Improving Recommendation in E-Commerce Using Apriori Algorithm

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Abstract- The project aims at improving recommendation in E-Commerce websites. For that there will be User Interface development which acts as a kind of input module to the project. The existing E-Commerce websites aim at providing recommendation based on the transaction history of the user and sometimes they recommend latest products and also highly rated products. In our project we aim at recommending products to the user based on the transaction history of other users who has same characteristics as this user. Thus we aim at collecting details like Age, Gender, Education, Marital status, Salary etc. So there requires the data mining techniques like clustering. Apriori Algorithm is the main algorithm used in our project. Apriori Algorithm is the general algorithm which can be used by developers according to their need and implement it in their projects.

Key Words: E-Commerce, Apriori, Association rule mining, Market Segmentation, Data Mining, Recommendation.

1.INTRODUCTION

Association rule mining is a major factor and a method of data mining. Apriori algorithm is a tool in association rule mining used to implement it. Data mining helps using the huge amount of data in an efficient way, extract the required data and predict the future based on customer behavior. Data mining is one of the steps in the knowledge discovery process. It is the process of extracting interesting patterns from large amounts of data and in the proposed system it’s used to provide recommendations to the customers based on their profiles. Data mining uses the already available data i.e., datasets to solve a problem or to find the patterns. The two types of data mining tasks: descriptive and predictive. Predictive data mining or predictive analysis uses modelling, statistical techniques to study the current and historical data to predict the future. Descriptive data mining or descriptive analysis uses data aggregation to provide an insight into the past. Data mining is widely used by different companies and organizations to extract information, predict the future like predicting stock market, sales, profits. It helps the companies to gain information about customer satisfaction. Using data mining, organizations can increase their profit by providing better services customer and minimizing the risk. In the proposed system, Association rule mining is used to extract the customer transaction data from a e-commerce organization. Apriori algorithm is used to analyze the customer behavior based on his/her profile and provide recommendation to the customer by extracting and finding matching patterns.

1.1 Data Mining Tasks

The initial form of data is the data present in a database. The first step of data cleaning process is the removal of invalid data, the NULLs, the transactions aborted mid-way (3). The next step of refinement is removal of the data which is not necessary for the analysis, say if we are analyzing the products bought in India, there is no point in considering the data of the products bought in Germany. The next step is clustering, grouping of data which are similar. There are a bunch of parameters set for any client or a transaction, the transactions for which most or all of these properties match are grouped as similar. The end result of such a clustering is that when a new transaction or client registers with the same properties as set before, the output of the analysis can be utilized on that client. The final step in the process is transforming the data which we have refined till now into a format the pattern searching algorithm expects.

1.2 Transaction Set for Apriori Algorithm

1. CUSTOMER_DETAILS

<table>
<thead>
<tr>
<th>Email_ID</th>
<th>Name</th>
<th>Password</th>
<th>Gender</th>
<th>DateOfBirth</th>
<th>MaritalStatus</th>
<th>HighestDegree</th>
</tr>
</thead>
<tbody>
<tr>
<td>user1</td>
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</tbody>
</table>

2. CUSTOMER_TRANSACTIONS

3. ITEM_DETAILS

4. TRANSACTIONDETAILS

2. APRIORI ALGORITHM

The steps for the algorithm:

- Scan the opinion data set and determine the support(s) of each item.
- Generate L1 (Frequent one item set). Use Lk-1, join Lk-1 to generate the set of candidate k - item set.
- Scan the candidate k item set and generate the support of each candidate k - item set.
- Add to frequent item set, until C=Null Set.
- For each item in the frequent item set generate all non empty subsets.
- For each non empty subset determine the confidence. If confidence is greater than or equal to this specified confidence. Then add to Strong Association Rule.
A->CLASSIC TIES
B->CASUAL SHIRT
C->BLUE SHIRT
D->SPORTS SHOES
E->CASUAL SHOES

INPUT DATASET:

<table>
<thead>
<tr>
<th>TID</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A,C,D</td>
</tr>
<tr>
<td>2</td>
<td>A,C,E</td>
</tr>
<tr>
<td>3</td>
<td>A,B,C,E</td>
</tr>
<tr>
<td>4</td>
<td>B,E</td>
</tr>
</tbody>
</table>

Minimum Support = 50%
Minimum Confidence = 80%

Item set: A, B, C, D, and E

STRONG ASSOCIATION RULE:

This is the result obtained.

1. {B}->{E}
2. {CE}->{A}
3. {AE}->{C}
4. {A}->{C}
5. {C}->{A}

3. CONCLUSIONS

The proposed system uses Apriori algorithm for finding item sets frequently bought together considering customer profile factors such as age, gender, income, education, marital status rather than providing product based recommendation. The customer spends more time due to better recommendation. This increases the profit for the organization and also increases the number of customers.

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