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Transaction Based E-Commerce Recommendation Using Collaborative Filtering

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Abstract: *Product recommendations are a must-have feature for all ecommerce websites as they can drive sales, increase conversion rate and order value. The main aim of this project is to provide the recommendation to the e-commerce users based on user preferences. Customer will be segmented based on the transaction that they perform and based on the customer transaction detail, the user point of interest and cold products is identified in the e-commerce application and the product is recommended to the user using colloborative filtering approach.*

I. Introduction

Recommender system predicts the "rating" or "preference" a user would give to an item and is a subclass of Information Filtering System. The goal of Recommender System refers is to predict the future preference of a set of items for a user, and to recommend the top items. .

Clustering of customer transaction data is an important procedure to analyze customer behavior in retail and e-commerce companies. Analyzing customer behavior is important in order to provide the best product that suite the particular customer and to identify the customer POI and to recommend that product to the user.

In the existing methodologies of e-commerce shopping websites, there is a chance of promoting the products which are more famous in the market. Thus increase in recommendation to the popular products obviously makes major products remain unsold that is said to be cold products. Companies will not recommend any cold rated product to any user until the number of rating to the particular product would increase which would make the cold rated product to be in stock for long time. In-order to recommend these cold items into market, we propose a recommendation algorithm termed innovator based Collaborative filtering or Collaborative code generation method.

The e-commerce recommender system consists of customer segmentation based on the transaction that they perform. Based on the customer transaction detail, the customer purchased tree and product tree will be compared and the user point of interest is identified for further recommendations to the user. In order to promote the product with less popularity among the user, user activeness and the number of product they view and time spent for any leaf node are captured.

II. Implementation Techniques

2.1 Collaborative Filtering

Collaborative filtering is a way of making automatic predictions about the user interests by collecting preferences or taste information from many users.

2.2 Content-Based Filtering

Content-based filtering, recommends items based on a comparison between the content of the items and a user profile. It works with existing profile of the user.

2.3 Hybrid Filtering

This combines both colloborative filtering and content-based filtering methods.

III. Literature Survey

3.1 Xiaojun Chen, YunmingYe, XiaofeiXu, JoshuaZhexueHuang,“ A feature group weighting method for subspace clustering of high-dimensional data,” Pattern Recog., vol. 45, no. 1, pp. 434–446, 2012.

This paper proposes a new method to weight subspaces in feature groups and individual features for clustering high-dimensional data. In this method, the feature so high-dimensional data are divided into feature groups, based on the natural characteristics. Two types of weights are introduced to the clustering process to simultaneously identify the importance of feature groups and individual features in each cluster. A new

optimization model is given to define the optimization process and a new clustering algorithm FG-k-means is proposed to optimize the optimization model. The new algorithm is an extension to k-means by adding two additional steps to automatically calculate the two types of subspace weights. A new data generation method is presented to generate high-dimensional data with clusters in subspaces of both feature groups and individual features. Experimental results on synthetic and real-life data have shown that the FG-k-means algorithm significantly outperformed four k-means type algorithms, i.e., k-means, W-k-means, LAC and EWKM in almost all experiments. The new algorithm is robust to noise and missing values which commonly exist in high-dimensional data.

