



Intuitive Ecommerce System using Machine Learning

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Abstract: Nowadays E-commerce is considered as a standard in industry providing customers with instant access to products or services at any given time without physical barriers and provides sellers to acquire a wide range of customers locally and globally. Customers are often overwhelmed by the plethora of options available on the net and spend significant time browsing the products that they wish to purchase. Hence an intuitive design is the need of the hour for all E-Commerce websites. This can be achieved by using the concept of "Machine Learning". Machine Learning algorithms can help make sense of large amounts of data and provide actionable insights that retailers can use to make decisions later, or even in real-time. Also it helps the system make the user's experience more personalized on the basis of his needs. This paper describes an effective system that would capture and make use of the user's previous search and purchasing history so that personalized recommendations could be suggested to the user thereby making the system "intuitive".

General Terms: Database, Object oriented programming, Machine Learning.

Keywords : E-Commerce, Classification, Clustering, Collaborative Filtering, B2C.

1. INTRODUCTION

Nowadays e-business is considered as a standard in industry providing customers with instant access to products or services at any given time without physical barriers and provides sellers to acquire a wide range of customers locally and globally. The design of e-commerce website must be user-centric. Onsite user perform action like purchases, membership registrations, sample downloads, sales inquiries. An expectation arises as there are many websites across industries competing with each other and are "just a mouse click away". E-commerce website acts as electronic catalogues which are convenient for displaying and publicity of large inventories. Website's user interface plays an important role as it increases readability and usefulness of catalogue. Hence an intuitive design is the need of the hour for all E-Commerce websites. Intuitive design of graphical user interface in e-commerce provides high conversion rate. A conversion rate is defined as the percentage of website visitors who complete a desired action. High conversion rate increases sales, decreases user errors, decreases customer support costs, reduces cost of providing training, increases user productivity. With the escalated competition in E-commerce it is really important for the retailers to retain as well as acquire customers. There is a need of using intelligent systems which derive market trends and the needs of the customers so that they can market that product in such a way the customer is likely to buy it. This can be achieved by using the concept of "Machine Learning".

Machine Learning algorithms can help make sense of large amounts of data and provide actionable insights that retailers can use to make decisions later, or even in real-time. Various algorithms like clustering association, classification and regression help generate accurate statistical models. These models help us structure the raw data collected from the usage of millions of users in form of graphs and pie-

charts. Also it helps the system make the user's experience more personalized on the basis of his needs.

2. LITERATURE SURVEY

J. Ben Schafer, Joseph A. Konstan, John Riedl [1] infer that recommender systems are being used by an ever-increasing number of E-commerce sites to help consumers find products to purchase.[1] present an explanation of how recommender systems are related to some traditional database analysis techniques. Based on the examples, it creates a taxonomy of recommender systems, including the inputs required from the consumers, the additional knowledge required from the database, the ways the recommendations are presented to consumers, the technologies used to create the recommendations, and the level of personalization of the recommendations. It identifies five commonly used E-commerce recommender application models, describe several open research problems in the field of recommender systems, and examine privacy implications of recommender systems technology.

Linden, G. Smith, B. York, J. [2] have studied the recommendation system of Amazon.com and have inferred that they system uses recommendations as a targeted marketing tool in many email campaigns and on most of its Web sites' pages, including the high traffic Amazon.com homepage. Clicking on the "Your Recommendations" link leads customers to an area where they can filter their recommendations by product line and subject area, rate the recommended products, rate their previous purchases, and see why items are recommended. Shopping cart recommendations, which offer customers product suggestions based on the items in their shopping cart. Items are targeted to each customer. Amazon.com extensively uses recommendation algorithms to personalize its Web site to

each customer's interests. Because existing recommendation algorithms cannot scale to Amazon's tens of millions of customers and products. The algorithm, item-to-item collaborative filtering, scales to massive data sets and produces high-quality recommendations in real time.

Linqi Song, CemTekin, Mihaela van der Schaar [3] have proposed a novel large-scale, context-aware recommender system that provides accurate recommendations, scalability to a large number of diverse users and items. The recommendation system relies on an algorithm which learns online the item preferences of users based on their click behavior, and constructs online item-cluster trees. The recommendations are then made by choosing an item-cluster level and then selecting an item within that cluster as a recommendation for the user. This approach is able to significantly improve the learning speed when the number of users and items is large, while still providing high recommendation accuracy.

