Chapter XVII
Green Product Retrieval and Recommendations System

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ABSTRACT

This chapter introduces a preference-based recommendation procedure in a green product information retrieval system. It constructs a green information management system based on data mining technology. Green products and relevant green regulations were collected and then integrated in a content-based and collaborative filtering method to provide a preference-based query interface for green products. It is hoped that the proposed system offers consumers a green information platform when they are considering buying green products. Our proposed system recommends the best possible choices for consumers that indicate a green preference. Besides serving as a green information retrieval for the consumers, the system also assists the product designers with understanding the preference some consumers have for green products and the satisfaction they get from buying these products.

With the steadily worsening pollution and the continuous degradation of the environment, consumers are becoming more and more concerned about what they eat, the goods they purchase, and the impact it has on the environment. Jones (1994) pointed out that 94% of Italians will consider the green index when selecting a product; 77% of Americans regard the green index as an important reference for purchase and more than 40% of consumers in Europe love to purchase products with a green seal. However, in Asia green consumerism is still a very limited phenomenon, as far as the share of green consumers in the overall population is concerned, as well as the willingness to pay for green products. At the same time however, there is little useful information available on the Internet that helps consumers to make a green purchase decision.

To respond to the global environment trend, an increasing number of environmental labeling programs have been developed that identify producers and the level of environmental friendliness of their

company or their product. Meanwhile, more and more companies are emphasizing green in their product as a matter of business policy. However, most of the green products that are being produced are designed to follow the international green regulations and policies, for example, WEEE, RoHS, and so forth, and few producers consider the consumers' needs and perception of green. As a result, the market share of green products remains restricted. How to increase consumer satisfaction, while being restricted by a limited budget and guided by only a set of basic green rules, is an important task for a green producer. In other words, the criteria that need to be considered for producing a green product should be identified beforehand.

Consumers often find it difficult to understand let alone make a judgment regarding the criteria of the green products in the market. Faced with the huge amount of general information available on the Internet, consumers have to spend much time and effort sorting through the results provided by all kinds of search engines, forums, advertisements, and so forth. Therefore, we will design a green product information retrieval system which provides consumers with green information, green products recommendation, and allows for feedback regarding the level of satisfaction with the recommender system.

In other words, the system will provide a green platform for the green product designers so that the producers can create green models by which to understand the expectation of consumers regarding green products.

MANAGEMENT INFORMATION SYSTEM

The Trend of E-Business

First, business and technology trends are changing rapidly. More and more enterprises increase their portion of the e-market and develop their informa-

tion systems (Post & Anderson, 2003). Utilization of the Internet has changed how people network and communicate, and the worldwide Web has changed how we obtain information.

Consequently, customer-oriented interactive systems are becoming a major trend in the development of the current e-business system (Blecker et al., 2005). Information systems should support the requirements of the customers while automating the operating process, allowing customers to configure their products by specifying the attributes of the products they are looking for (Bramham & MacCarthy, 2003). In order to configure a system for a user, the system requires an accurate understanding of the customer's needs so as to create a complete description of a product that suits the consumer's individual requirements. Given a set of customer requirements and a product family description, the task of configuration is to find a valid and completely specified product among all of the alternatives (Sabin & Weigel, 1998). Up to now, the product configuration process has been a very technical-oriented process, necessitating product expertise of the customer while seldom taking into account the requirements of the customer.

When it comes to configuration knowledge, there are three important design approaches based on: (a) rule-based, (b) model-based, or (c) case-based, respectively (Sabin & Weigel, 1998). The rule-based knowledge representation method relies on rules which have the following form: "if condition then consequence," which is the most common one implemented in practice. The main assumption behind model-based reasoning is that the system's model consists of decomposable entities and interactions between their elements. For configuration problems with high product complexity, model-based approaches are more convenient than rule-based approaches. The case-based approach relies on the assumption that similar problems have similar solutions. The knowledge necessary for this type of reasoning consists of cases that record a set of configurations

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