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Product Recommendation System Using Machine Learning

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ABSTRACT: Due to the explosion of e-commerce, recommender systems are rapidly becoming a core tool to accelerate cross-selling and strengthen customer loyalty. There are two prevalent approaches for building recommender systems – content-based recommending and collaborative filtering (CF). This study focuses on improving the performance of recommender systems by using data mining techniques. This paper proposes an SVM based recommender system. We conducted an experiment to evaluate the proposed model on the each type of product data set such as Grocery, Beauty, Cold drinks, watches, lockers, Gourmet Foods etc. and compared them with the traditional algorithm. The results show the proposed model is improvement in making recommendations.

KEYWORDS: Support Vector Machine, Machine Learning

I. INTRODUCTION

With the quick advancement of internet business, it has turned into a significant examination subject how to look through the connected items and give the comparing positioning as indicated by the catchphrases presented by clients. Most shopping sites will give an assortment of ware positioning records, for example, deals positioning, value positioning, positive rating positioning, and so forth, with the goal that clients can pick various sorts of positioning records as indicated by their own requirements. Distinctive shopping sites take on various positioning calculations. A fantastic positioning calculation can give clients an agreeable and advantageous shopping experience and increment the business pay of sites and organizations. This paper examines the inconsistent assessment issue of the customary positioning calculation dependent on the high applause rate. Then, at that point, the paper gathers the information of amazon of item audits from an internet business site, investigates the attributes of surveys, then, at that point, presents the item type strategy for agrarian ware audits dependent on SVM. At long last, joined with the consequences of audits to understand a sensible positioning of products.

With the improvement of people's assumptions for regular solaces, people pay to an always expanding degree respect for the strength of diet, and standard dietary proposition are difficult to meet the customer's dietary tendencies and stimulating balance. The past frameworks utilize the k-implies grouping calculation to parcel the food set into various disjoint subsets, by then use the customer based synergistic filtering calculation to propose the food that the customer might like. The proposed food in standard plans set by customer's own situation are in the same bundle, which meets the customer's fortifying balance. The exploratory results show that the proposed effect of this procedure is fruitful, and the recommended accuracy rate is finished 70%.

II. LITERATURE SURVEY

Paul Bertens, Anna Guitartet al.[1] stated that, author evaluate and compare two of these algorithms, an ensemble-based model (extremely randomized trees) and a deep neural network, both of which are promising candidates for operational video-game recommender engines.

Gayatri Khanvilkar[2] proposed that Random Forest shows outstanding performance. To create suitable recommendations using the analysis of emotions, there is a need to use polarity obtained through the reviews.
Ümit Turkut, Adem Tunceret al. stated that [3] a deep learning-based online recommendation system has been proposed with a Convolutional Neural Network (CNN). Classes of different patterns in the CNN architecture have been determined according to users' and designers' pattern preferences.

Pranavi Satheesan, Prasanna S. et al. [4] proposed that to recommends the products to the new customers using up two methods. One method recommends the most popular products while the other method solely focuses on the product

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description for recommendation.

Chen Rulong, Liu Min et al. [5] stated that number of product reviews, the length of comments and the emotional factors of comments, which can effectively solve many problems in the ranking of high praise rate.
Sannasi Ganapathy, Karthik.R.V [6] proposed the algorithm analyzes online products and ranks them according to product reviews.

Tingwei Gao, ,Xiu Li, Yueting [7] stated that deep learning model to predict the values of null ratings. Moreover, author investigate personal recommendation based on customer preferences and search the neighbors through the customer preferences.

III. PROPOSED METHOD AND ALGORITHM

1. Proposed Methodology:

In a proposed system, we are proposing a product recommendation system with limited set of supervised data. In this paper the support vector machine is used for product recommendation system.
The System architecture of the proposed model is shown in fig. 1.

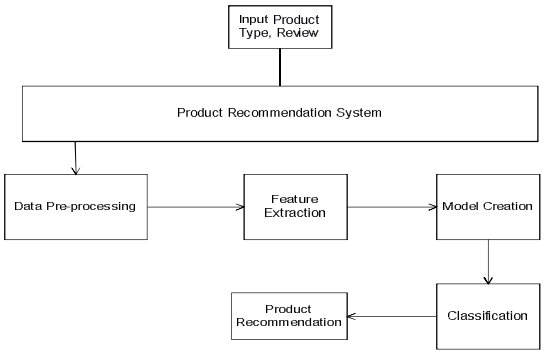

Fig1. Proposed Architecture

The product recommendation using SVM a sufficient no. of data samples is required. Thesesamples are collected from kaggle. After successful collection of datathe products will be recommended by using Support vector machine (SVM). In that we are contributing one more facility to the E-commerce sites. The method involves two phases: training phase and testing phase.

i. Data Collection

We have work on Amazon dataset collected from kaggle. The dataset contains total 2782 entries with four attributes such as Product type, rating, review and product.

ii. Data Pre-processing

Most machine learning algorithms are fulfilled with mathematical things such as statistics, algebra, calculus and etc.They expect the data to be numerical such as a 2 dimensional array with rows as instances and columns as features. The problem with natural language is that the data is in the form of raw text, so that the text needs to be transformed into a vector.