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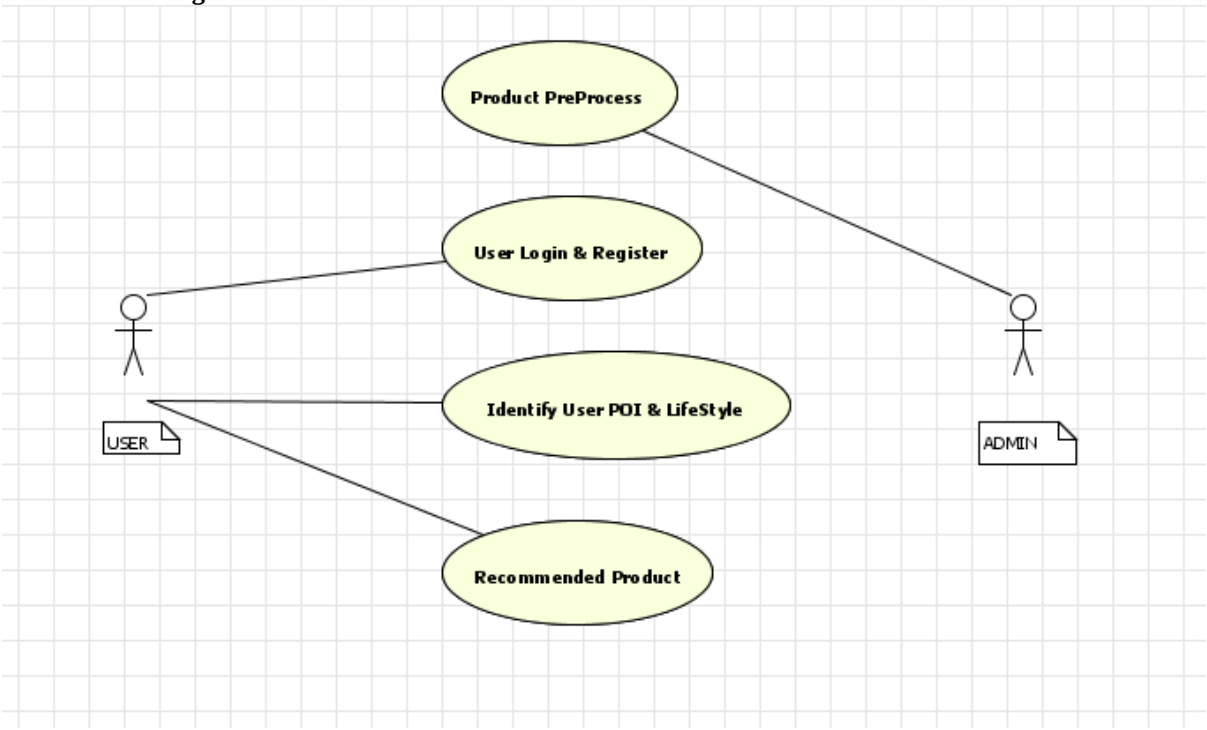
3.2 V. L. Migu_eis, A. S. Camanho, and J. F. E. Cunha, "Customer data mining for lifestyle segmentation Expert Syst. Appl., vol. 39,no. 10, pp. 9359–9366, 2012.

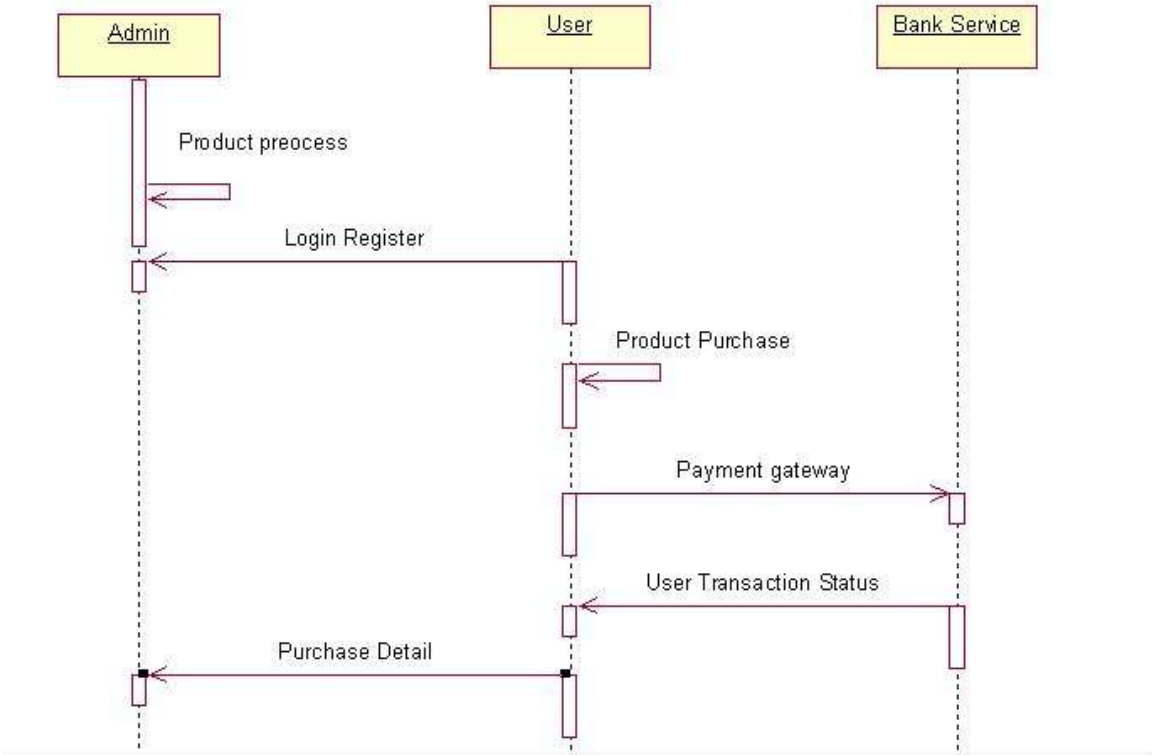
A good relationship between companies and customers is a crucial factor of competitiveness. Market segmentation is a key issue for companies to develop and maintain loyal relationships with customers as well as to promote the increase of company sales. This paper proposes a method for market segmentation in retailing based on customers' lifestyle, supported by information extracted from a large transactional database. A set of typical shopping baskets are mined from the database, using a variable clustering algorithm, and these are used to infer customer's lifestyle. Customers are assigned to a lifestyle segment based on their purchases history. This study is done in collaboration with a European retailing company.

