A Study on Intelligent Users’ Behaviors Feedback Model

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Abstract: In this study, we propose an intelligent feedback model of users, which can collect the preference features of online users and give online users on-time feedback for search. The proposed model includes three main functions for online users, which are feature extraction, behavior classification and behavior preferences evaluation. Also, it can save the search time for users, make the preference feedback effectively and recommend the commodity for online users.

We build an intelligent user feedback model to provide the on-time feedback and correct information for on-line users. The proposed model consists of two sub-models, namely the User Behavior Collection Sub-model and the User Behavior and Commodity Recommendation Sub-model. The user behavior collection sub-model collects and extracts the online user features through recommendation web sites. The user behavior and commodity recommendation Sub-model makes the data/information from the first sub-model filtered, indexed and recommended using the proposed collaborative filter algorithm.

We used Web server to host websites and let Amazon EC2 as cloud computing platform to do data mining in Hadoop and Mahout based implementations. As the result shows that our proposed model not only can save the search time for online users, make the preference feedback effectively but also can recommend the commodity on time for users.

Keywords: Commodity recommendation; Collaborative filter algorithm; Cloud computing; Data mining

1. Introduction

Along with the prosperity of internet, the recommendation systems emerge as a result. Recommendation systems apply knowledge discovery techniques to the problem of making personalized recommendations for information, products or services during a live interaction [1]. Sarwar et al. [1] analyzed different item-based recommendation generation algorithms, and looked into different techniques for computing item-item similarities and different techniques for obtaining recommendations from them. Yang and Li [2] proposed a collaborative filtering approach based on heuristic formulated inferences. The proposed approach was based on the fact that any two users may have some common interest genres as well as different ones. This approach introduces a more reasonable similarity measure metric, considers users’ preferences and rating patterns, and promotes rational individual prediction, thus more comprehensively measures the relevance between user and item. There are some E-commerce applying recom-
mendation systems to serve the users, e.g., Amazon.com, eBay, and CDNow.com [3-5].

The purpose of this study is to propose an intelligent feedback model of users, which can collect the preference features of online users and give online users on-time feedback for search. The proposed model includes three main functions for online users, which are feature extraction, behavior classification and behavior preferences evaluation. Also, it can save the search time for users, make the preference feedback effectively and recommend the commodity for online users.

In this study, we used Web server to host websites and let Amazon EC2 as cloud computing platform to do data mining in Hadoop and Apache Mahout based implementations. As the result shows that our proposed model not only can save the search time for online users, make the preference feedback effectively but also can recommend the commodity on time for users.

2. Framework of the Proposed Model

We present the proposed intelligent users’ behaviors feedback model in this section. The circumstance of the proposed model is as shown in Figure 1.

There are two sub-models in the proposed model, namely, the User Behavior Collection sub-model and the Recommendation sub-model for User Behavior and Commodity, as shown in Figure 2.

The functions of these sub-models are as the follows:

1) The User Behavior Collection Sub-model can collect and extract the online user features through recommendation web sites. There are two modules in this sub-model, namely, User Behavior Features Collection Module, and User Behavior Features Extracted Module, as shown in Figure 3.

2) The user behavior and commodity recommendation Sub-model makes the data/information from the first sub-model filtered, indexed and recommended using the proposed collaborative filter algorithm. There are two modules in this sub-model, namely, User Behavior and Commodity Information Module, and User Behavior and Commodity Indexed with Ranking Module, as shown in Figure 4.

The proposed model can provide user with fitting preference information.
Figure 1. Circumstance of the proposed model

Figure 2. Framework of the proposed model
Figure 3. Framework of the Users’ Behavior Collection Sub-model

Figure 4. Framework of the Users’ Behavior and Commodities Recommendation Sub-model
3. Implementation of the Proposed Model

(1) Implementation environment requirements are as follows:
Software development platform: Eclipse Indigo
Implementation language: JAVA 2 Standard Edition 6.0
Database: MySQL 5
Data mining tools: Hadoop-0.20.2, Mahout 0.5
Cloud server: Amazon EC2

(2) For convenient to Taiwanese users, we use the traditional Chinese character as the interface. Suppose there are five shopping districts, saying, 公館商圈, 士林夜市, 台北車站, 饒河夜市, and臨江商圈, etc.

