E-Commerce Recommendation System Model Based On Cloud Computing

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Abstract: As the company grows, the traditional offline sales model is no longer sufficient. Adapting to the digital era, companies need to create their online e-commerce platforms. The complex nature of e-commerce information is constantly increasing, overwhelming users with vast amounts of product data. Establishing effective customer relationships amidst this data overload proves challenging for merchants. To enhance service quality and stay competitive, many e-commerce websites are turning to data mining technology. By analyzing user purchase and browsing history, individualized product suggestions are made. Efforts to efficiently manage product and user data have led to the proposal of leveraging cloud computing for e-commerce recommendation systems. This move aims to enhance data mining capabilities and reduce costs, enabling high-performance computing.[1]

Keywords: **Machine Learning, SVM classifier, TF-TDF Support Vector Machine**

I. INTRODUCTION

With the swift evolution of online shopping, its information structure is growing increasingly intricate, and volume of data is expanding significantly. Users frequently find themselves overwhelmed by the vast array of product information, and companies struggle to form meaningful connections with their large user base. E-commerce has transitioned into the era of massive data. Online shopping platforms consolidate a plethora of product offerings and customers, offering customers more effective way to users choices while also presenting the challenge of navigating through a sea of options. In the current landscape, online shopping is progressing rapidly.

Recommendation on e-commerce websites is a broad term used to suggest products and services (queries, novels, policies, movies, images, books, web pages, etc.) that are relevant to users' preferences.[1]

II. AIMS and OBJECTIVE

a) **Aim**: The Aim of incorporating a recommendation system via cloud computing is to utilize the scalability, adaptability, and computing prowess of cloud infrastructure to supply individualized and pertinent suggestions to users. The primary goal is to offer users a more delightful and immersive experience by presenting them with customized recommendations that match their preferences and requirements.

b) Objective

- Understanding user preferences and purchasing patterns can benefit online retailers optimize their inventory management by stocking popular items and minimizing excess stock of less-demanded products.

- Recommendation systems can also facilitate cross-selling and up-selling by suggesting complementary or higher-end products based on the user's preferences and browsing behavior.

III LITERATURE SURVEY

Paper 1: A Framework is to Secure Medical Image Storage in Cloud Computing Environment.:

Content-based recommendation systems analysis the characteristics of the recommended items to forecast recommendations derived from their similarity to those previously admired by the user. For instance, within an app suggesting novels, a book may encompass details like the author, rating, genre, and subject matter. The user's preferences are also encapsulated by the same attributes, identified as the user profile.

Collaborative Filtering Systems Overview:

Collaborative filters operate by suggesting products based on similarities between users or items. The suggested products are those favored by alike users. CF, or collaborative filtering, is the most explored and widely applied recommendation method. A primary feature of CF is

predicting a user's preferences based on items rated by similar users in the past.

Hybrid Recommendation Approaches:

Hybrid recommendation systems prove superior to both cooperative and content-based systems. These systems merge different content and collaborative systems to rectify the shortcomings seen in individual recommendation approaches.

A survey was carried out on various e-commerce platforms, considering different parameters.a competitive analysis was conducted. The examined e-commerce websites include Amazon, eBay, Paytm, Flipkart, and Snapdeal. The competitive analysis indicates robust hardware such as GPUs.[2]

Paper 2: The Role's of Individualizations and Project Learning for Cloud Services Profitability.

Building a framework of recommendations for an e-commerce platform involves leveraging various techniques from machine learning and data analysis. Here's a generalized approach to developing an effective recommendation system. This matter arises due to inadequate categorization. Both Amazon and Ebay group laptops and their accompanying items together under the label 'laptop & accessories'. Hence, if the user opts to explore laptops, only outcomes Nowadays, healthcare providers in the modern era generate vast amounts of medical images daily due to advancements in imaging technology. This is

primarily a result of the growing demand for medical services from an increasing number of patients. Therefore, there is a continuous need for significant storage capacity. Regrettably, healthcare sectors still rely on local data centers to store medical information and manage operational processes. This approach has substantial adverse effects on operational expenses related to licensing and maintenance fees[3].

Paper 3: Improving Operational Efficiency of Applications via Cloud Computing.

