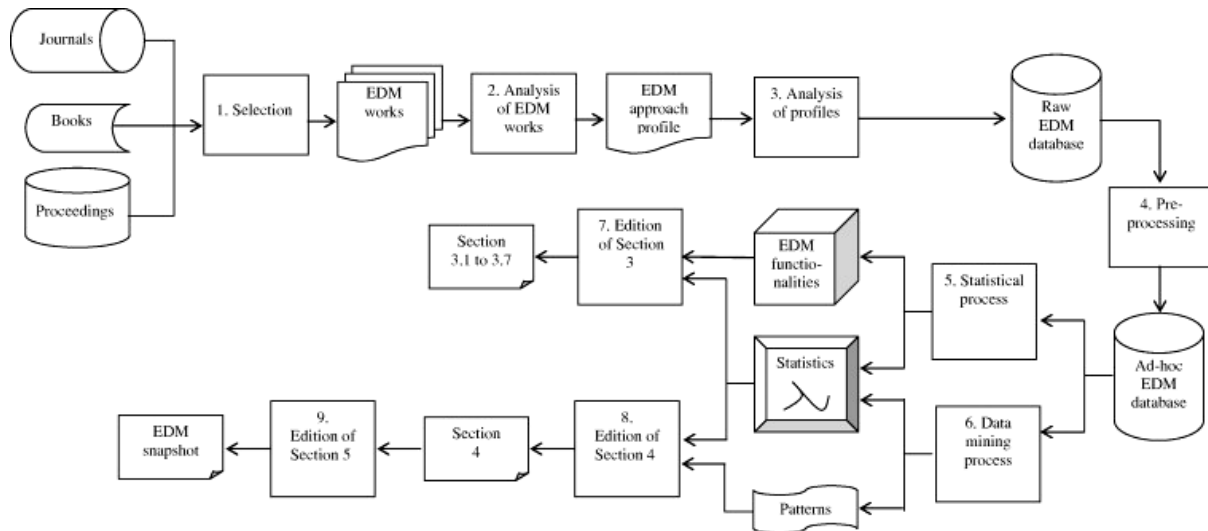


Fig.2 Educational Data Mining: a Survey and a Data Mining-Based Analysis of Recent Works

Object-oriented design methods generally describe emerging problems in design, such as how to solve problems and how to evaluate design, but they cannot describe a complete software engineering experience. Design pattern is an important complement to its drawbacks, applicability, effects, and its implementation will help guide you to make the necessary design decisions, can make you more description of “why” is designed, and the transform an analysis model for the realization of the model play an important role in the process, also can solve the problem of reusability and scalability.

Software Design Pattern is the summary of people's experience in solving some classic problems in software development practices. It is a set of commonly known, re-used, classified and compiled code Design practices. The purpose of applying design pattern is to reuse the successful architecture and design code more conveniently and simply, reduce the difficulty of using and understanding the code, and make the reused code accurate and reliable. The basic elements of software design Pattern include : (1) Pattern Name, which describes the essence of Pattern and summarizes the essence of Pattern. (2) Problem (Problem), the target to be achieved or the Problem to be solved under the specified context and incentive mode; (3) Solution, describing the process and Solution to solve the design problem, is a set of dynamic rules or static relations, used to explain how to get the desired results; (4) results (Consequences) to illustrate the utility of application model and evaluation of model selection.

3. Results and Discussion

Design patterns of two sources: one is peculiar to the OO software development problem, Gof and others to extract the 23 design patterns, based on the technology of OO respectively structured, create and behavioral design pattern, some design problems exist in the design of MAS, these patterns are commonly used, and formed a significant impact force, many practice also proved that the application of design pattern, and deeply studied how to use the design patterns according to certain system dealing with the nature of reality, in the OO design patterns up AOP research of existing technology has a certain foundation and the advantageous situation. 2 it is AOSE (Agent Oriented Software Engineering) and the problem existing in specific areas of the design practice, the Agent technology and ideas and implementation process of software engineering design (including analysis, design and implementation phase) mutual confluence, the complex distributed collection of each Agent, suitable for the development of CAS, become a kind of early, a new and effective software development paradigm. MAS are constituted by the behavioural correlation and structural correlation between agents. Each Agent, as an autonomous entity, performs a series of actions in the environment where it resides. As the basic operating unit of the software system, the execution of actions is affected by the dynamic environment.

Object-oriented design method is to improve the degree of code reuse, people in the process of software development, the solution of some similar problems are summarized, and the concept of design pattern is proposed. Design patterns actually scatter specific details, separating out the changing parts, that is, when one part of the program may change due to some influencing factors, these changes will not be propagated to other parts of the program code, in order to make the program easier to maintain, easier to understand and lower development costs.

