

Development of Expert System

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Abstract

The difficulty in managing manufactory with custom and individual production forces development and evolution in expert system technology. The uniqueness of each order, resource constraint and existence of different technical ways to fulfill an order make this task interesting. This paper considers the use of expert systems techniques in the field of printing house manufacturing and gives as an example a prototype developed by author of this paper. The prototype addresses the problems of front end scheduling and the allocation of critical resources for maximum efficiency. The special value of the prototype is computer compilation of all technical and production documents based on order description from the manager.

Keywords: expert system, database, data mining.

1 Introduction

The individual production management problem is defined as the specification of the number of each type of resources (raw materials, equipment, technological chain) to use in a manufacturing system for a given planning horizon. Mainly, the approaches that dealt with this problem are complicated production route for every order, which overlaps with other orders in the struggle for resources. Also is important, an initial assessment of the cost. Filling in the order form, manager get technological map, where is indicated optimal path (all the necessary processes, optimal equipment and employee for each, astronomical time, workers time, raw materials, other production costs, cost total).

So, the remaining of this paper is organized as follows. First, Section 2 introduces the Expert System Simulation Approach (ESSA) that constitutes the utilization scope of ESMRS. Then, Section 3 describes the

Expert System static and dynamic knowledge representation, whereas Section 4 presents the basic Expert System features as well as its development using a commercial system shell. Finally, Section is dedicated to conclusion and future work perspectives.

2 Knowledge representation

Two main kinds of knowledge constitutes the core of any Expert System, also called knowledge based system: the static and the dynamic knowledge. The first is the group of concepts describing the expertise domain, where as the second is the reasoning mechanism. Both are exploited by the Expert System inference engine either to inductively answer a question or to deductively generate new facts.

In the job selection production route problem using the system, the main concepts are: optimization objective, performance measures, machine departments, performance limits and optimization history. Theses concepts are modeled using an bid data base of experts knowledge, in which each object is defined by a set of private data called attributes and a set of intrinsic functions called methods. Objects are also categorized into classes and sub-classes and both attributes and methods are inheritable.

The dynamic knowledge, also called ‘know-how’ can be schematized by a general resolution procedure in which each function or step is realized by a set of production rules.

Olso all problems are diagnosed, the Exper System tries to establish the list of corresponding feasible recommendations. Such recommendations should ensure the feasibility of all orders without deterioration in indicators a previously obtained orders. Then, the system ranks the feasible recommendations according to the severity of the related problems. Thus, a ‘lack of resource’ problem is generating order for purchase department, using data of all providers, purchases and experience of wirk with this material. Other related problem is manufacturing employment. Expert System evaluate possible production plans and checks order date of issue, considering other orders and raw material delivery time. In addition, problem solutions are ranked by decreasing in order of their difficulty of eliminating, with offered solutions.

3 Results

The Expert System for manufactory with custom and individual production was developed and implemented. User-friendly interface is supported this product too.

As a result of implementation is increase in the capacity of the enterprise by optimizing process planning. Reduction of stock and in-depth analysis of offers from suppliers allow you to save on raw materials. Increase in accuracy of calculation of the preliminary cost price reduces the risk of losses and raises competitiveness. Accuracy and transparency of production plans allowed to transfer workers to piece-rate wages. Master Data administration make the system flexible and viable. Order system is making possible all users see at what stage the order is located and what parameters it has. There are electronic job ticketing and shipping labels, what reduces the percentage of errors in order execution.

After the order is made the final calculation (verification) is calculated. If there were large deviations between the plan and the fact, the system detects the points of deviation and looks for the reasons. Human experts are join this detection, they write reasons and all is introduced into system knowledge of the industry.

The System collects and provides all needed statistical and financila analysis for different type of users.

4 Conclusion

Once a expert system is developed and the data based is designed, it must be implemented, a task often more easily discussed then carried out. Expert system, about which there is a discourse, is implemented and works. Nonetheless, there will inevitably be changes needed. There is a desire to contribute to the system more and more intelligence. Besides, artificial intelligence techniques such as expert system, will be used in each industry, ousting human experts.

Acknowledgments.

The research described in this publication was made possible in part by - Casa Editorial Poligrafică “Bons Offices”.

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