Research of Enterprise Agile Intelligence Manufacture Technique

Sheng Liu^a, Jubao Qu^a, Junhong Pan^a a*

^a(Department of Mathematics & Computer, Wuyi University, Wuyishan City, Fujian, 354300, China)

Abstract

For the characteristics of the modern production process, through the intelligent manufacturing systems research, the intelligent manufacturing system based on multi-Agent model, and solar power LED products, the manufacturing process, given the system characteristics, network implementation and system construction technology, and the realization of intelligent enterprise information system specific method for the rapid realization of agile enterprises Intelligent Manufacturing provides an important theoretical basis.

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1. Introduction

With economic globalization, the deepening of the process of manufacturing network to drive the product performance perfect, the structure of the complex, functional diversification, making the products included in the design, engineering, production and management of information surge in manufacturing systems is driven from the original energy into information-driven, which requires not only to have a flexible manufacturing system, but also to show intelligence, otherwise it is difficult to handle such a large and complex information work^[1]. At the same time changing market demand and fierce competition in the complex environment also requires a higher performance of manufacturing system flexibility, agility and

* Corresponding author. Tel.: +86-0599-5137529.
E-mail address: wyxyjsj@qq.com.
intelligence. To this end, the paper will be introduced to communicate with each other, the distribution, with Intelligent Multi-Agent Autonomous function of intelligent manufacturing entity to promote manufacturing system, known as agile manufacturing system, its various subsystems to achieve autonomy as possible in order to facilitate applications maintenance and upgrading, while increasing the intelligence of the system.

2. MAIMS system concept

The so-called MAIMS (Multi Agent Intelligent Manufacturing Systems), is the use of multiple Agent (intelligent agent) to a variety of manufacturing activities from order, design, production and marketing are integrated together to achieve multi-Agent aggregation agile manufacturing system[2]. For such a multi-agency, multi-event of conflict systems, each independent of the Agent are required in parallel to complete each individual target, in order to facilitate conflict resolution, thus completing the overall system objectives; but also easy system expansion, a new Agent can always add to an already working system, improve the completeness of the information distribution is the essence of intelligent manufacturing control functions, these features constitute the basis for improved system performance[3,4].

3. MAIMS system characteristics

From the control point of view, this is an adaptive, distributed, parallel manufacturing systems. To be highly flexible, self-organizing function, it depends on the nature of organizational units, units and the coupling between the two formed by this morphology[5]; each Agent is changing the coupling between the fast effective; self-determined orientation and integration tendencies. Agent of determining the overall tendency of the dynamic expression, and integration of sexual orientation is part of the expression of Agent. Manufacturing system of determining the tendency is to perform a given task by the degree of autonomy to determine, the system has self-diagnosis, self-modification and self-learning ability[6,7]. Integrated performance of goal-oriented tendency, for the self-organization, flexibility and scalability for capacity. Figure 1 is a logical framework within Agent.

![Fig.1 Logical frame of Agent](image)

4. MAIMS Network

Agent Integration with the WWW Internet has become the mainstream of enterprise information integration, so the realization of Agent technology combined with the WWW. However, due to Agent communication is point to point between the means of communication, but WWW is the essence of the client and server (C/S) two-tier structure; while the Agent is to use similar to KQML (knowledge query and manipulation language) expressed The syntax of the task, making only the format used to transmit
and display the information structure of the WWW can not be completed. can be resolved by the following two ways:

(1) CGI approach: the preparation of a CGI program, the Engineering KQML messages and information to the news page conversion. Work shown in Figure 2.

(2) Java way: Using the Java-based Agent www's communications capabilities, such Agent is a multi-threaded, and distributed it to other Agent in the Internet, non-synchronous communication using KQML, you can also use Java platform-independent exchange of process information.

5. MAIMS Mode

Manufacturing process to enable enterprises to be completed entirely by market-driven, MAIMS mode of production directly to customers, will design, manufacture and sales of the entire process should be used in parallel mode, the design - manufacturing process shown in Figure 3. Agent which is a customer order to define customer needs, including the specific characteristics of the object was manufactured the description and design of Agent to take advantage of customers in interactive dialogue. Design Agent's manufacturing customers mainly the characteristics of the object identification and assessment, and gives the technical parameters of manufactured products, while it also on the design and operation rules and constraints are described and regulations, and the performance of the simulation in the form to the customer. Planning / Scheduling Agent to complete the main task decomposition, coordination, identifying specific implementation plans, resource allocation, scheduling. Agent is an adaptive process control system, which implementation plan / dispatch order of production, and maintaining the stability of the production process.
6. Enterprise MAIMS simulation

To further illustrate the theoretical feasibility of this study, combined with Optical Co., Ltd. Wuyi Xintai production process of solar LED lighting products, indicating that the system application process. Internal network (Intranet) technology to accelerate enterprise information system (EIS) process of building, because the Intranet technology allows between various functional departments within the enterprise can think that an independent enterprise, and can become a global manufacturing system, a child node, its corporate functions of the model simulation shown in Figure 4. As the various sub-sectors and mutual cooperation in various independent Agent, during which there is no human master-slave relationship, they all have their own functions, equality between them through mutual coordination of the communication itself together to accomplish the goals for system, the Agent is the use of negotiation mechanism between the decision-making, its theoretical foundation for distributed artificial intelligence, which is determined by the Agent collaboration features. Intranet technology has changed both the internal information of the original hard-wired way to make them into a loose soft connection, this connection is conducive to information system restructuring.
Fig.5 Our system and compare the performance of other manufacturing systems

This information structure through simulation, we found that it has the following advantages: (1) help enterprises to a market opportunity for the speedy achievement of the required resources to meet this market opportunity and effective integration. (2) MAIMS is a change within the scope of market opportunities for different, internal organization has to change. (3) fully open to internal and external information, both for the rational allocation of social resources, but also conducive to competition and cooperation between enterprises.

Figure 5 shows our system and literature comparison of the system Document [5-7], from which we can see, our system has higher efficiency and lower production costs.

7. Conclusion

Multi Agent Based on the characteristics of intelligent manufacturing systems analysis, to achieve MAIMS in Internet solutions, to enable MAIMS mode of production directly to customers, made from the design, manufacture and sales of the whole process parallel mode, the enterprise All the market-driven manufacturing process completed and building of enterprise information systems with specific programs, to promote business investment in low-cost, high-profit output is very helpful.

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