IV. System Design

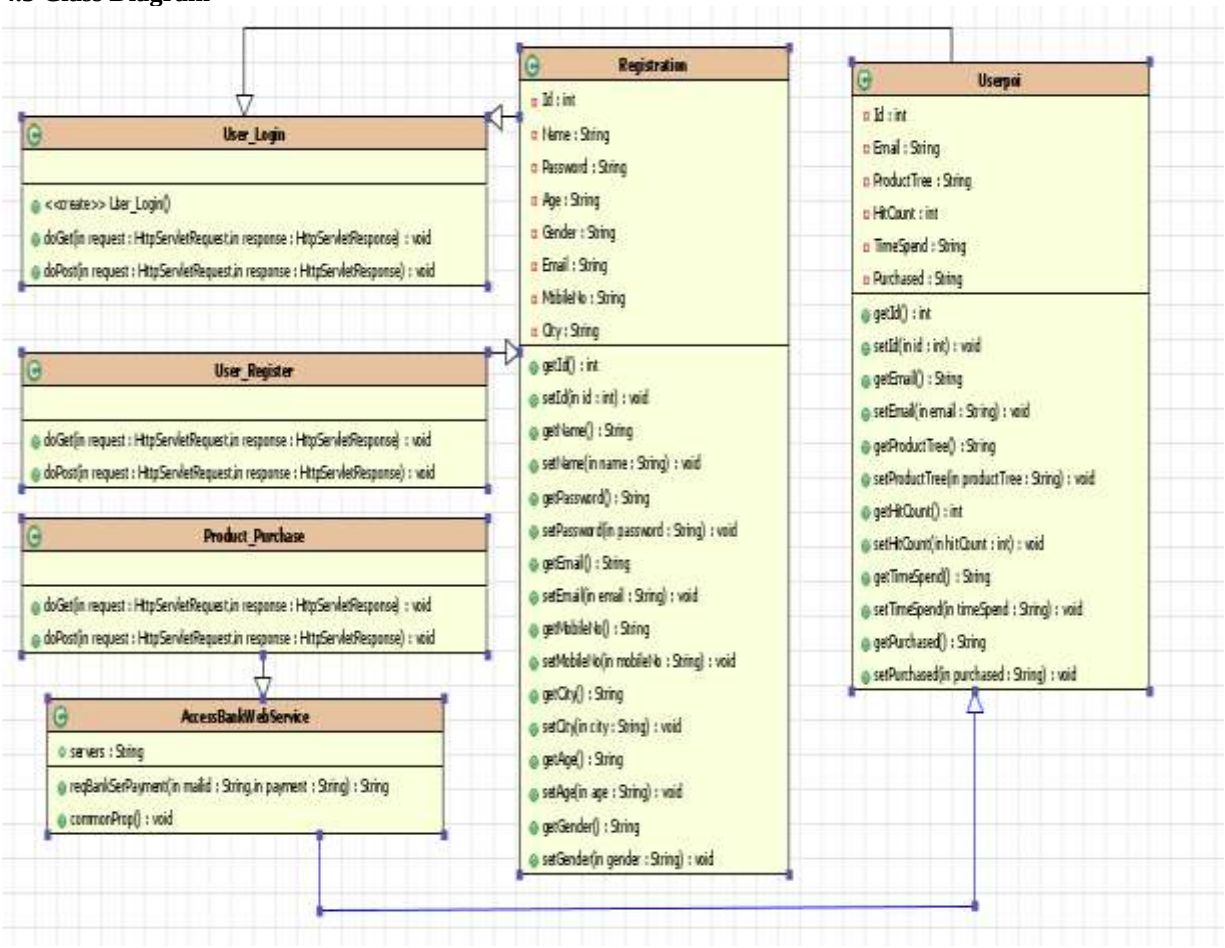
4.1 Use Case Diagram



4.2 Sequence Diagram



4.3 Class Diagram



V. Module Description

5.1 Admin Preprocessing

Initially admin needs to add a new product in the e-commerce website.Admin add the products on basis of tree structure as from root to leaf node. Admin would need to mention the category, subcategory, product description and other related information about that particular product. On successfully added new product in the database admin need to preprocess the data that are available in the E-Commerce database.

