Personalization System based on Dynamic Learning

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1 Introduction

In the Semantic Web, it is required that information systems have high-flexibility to deal with changes of the target world. This is because various new services come into being, and various terms are used.

We have developed a recommender system CRADLE that has high-level dynamic properties. In this article, we introduce CRADLE and illustrate its use case by example.

2 CRADLE

CRADLE (CorRelAtion Discovery and Learning Engine) is a recommender system that realizes personalization. CRADLE uses three types of information internally:

profile: profile represents characteristics of the content, and consists of the set of attributes.

case: case is defined by a relation between profiles which occurred in the past. It consists of related profiles and the attributes of the relation such as weight or status (Figure 1).

rule: rule is explicit business logic (ex. campaign rule)

CRADLE is a hybrid recommender system combined with case-based reasoning (CBR) and rule-based processing techniques (Figure 2). The hybrid recommendation is performed according to the following procedure:

1. A rule-base part attempts to apply rules to the query and it rewrites the query according to the matched rule.
2. A CBR part recommends the contents. First, this part retrieves cases with the profile which similar to the query, and then performs the cross-profile correlation learning using the similar cases. Finally it calculates the importance of each attributes according to the degree of contribution to the correlation, and returns the results.

In the above procedure, CRADLE use a dynamic algorithm at the learning phase. This algorithm is able to deal with frequent changes of the data. So, CRADLE can handle dynamic attributes such as trend or complicated relation that is difficult to categorize.

Moreover, the importance of the attributes are determined dynamically and the weighted attributes indicate the characteristic of the recommendation. This is personalized information and it is important to support decision-making of the user.

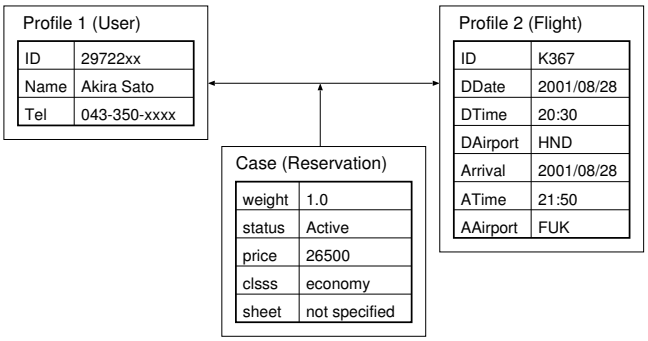

Figure 1: Data model of case

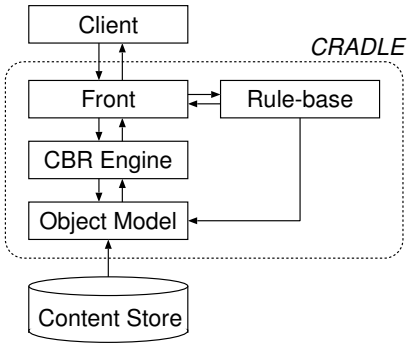

Figure 2: CRADLE: system description

3 Example

We have applied CRADLE to the community portal, and built a prototype system. This system recommends appropriate communities to the user according to the user's attributes such as personality, situation, and so on.

For instance, when a user inquires for an hospital near one's home, CRADLE retrieves cases for similar users and then retrieves related hospitals with the cases. In this case, the results reflect the user's properties (ex. address, sex, and age). Moreover, the results return important attributes of the contents and it can be used to make decision.