China's e-commerce sector is experiencing rapid growth with continual sales milestones being achieved. Nonetheless, this expansion has brought to light various challenges. The management approaches in B2C e-commerce differ significantly from conventional business practices, resulting in distinct risks for e-commerce companies compared to traditional enterprises. E-commerce ventures encounter more intricate and unpredictable risks in contrast to their traditional counterparts. Despite the swift pace of B2C e-commerce advancement, risk management strategies are still while carrying out being refined. Given the growth of online buying, there is an urgent need for investigating the e-commerce data management model. In-depth discussions concerning the theoretical research and commercial deployment of cloud computing are conducted through literature analysis, comparative analysis, graphical analysis, and case studies. [4]

COMPARATIVE STUDY

Table 1: Comparative Analysis

SR No.	Paper Title	Authors	Publication	Technology	Purpose
1	Design and Implementation of E-commerce Recommendation System using cloud Computing	Cao Xuecong, Li Zhaoming, Chen Sisi	IEEE, 2021	Cloud Computing	Recommend the products according to previous searches
2	A Framework to Secure Medical Image Storage in Cloud Computing Environment	Marwan M, Kartit A, Ouahmane H	IEEE, 2018	Cloud Computing	An age – Storing Huge Volume of Data through Cloud Computng
3	The Role of Individualization and Project Learning for Cloud Service Profitability.	Herzfeldt A, Wolfenstetter T, Ertl C	IEEE, 2018	- Hadoop	To analyse huge volume of data to store in a structured manner.
4.	Improving Operational Efficiency of Applications via Cloud Computing.	Bauer E.	IEEE, 2018	Data Catching	To work data of user prediction data to store in a structured manner.

V. EXISTING SYSTEM

Most studies focus only on building solutions within certain electronic commerce websites and in particular using user

history work records. There is also a lot of research work that focuses mainly on the problem of recommending a cold start. Seroussi et al. proposed to use information from public user profiles and articles extracted from user generated content

into a matrix factorization Algo. for estimating new user ratings. Zhang et al. suggest a slightly supervised learning algorithm. Combining content and share data under a single framework of opportunity. [8] The e-commerce giant, Amazon.in, employs collaborative filtering between items to provide personalized recommendations. For instance, if a user searches for a mobile phone, relevant results appear. However, when the user opts to sort the results by price in ascending order, irrelevant listings like mobile accessories surface.[8]

VII. PROBLEM STATEMENT

Personalization Develop algorithms that can precisely Examine user preferences, actions, and past interactions with the platform to create personalized recommendations. The system must adjust to the changing preferences and behaviors of individual users over time. Scalability Construct a recommendation system that can manage large volumes of individuals and objects without compromising performance. Ensure the system continues to function and effective even as the user and product numbers increase.[7]

VIII. PROPOSED SYSTEM

While carrying out unveiling various forms of the proposal gradually, which essentially forms the foundation in the dealings and interactions between sellers and buyers in the online realm, these models have showcased fundamental concepts that have been relied upon in developing the suggested model. The suggested model has tackled the key elements utilized in the process of the electronic payment system such as (ACH, E-payment gateway, and E-marketplace) and their influence on enhancing service quality within the framework of one of the dimensions of the e-commerce. these models have showcased fundamental concepts that have been relied in developing the suggested model interactions between sellers and buyers in the online realm, these models have showcased fundamental ideas that have been relied upon in developing the suggested model. The suggested model has tackled the key elements utilized in the procedure of the electronic payment system such as (ACH, E-payment gateway, and E-marketplace) and their influence on enhancing service quality.[4]

IX. ALGORITHM

1. Recommendation System Model Files

Install Required Libraries -You start by installing the necessary Python libraries: `numpy`, `opencv- python`, and `torch`.These libraries are essential for working with the Recommendation model and images. # Example: pip install numpy opencv-python torchimport cv2 import torch from models.experimental import attempt_load

2. Load the Recommendation System Model

Collaborative filtering Model

-The code loads the TTF-IDF Vectorizer model using the `attempt_load` function. It specifies the path to the TTF-IDF Vectorizer model weights (e.g., 'tf-idfs.pt') and sets the target device to 'cpu' for inference.

