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Role Mining for Context-Aware Recommendation using Cluster on E-Commerce Clothing

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***Abstract*: Recommendation systems have been trying to utilize context information to recommend services that better meet the needs of the consumers. However, current service recommendation techniques are mainly based on individual intelligence or the local knowledge of users. The main objective of this paper is to develop a web application which will provide clothing recommendations based on the group of users having the same roles.**

***Keywords*: Recommendation, context-aware, role mining, cluster**

1. Introduction

Recommendation systems have been proposed to recommend services that bring about the requirements of the users. Recently, context-awareness has been as an important part of these recommendation systems. For example, people these days depend on their smart phones prepare with context aware capabilities to locate themselves, to obtain solutions to their day-to-day problems, and to receive personalized services. In the earlier system service recommendation methods are based on individual performance or local service using up records of users, rather than the common knowledge among them. To be able to group users according to their common knowledge, in this paper, we use the term of "roles" to represent user groups. They represent the abstract characterization of user behaviors within a certain context. Users can take a part in different roles in their life, and their roles change as the text changes. Users who take a part of the same role are likely to share the same liking and behavior patterns. Once a user's role in a certain context is identified, the services closely related to the role can be recommended to the user. The service suggestion from people who play the same role as a particular user is usually more reliable than the others that irregularly play that role. Furthermore, as pointed out by previous work on role modeling, e.g., roles can have different levels and are better represented in a hierarchy, e.g., in the form of ontology. This paper adapts the concept of roles from the domain of Role-Based Access Control (RBAC) and organizes user's interests and habits according to roles. Existing role mining approaches in the field of RBAC only consider two dimension parameters, namely user, permission, and neglect context, which is important in a mobile environment.

2. Existing work

Existing role mining approaches only consider two dimension parameters, namely user, permission, and neglect context, which is important in a mobile environment. Besides, most RBAC research efforts are on static data and disregard the dynamic nature of user preferences and behavior patterns, i.e., changes over time. This is more problematic to mobile services, since mobile users are usually on the move. They need to respond to changing environments and hence contexts. Current service recommendation techniques are mainly based on individual intelligence, and do not take into consideration the common choices among different users. The proposed algorithms are inefficient and may not scale to cope with the large amount of mobile traffic in the real- world. In our system we form a group of users having common interest and then sort them accordingly by forming clusters. To be able to group users according to their common knowledge, we use the notion of "roles" to represent user groups. They represent the abstract characterization of user behaviors within a certain context. Users can take a part in different roles in their daily life, and their roles change dynamically as the context changes. Users who play the same role are likely to share the same choices and behavior patterns. Whenever a person searches for something then he will be recommended taking into consideration the various other searches of people in that cluster who have same interest as that of that person. This increases the choices for individual providing him variety of options to choose. Our system provides variety of choices for the individual. It also outperforms previous work in runtime complexity and scalability. It provides recommendations that are highly specific and filtered because of the use of the concept of data mining and clusters. System provides up to date recommendations.

3. Comparative analysis

This is a user-context table which is based on how many

Table 1
User Context

	<Context,Behavior>					
User		<858,2>	<1065,1>	<1077,1>	<1095,1>	<1049,0>
	39	1	0	0	1	0
	34	0	1	1	0	0
	53	0	0	1	1	0
	47	0	1	1	0	0
	32	0	0	0	0	0

times the user has viewed the context. In the first matrix (Table-1) the user 39 has viewed the context 858 one time. User 39 has not viewed the context 1065 and so on. Here the user is the user ID of the customer & the context is the clothing ID. So based on this views the recommendations will be provided based on the matrix and views.

In the second matrix (Table-2) the count of how many times the user has viewed a particular context is shown. The user 39 has viewed the clothing with ID 858 two times. This is the count of views. Thus the second and first matrix can be compared based on the actual views by the user and the number of times the context is viewed.