1) District recommendation:
Selected recommendation restaurant shopping district is as shown in Figure 5. Fitting the recommendation shopping district lists are as shown in Figure 6.

2) User’s preference recommendation:
Selecting user’s preference items are as shown in Figure 7. Selecting the restaurant to fit user’s preference items are as shown in Figure 8. Recommendation restaurant lists to fit the user’s preference are as shown in Figure 9. From Figure 7-9, we can have the effective performance.

Figure 5. Selected recommendation restaurant shopping district
### 評鑑團

您想查詢餐廳商圈是臨江商圈
下表依照您的偏好及區域進行推薦餐廳

<table>
<thead>
<tr>
<th>推薦清單</th>
<th>店名</th>
<th>價格</th>
<th>商圈</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Mr.J義法廚房</td>
<td>350</td>
<td>臨江商圈</td>
</tr>
<tr>
<td>02</td>
<td>漢香居異國料理</td>
<td>300</td>
<td>臨江商圈</td>
</tr>
<tr>
<td>03</td>
<td>瓦城泰國料理</td>
<td>450</td>
<td>臨江商圈</td>
</tr>
<tr>
<td>04</td>
<td>義式履古拉爵</td>
<td>423</td>
<td>臨江商圈</td>
</tr>
<tr>
<td>05</td>
<td>馬賽法式廚房</td>
<td>499</td>
<td>臨江商圈</td>
</tr>
<tr>
<td>06</td>
<td>Kimmi food &amp; Drink</td>
<td>300</td>
<td>臨江商圈</td>
</tr>
<tr>
<td>07</td>
<td>吃蛋吧Omelet to Go</td>
<td>305</td>
<td>臨江商圈</td>
</tr>
</tbody>
</table>

*Figure 6. Fitting the recommendation shopping district lists*
### alley food 评鑑團

[Image]

**Figure 7. Selecting user’s preference items**
jack您好:
请依照您的偏好填选，下列符合您的餐馆项目

请选择符合您的偏好项目
注意!条件太苛刻，餐馆资料可能无法符合

餐馆外部装潢
非常喜歡 ☑ 喜歡 ☑ 普通 ☑ 不喜歡 ☑ 非常不喜歡

餐馆内部装潢
非常喜歡 ☑ 喜歡 ☑ 普通 ☑ 不喜歡 ☑ 非常不喜歡

服务态度
非常喜歡 ☑ 喜歡 ☑ 普通 ☑ 不喜歡 ☑ 非常不喜歡

座位空间舒适度
非常喜歡 ☑ 喜歡 ☑ 普通 ☑ 不喜歡 ☑ 非常不喜歡

餐馆环境卫生
非常喜歡 ☑ 喜歡 ☑ 普通 ☑ 不喜歡 ☑ 非常不喜歡

Figure 8. Selecting the restaurant to fit user’s preference items
jack您好:
根据您所设定个人与餐厅偏好

我们推荐您数则，您可能会感兴趣之餐厅

<table>
<thead>
<tr>
<th>推 薦 清 單</th>
<th>排名</th>
<th>店名</th>
<th>價格</th>
<th>商圈</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>馬辣頂級麻辣鴛鴦鴨</td>
<td>650</td>
<td>公館商圈</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>天外天精緻麻辣火鍋</td>
<td>600</td>
<td>公館商圈</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>天麻麻辣火鍋</td>
<td>500</td>
<td>公館商圈</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>小樂牛頂級麻辣火鍋</td>
<td>500</td>
<td>公館商圈</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>皇家帝國麻辣鴛鴦鴨</td>
<td>550</td>
<td>西門町</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>飛天麻辣火鍋</td>
<td>500</td>
<td>西門町</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>滿堂紅頂級麻辣鴛鴦鴨</td>
<td>650</td>
<td>敦南商圈</td>
<td></td>
</tr>
</tbody>
</table>

Figure 9. Recommendation restaurant lists to fit the user’s preference
4. Conclusion

Via the implementation of our proposed model, we have that the proposed model not only can save the search time for online users, make the preference feedback effectively but also can recommend the commodity on time for users.

References


