

An Efficient Selection Method for Personalized Advertisements Using Bitwise Operations^{*}

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1. Generating Recommendation Rules

Personalization is the ability to provide products and services tailored to a customer based on his/her demographic characteristics or based on his/her past purchasing behavior. Most of the tools developed such as *BroadVisions One to One*, *Net Perception's E-Commerce* use either the collaborative filtering or the rule-based approach. Some tools integrate both approaches. In the rule-based approach, providing personalized advertisements totally depends on the rules generated by both marketing experts and recommendation systems. However it is very difficult for human experts to construct or manage all the recommendation rules to select appropriate ones to each customer from lots of items without the help of the recommendation systems. Thus developing rule generation algorithms has been the major issue in this area and many researches has been carried out. One of them is the decision tree methods like *CART*, *C4.5*, *QUEST*.

2. Selecting personalized recommendations

Another issue in the rule-based approach, which has been less paid attention to than the generating issue, is about efficient methods of selecting some personalized advertisements appropriate to a specific customer from the whole set of items to advertise. Regarding this issue, most of systems are adapting "If-then" inference engine to select the best advertisements. In this study we propose an alternative method that is

^{*} This Research was supported by SOREC (Software Research Center) Designated by KOSEF in Chungnam National University. (Research No: 00-11-05-99-A-1)

faster than the “If-then” engine and is easy for human experts to incorporate their thoughts to the rules generated by systems. Such an investigation is motivated when we notice that some sites such as virtual shopping malls are handling much more items to be selected for advertisement than usual shopping malls since these sites are connected to lots of various kinds of business sites.

3. Bit - operation

We suppose that the selection rules for an advertisement have been generated by decision tree algorithms based on the pre specified fields which can be coded with binary. Then both the selection rules and customers who are supposed to get the advertisements are also constructed only with the fields. We suggest a scheme to represent both selection rules and customer’s feature in a vector form appropriate for bit operation, which enables faster choices of the best advertisements than the conventional inference engine. Also this scheme contains a method of selection process. An experiment to show the effectiveness of the proposed scheme is performed using an Internet survey data artificially constructed.

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RESUME

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