The human-computer interaction in this system includes three aspects: first, the user interacts with the system to solve the problem; second, the system administrator interacts with the system to manage the system; third, the expert interacts with the system to obtain the solution results and return the decision opinions. Users interact with the interface Agent first, interface Agent will record the user's identity and stored in its own user repository, as Agent and an increase in user interaction interface, interface Agent can learn the user and the specific understanding of issues users like problem solving model, storage and simple user personalization, at the same time in a man-machine cooperation environment to understand user needs to solve the problem, and under the guidance of the user to the original problem decomposition, the original complicated problem is decomposed into several subtasks can be solved separately. After the problem is decomposed, there are two ways to solve the decomposed sub-tasks. First, the interface Agent communicates with the central control Agent on the basis of understanding and decomposing the problem. Under the coordination of the control center Agent, these sub-tasks are assigned to the model Agent competent for sub-tasks according to certain allocation principles for solving. The second is man-machine cooperation, in which the user selects the candidate model Agent of different sub-tasks provided by the system to solve the sub-tasks. When the system solves the problem and integrates the results, the interface Agent submits the final results to the user. In the system, after the model Agent solves the problem to obtain the preliminary results, the experts will obtain the preliminary results through the network. The interface Agent between the experts and the system is relatively simple and only plays the role of information transmission. After obtaining the initial result information of the problem solving, the expert puts forward opinions on the decision problem based on his/her own expert knowledge, and returns to the system through the network.

The management of the system includes three aspects: Agent management, database management and public information database management. In the system these three aspects of management can be done automatically by the system can also be done by the system administrator. The central control Agent owns the identity information of all agents in the system, owns the information dictionary of agents in the system, and manages all agents in the system. On the one hand, this kind of management work is completed by the user or system administrator with the help of the interface Agent, on the other hand, it is automatically completed by the central control Agent. At the initial stage of system construction, all agents are registered at the central control Agent. The central control Agent stores the basic information of the Agent, including ID, name, type, and competent task type. During the system operation, the multi-agent management in the system is completed, including the registration of new agents, the maintenance and update of the original agents, etc. At the same time, it also undertakes the task of collaborative Agent to communicate information between multiple agents. When there is a new task, it looks for the appropriate model Agent and conveys the task to it. The management of the database part of the system is completed by the system data management function, including getting data from the outside of the system and pre-processing, data storage, update management and so on. The management of the public information base in the system is undertaken by the central control Agent, and the public information base in the system mainly stores the knowledge information Shared by all agents in the system. The management of all three parts can be managed by the system administrator through the interface Agent.

Since the solving methods of the problem can be divided into quantitative method and qualitative method, the system can also solve the problem from these two aspects. In the process of solving the problem of the system, the quantitative method and qualitative method are organically combined to solve the whole problem together. The solution of the problem in the system starts from the

decomposition of the problem. Firstly, the problem is decomposed into several solvable sub-tasks. In this process, there is a combination of quantitative method and qualitative method. After task decomposition, these sub-tasks are assigned to multiple model agents according to certain task allocation principles, and they work together to solve the original problem. Model Agent is the core component of quantitative problem solving in the system. In cooperation with other model agents, it can solve the task (sub-task) and reach its goal. In the process of solving the problem by model Agent, quantitative method is the main method and qualitative method is the auxiliary one. Model Agent has the ability to solve a certain kind of problem and is the “expert” of this kind of problem. Macroeconomic forecasting involves many complex factors and often requires the cooperation of multiple “experts” to complete the task. The knowledge of model Agent is often acquired when the Agent is formed, and can be constantly supplemented by learning in the process of system operation. After the model Agent obtains the task from the central control Agent, if it needs cooperation with other model agents, it will query its partner information database. If no suitable candidate is found, it will send a cooperation request to the central control Agent, and the central control Agent will coordinate the cooperation. The quantitative results obtained by the model Agent are analysed and evaluated by the evaluation Agent, and then several experts make reasonable decision-making Suggestions based on their own experience knowledge. This process is an organic combination of qualitative and quantitative analysis. The solving process of the whole problem in the system combines the qualitative method and the quantitative method organically, which is helpful to make the correct and scientific decision.

4. Conclusion

On the basis of the traditional information mining technology, it has been expanded in two ways. On the other hand, the semantic processing and utilization of information is added, including the acquisition of the semantic optimization page of mining requests through user interface and user interaction, and the summary of the content of the page from the perspective of semantics. Semantic conditions are added into the mining rules for information mining, so as to improve the accuracy of mining. On the other hand, they make use of their autonomy and cooperation to actively learn knowledge and coordinate with each other to serve the overall goal. The technology-based (Web) information mining system can comprehensively apply various mining algorithms, realize the parallel operation of data mining, and obtain convincing mining results. However, it has some problems in the aspect of speed, and it is difficult to deal with resource conflicts in parallel mining. Multi-agent system technology in the design and implementation of Web data mining and intelligence and integration, and so on, has a unique advantage. Multi-agent system structure is hierarchical, so that the multi-agent system can handle very complex and real-time information flow; Agents in the multi-agent system are independent and cooperate with each other. They can not only handle their own sub-tasks, but also cooperate with each other to complete complex tasks. As a result, the work efficiency of the whole system is greatly improved. Due to the encapsulation of Agent, the independence of Agent is very strong, and the whole multi-agent system adopts the programming and program development of Agent, which makes the whole system have good scalability and inheritance. It can be said that Agent technology provides a simple and convenient method for intelligent Web data mining.

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