



Chapter V

Knowledge Discovery Process and Introduction of Domain Knowledge

Katsutoshi Yada
Kansai University, Japan

ABSTRACT

This paper describes the framework of knowledge discovery process in sales data and how the data mining system is applied to the data in the real business world by using the domain knowledge. First the framework of the knowledge discovery process in databases is reviewed. It is not clear how users construct the actual data mining process and use the domain knowledge in the existing models. We propose a two-dimensional matrix of knowledge for analysis of sales data to understand the knowledge discovery process from purchase history. And then Then we distinguish the data mining process from the creation of business action. We point out that efficient knowledge discovery can be achieved by intensively introducing domain knowledge of experts to the creation of business action.

Introduction

With the propagation of information technology typically represented by the Internet, enormous amount of data can be accumulated, and there are now strong interests in data mining in the research and business fields (Hamuro, 1998). Despite the efforts of the analysts, the useful knowledge cannot be effectively discovered very often. In Japan, many companies have also been studying the introduction of data mining systems, and effective management of business process by data mining is considered to be very important in future.

In joint research projects with many firms, we have successfully discovered useful knowledge by using data mining (Hamuro, 2001; Ip, 2000, 2002). In this paper, we try to elucidate the process of knowledge discovery from sales data and to construct a process model for efficient data mining based on these experiences. In the conventional process model, steps of typical data processing are expressed, and it gives no clear explanation as to which kind of knowledge is converted in the data mining process or how the domain knowledge should be introduced. By the use of a two-dimensional matrix for type of knowledge, we clearly identify the type of knowledge to be converted in the data mining process and the path of the conversion. We also assert that business action is created from interaction between tacit knowledge and explicit knowledge of the data analysts and the marketing staff, and that domain knowledge should be efficiently introduced to be a part of the discovery process.

Review of the Existing Studies

First, we will review the existing studies on the knowledge discovery process. The problems in the framework of the conventional knowledge discovery process are pointed out, and we will clearly define the primary aim of the present article.

Framework of Knowledge Discovery Process

Matheus et al. (1993) explained a model of the entire system and its elements along the knowledge discovery process. As major domains, they cited acqui-

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