Chapter 21

Implementation of an Intelligent Model for Decision Making Based on CBR for Supply Chain Solution in Retail for a Cluster of Supermarkets

Adrian F. Loera-Castro
Technological Institute of Ciudad Juarez, Mexico

Jaime Sanchez
Technological Institute of Ciudad Juarez, Mexico

Jorge Restrepo
Autonomous University of Juarez City, Mexico & Technological University of Pereira, Colombia

Angel Fabián Campoya Morales
https://orcid.org/0000-0002-2920-1186
Autonomous University of Juarez City, Mexico

Julian I. Aguilar-Duque
Universidad Autónoma de Baja California, Mexico

ABSTRACT

The latter includes customizing the user interface, as well as the way the system retrieves and processes cases afterward. The resulting cases may be shown to the user in different ways, and/or the retrieved cases may be adapted. This chapter is about an intelligent model for decision making based on case-based reasoning to solve the existing problem in the planning of distribution in the supply chain between a distribution center and a chain of supermarkets. First, the authors mentioned the need for intelligent systems in the decision-making processes, where they are necessary due to the limitations associated with conventional human decision-making processes. Among them, human experience is very scarce, and humans get tired of the burden of physical or mental work. In addition, human beings forget the crucial details of a problem, and many of the times are inconsistent in their daily decisions.

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INTRODUCTION

Knowledge-based decision models are getting significant attention in the academia and the industry. A vast amount of original research and thesis projects have been carried out to make robust decision support systems (DSS) to facilitate managerial decisions. Decision Support Systems are categorized as a specific class of computerized information system that supports management decision-making activities. By the early 1970s, the concept of decision support systems had been conceived through the work of Scott Morton. The approach tries to analyze strategic decisions to offer support to decision makers (DMs) in a complex and poorly structured situation. DSSs have some advantages in the decision-making process by assisting decision makers in their tasks and improving the quality of decision process (Zarate, 2013). The concept of DSS comes from a balance between human judgment and information process by a computer.

On the other hand, Kolodner et al. (2014), case-based reasoning (CBR) suggests a model of reasoning that incorporates problem solving, comprehension and learning and integrates everything with memory processes. Within artificial intelligence (AI), when one talks of learning, it usually means the learning of generalizations, either through inductive or through explanation-based means. Though the memory of a case-based reasoner notices similarities between cases and can therefore notice when generalizations should be formed, inductive formation of generalizations is responsible for only some of the learning in a case-based reasoner. Case-based reasoning achieves most of its learning in two other ways:

- Through the accumulation of new cases
- Through the assignment of indexes

New cases give the reasoner additional familiar contexts for solving problems or evaluating situations. A reasoner whose cases cover more of the domain will be a better reasoner than one whose cases cover less of the domain. One whose cases cover instances of failure as well as success will be better than one whose cases cover only success. New indexes allow a reasoner to fine-tune its recall apparatus so that it remembers cases at more appropriate times.

That is not to say that generalization is not important. Indeed, the cases a case-based reasoner encounters give it direction in the creation of appropriate generalizations, that is, those that can be useful to its task.

CBR is not the first method that combines reasoning and learning, but it is unique in making learning little more than a byproduct of reasoning. A case-based reasoner that remembers its experiences learns as it reasons; feedback from early experiences gives it insight for solving later problems.

BACKGROUND

The Role of Distribution in the Chain of Supply

A supply chain is defined as a process with a complete set of activities wherein raw materials are transformed into final products, then delivered to customers by distribution, logistics, and retail. All inter-organizational practices such as planning, purchasing, distribution, delivery process, and reverse logistics are considered as a supply chain management system (Brandenburg, Govindan, Sarkis, & Seuring, 2014; Fahimnia, Sarkis, & Davarzani, 2015; Yazdani, Hashemkhani Zolfani, & Zavadskas, 2016).