A Virtual Expert System for Internet Recommendation of Experience Products:

Development and Empirical Validation of a Bayesian Residual Model

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The information overload caused by the explosive growth of the number of products available in online stores has created a set of new marketing problems on how to accelerate online shoppers' purchase decisions by helping them find the right products with minimum search costs and what to promote without annoying their target customers. Internet recommender systems, one of intelligent agents, are services to aid people searching information/products by screening out (filtering) a set of information or products most valuable or interesting to them. So, these systems are attracting online sellers and shoppers' attention as a new one-to-one marketing tool.

The objective of this dissertation is to develop a model for Internet recommender engines that predict consumer preferences on, especially, experience products. We develop a hierarchical Bayesian model that embeds automated "word-of-mouth" information from virtual experts representing a group of consumers into the random utility model to supplement the predictive power of consumer preference model So, it exploits information on product attributes and other customers' product preferences simultaneously in an explicit fashion to predict target customers' preferences on products. A finite number of virtual experts are developed from a group of people who are similar each other in their preferences through model-based clustering.

This research will make three specific contributions to the marketing literature. First, we develop a general consumer preference model for products with missing information on product attributes such as experience products in which some attributes are not quantifiable. Therefore, this model can be applied not only to recommender systems but also to many other choice problems to enhance the predictive power of them if critical product attributes are missing or not quantifiable. Second, our model is more efficient than existing models for Internet Recommender Systems since it utilizes both attribute information and word-of-mouth information in a complementary way while the current existing models use only part of them. The model is flexible enough to incorporate a variety of different information available in online retailers' customer database such as customer characteristics since the hierarchical Bayesian framework is

employed. Third, this model bridges the methodological gap between the two existing approaches- attribute-based filtering and collaborative filtering - by structurally incorporating the ideas of both approaches.

Online companies like e-retailers can use our model for some practical marketing problems they encounter: (1) Our model makes it possible for online companies to provide customers with personalized services and promotion, the result is the eventual form of mass customization for e-Business; (2) Based on that, they can develop customer loyalty on the Internet. The more a customer uses the recommender system, the more loyal they are to the site since the company can prodvide more personalized recommendation; (3) Another interesting problem our model can be applied and extended to is the development of virtual stores personalized to each customer. Information obtained from recommendation system can be utilized not only for passive services responding to customers' requests but also for active one-to-one marketing by customizing the contents and formats of information displayed on web sites when a target customer visits the web sties. This is an interesting way of utilizing the value of recommender system for mass customization.