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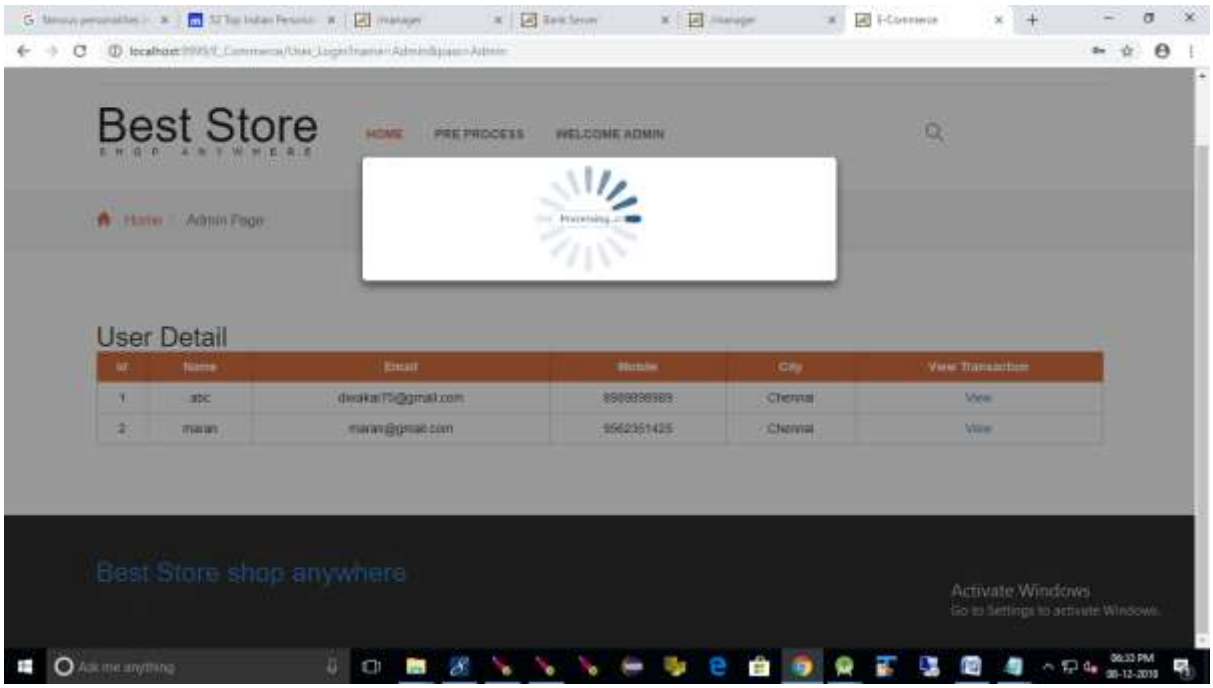

5.2 Customer Account Creation

In this component, customer account creation - gathering customer name, location, email-id and other contact details takes place. Unique customer id along with the balance amount will be generated for the payment processing. This component will be further utilized for the product payment in the ecommerce application.