Table 2
Count of views

	Context					
User		858	1065	1077	1095	1049
	39	2	0	0	1	0
	34	0	1	1	0	0
	53	0	0	1	1	0
	47	0	1	1	0	0
	32	0	0	0	0	0

4. Proposed system

In our system we form a group of users having common interest and behavior to assign role to the user on particular selected item and then sort them accordingly by forming clusters. To be able to group users according to their common knowledge and behavior on item, we will call them as “roles” to represent user groups. They represent the abstract characterization of user behaviors within a certain context. Users can play different roles in their daily life, and their roles change according to the context. Users who play the same role are likely to share the same preferences and behavior patterns. Whenever a person searches for something then he will be recommended taking into consideration the various other searches of people in that cluster who have same interest as that of that person. This increases the choices for individual providing him variety of options to choose.

5. Advantages of proposed System

- Provides variety of choicesfor the individual.
- Outperforms previous work in runtime complexity and scalability.
- Recommendations provided by the system will be highly specific and filtered because of the use of the concept of data mining and clusters.
- System provides up to date recommendations.

6. System architecture

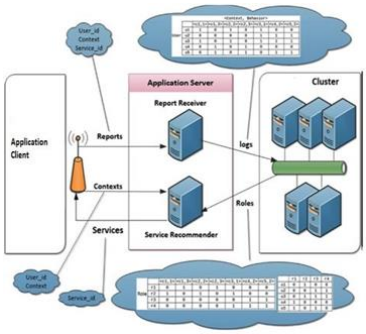
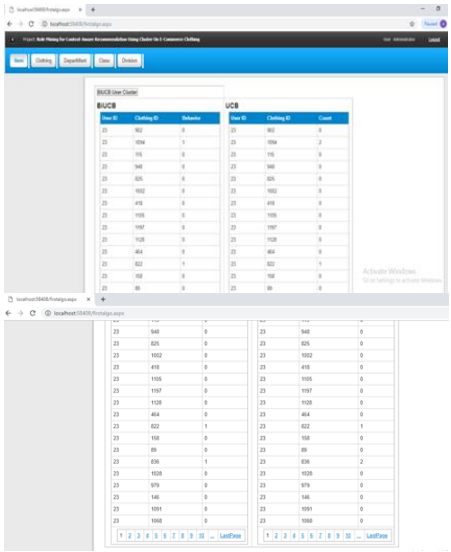


Fig. 1. System deployment framework

It contains three main components: namely Application Client, Application Server and Cluster.

- The received services and respective context information are collected by Application Client, this collected information is then send to the Report Receiver on the Application Server.
- The Report Receiver aggregate the data stream or collected information as logs and send them to cluster for role mining.
- The mined roles send to service recommendation performed based on current context and role of user which can be sent from Application Client to recommender.

7. Experimental results



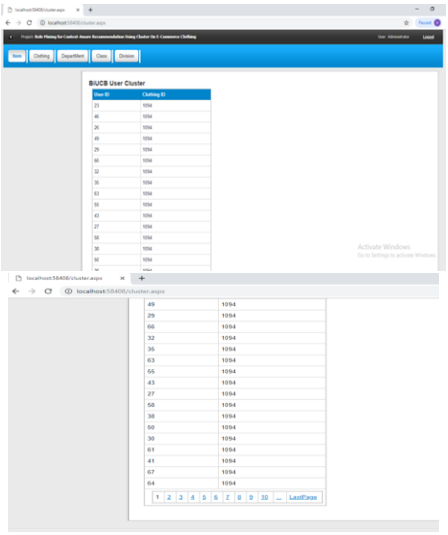


Fig. 2. Results

8. Conclusion

We have implemented the grid views of the forms which will be taken as an input to the processing on it. We have converted the datasets into databases. We have implemented the master page module using the insert query by which we send the data to the database. This is the data on which clustering will be performed. Also we have established the database connectivity.

In future, we aim at performing the clustering on live database. We will be implementing the dynamic style programming and merge style algorithms for the same. The service recommendations will be provided to the users on the updated data. As the technique of data mining will be used, the recommendations provided will be highly specific and filtered.

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