TFIDF

Term frequency-inverse document frequency is a text vectorizer that transforms the text into a usable vector. It combines 2 concepts, Term Frequency (TF) and Document Frequency (DF).The term frequency is the number of occurrences of a specific term in a document. Term frequency indicates how important a specific term in a document. Term frequency represents every text from the data as a matrix whose rows are the number of documents and columns are the number of distinct terms throughout all documents.Document frequency is the number of documents containing a specific term. Document frequency indicates how common the term is.Inverse document frequency (IDF) is the weight of a term, it aims to reduce the weight of a term if the term's occurrences are scattered throughout all the documents.

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iii. Model Creation

Selecting the machine learning classifier to recommend the product based on the user preference. In this proposed method we have choose the support vector machine SVM.

2. Algorithms

I. Support Vector Machine

Generally the use of machine learning algorithm is used for the recommendation. In this paper, the support vector machine will suggest the products. SVM is a supervised machine learning algorithm which works based on the concept of decision planes that defines decision boundaries. A decision boundary separates the objects of one class from the object of another class. Support vectors are the data points which are nearest to the hyper-plane. Kernel function is used to separate non-linear data by transforming input to a higher dimensional space. Gaussian radial basis function kernel is used in our proposed method as shown in fig2.

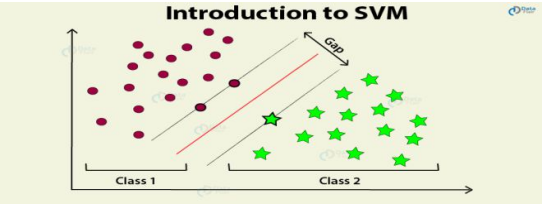

Fig.2: Architecture of SVM

IV. RESULTS & DISCUSSION

In the proposed methodology we have check the 25 test samples with the training model out of them 23 were correctly predicted. So we get 92% accuracy by using support vector machine.

Sr. No.	Paper	Algorithm	Accuracy
1	Paper 1	Ensemble	**71%**
2	Paper 2	Random Forest	**95%**
3	Paper 3	CNN	82.08%
4	Paper 4	Collaborative Filtering	Not Mentioned
5	Paper 5	SVM	78.87
6	Paper 6	Feature Based Ranking Method	81.23
7	Paper 7	Deep Learning	Not Mentioned
8	**Proposed Method**	**SVM**	**92%**

Table 1: Comparative Analysis

In the figure3 user chooses the product category is Watch and feeds the review as Good so the system recommends the product is “Titan Watch”.

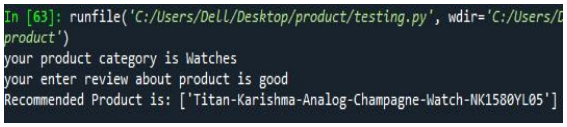

Figure 3: Output1

In the figure4 user chooses the product category is Cold Drink and feeds the review as Good for summer and based on the user preference the system recommends the product is “Glucon- D Orange”.

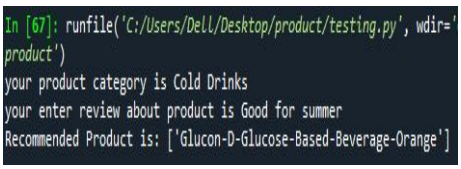

Figure 4: Output2

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It means that all the inferences we have tested on the trained model. The training is one time and testing is multiple times.

V. CONCLUSION

In this paper, a new online product recommendation system has been proposed and implemented for recommending online product efficiently. It is based on the factors like product type and review. The proposed method - Feature based product ranking and recommendation system takes the reviews/feedbacks from the review.The Social media sites contain more feedbacks and reviews when compared to the review sites. It also identifies interested feature details of users automatically by considering his/her past comments / reviews. This avoids an existing problem where user has to provide his/her interested feature details and weightage manually, at worst case, entire feature has to be considered.

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