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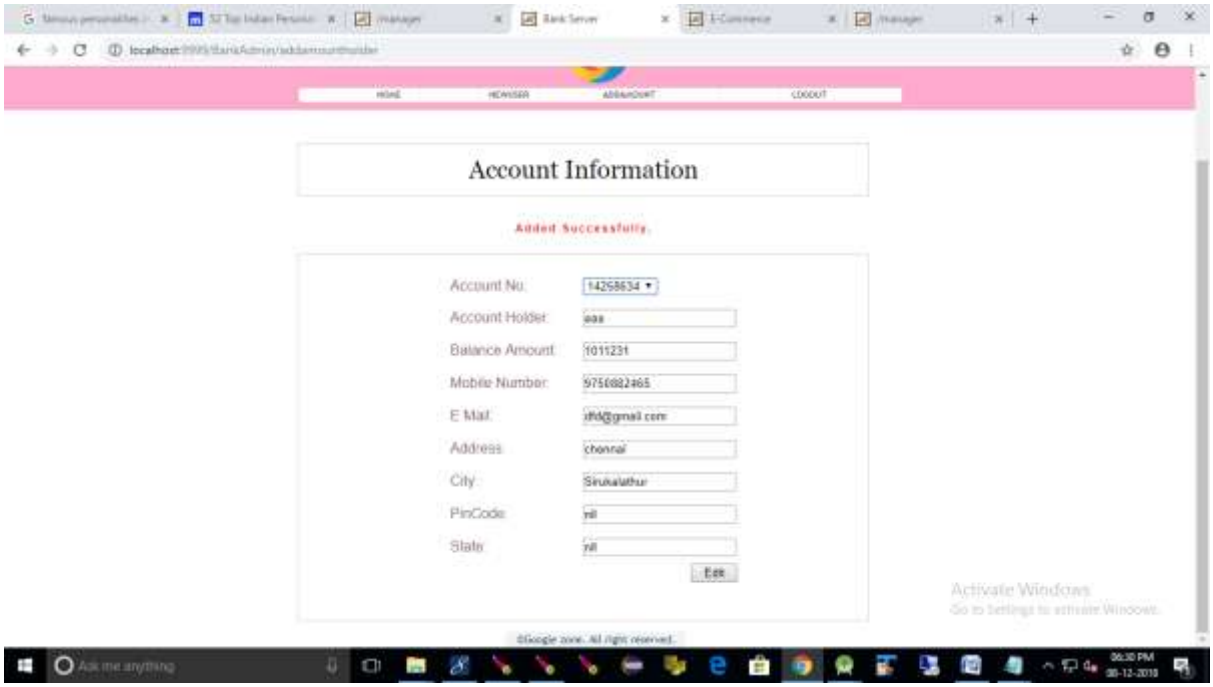

5.3 Customer Transaction Processing

In this component, the product purchase takes place based on the existing balance amount in the customer account.Customer account creation and adding the amount in the account can be done through the external banking application. The purchase details can be captured in the database for the purpose of predicting the user interest based on past transaction history and to support further recommendation to the user.

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5.4 Product Recommendations

Recommendations are based on user point of interest utilizing the past transaction data of the user.The cold products are recommended based on time spent irrespective of positive ratings to the customer. Thus the recommendations are based on user activeness, hit count,the number of product they view and time spent for any leaf node promoting recommendations over the user point of interest and the cold products which remains unsold for a long time.

VI. Conclusion

Recommendations are based on the user point of interest and cold products are taken into account irrespective of positive ratings based recommendations to the products.

Acknowledgements

In future enhancement, cold product recommendations along with user knowledge and feedbacks can be taken into consideration.

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