3. PROPOSED SYSTEM

The website provides a simple interface that collects ratings for the movies, keeps track of a customer's past purchases and their search history. Once the data is garnered, similar movies are grouped using clustering techniques. The recommender system then draws out similarities amongst the users using User-based Collaborative Filtering and recommends movies according to their rating. The recommender system also suggests movies on the basis of the customer's previous purchases and their search history using Item-based Collaborative Filtering. The website will feature a Home Page from where user can sign up or login and can have access to all these recommendations. It will also have a search facility with the help of which customers can directly search a particular movie.

For finding the similarity between any two entities, a utility matrix will be used. The project will implement three recommender systems which will make use of the algorithms as mentioned below:

3.1 System 1:

This System will make use of User based Collaborative Filtering. Here we will draw the similarity amongst the users on the basis of the ratings they provide. Once the similar users are identified, movies will be suggested to the new user on the basis of the rating provided by its similar user.

3.2 System 2:

Item to item collaborative filtering is used in this system. This system makes the combined use of a user's purchase history and other user's purchase history. From the user's purchase history, genres are ranked depending on the number of times the user buys movies having the same genre. Once the ranking is established, a matrix having only the preferred genre is generated. After this the algorithm generates a list of the most frequently purchased items falling in the same genre category of the users.

3.3 System 3:

This system will make use of the user's search history. Every user will have a list of page hit counters which will store the page hit of each genres. If a user clicks on a movie

and opens its page, the counter of the genre of that movie will increment. Now this list be ranked on the basis of number of page hits, where the genre with maximum page hits is placed at the top. This method will clearly show the preferences of the user and hence we can determine his liking and disliking. Now movies are recommended to the user from the top 2-3 genres only.

4. EXPECTED OUTCOME

To build a recommender system using machine learning approaches thereby making the B2C E-commerce system simple but intuitive. The data will be accumulated using variety of sources like customer ratings, previous purchases, feedback/reviews from reviewers etc. The project will implement the three main machine learning techniques i.e. collaborative filtering, clustering and classification. The intelligent system will draw out the similarities and patterns between the users unlike the traditional approach wherein recommendations are merely given on the basis of other unrelated users.

5. IMPLEMENTATION

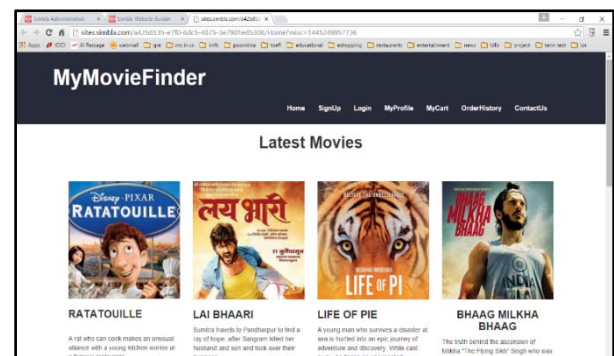


Figure 1: User Dashboard

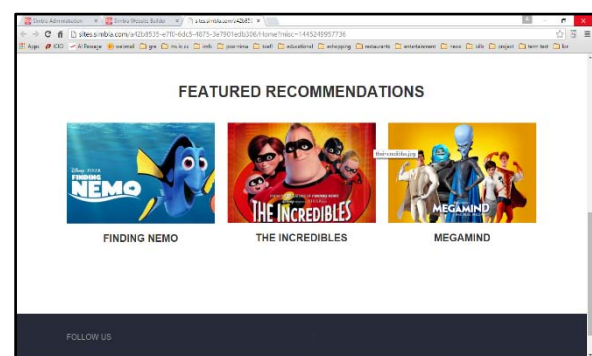


Figure 2: Recommendation Page

6. CONCLUSION

In this paper, we have discussed the design and implementation of the recommender system for MyMovieFinder. This system will allow the website to leverage their customer history to create more personalized experiences for their customers. Those customers will quickly discover that the business that "knows them best" is the one that can serve them most effectively, recommending the right products rather than treating them like strangers. Throughout this project we will implement various data mining and machine learning techniques to make the system intuitive. We have discussed the enhancements that could be

made to the traditional approaches in order to improve the performance and efficiency of the system we built. People change and their habits also change. This is the biggest challenge that our recommender system will face.

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