Model=attempt_load('tf-idfs.pt

',map_location='cpu')

Load an Image for Rocommendation -Load the image you want to analyze for detection using OpenCV. Gives the suggestion to users.

image = cv2.imread('your_image.jpg')

3. Suggestion for Product by TF_IDF

Term Frequency-Inverse Document Frequency (TF-IDF) is a numerical statistic used in natural language processing and information retrieval. A corpus, or collection of documents, is used to evaluate a term's importance in a given text. By measuring the frequency with which a word appears in a manuscript, TF highlights terms with greater frequencies. IDF assigns weight to unique terms based on how uncommon the term is in the corpus.

X. SYSTEM ARCHITECTURE
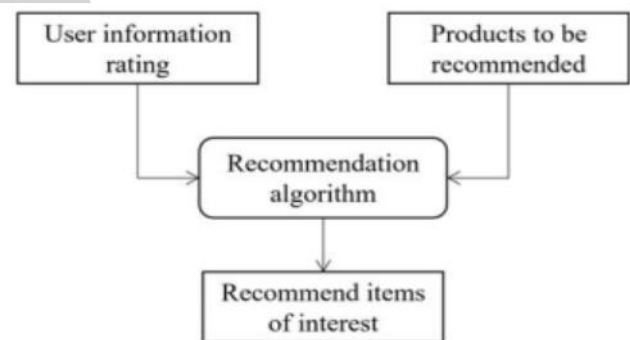
Data Collection: The system starts by collecting various types of data, including user interactions (e.g., browsing history, search queries, purchases), product attributes (e.g., descriptions, categories, ratings), and contextual data (e.g., time of day, location).

Data Preprocessing: Raw data collected from various sources undergoes preprocessing to clean, transform, and prepare it for analysis.

XI. ADVANTAGES

• Recommendation systems improve the overall shopping experience by offering tailored product recommendations based on customer preferences, browsing and purchase history, and demographic data.

• By suggesting relevant products to users, recommendation systems can raise the probability of conversion and boost sales revenue. Tailored recommendations can result in average order values being greater as well.

• Personalized recommendations keep users engaged on the platform for longer periods, leading to higher customer retention rates. Customers that are happy are more inclined to come back for future purchases.

• By offering personalized options, recommendation systems assist consumers in navigating through large product catalogs, minimizing decision fatigue and increasing the efficiency of the purchasing process.

• E-commerce recommendation systems can suggest complementary products (cross-selling) or higher-end alternatives (up-selling),thereby increasing the average order value and maximizing revenue per customer.
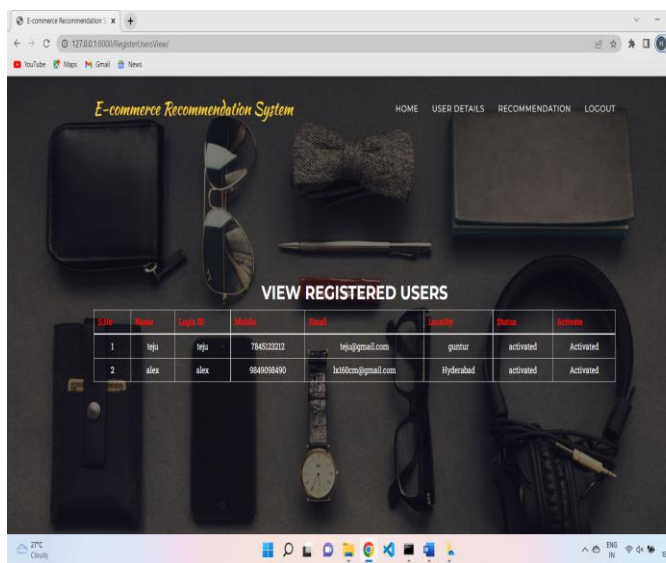
XII. DESIGN DETAILS

Fig 1:Result

XIII. CONCLUSION

Thus, We have tried to implement the paper "Cao Xuecong, Li Zhaoming, Chen Sisi. Design and Implementation of E-commerce Recommendation System Model Based on Cloud Computing, 2021 the implementation of an e-commerce recommendation system could summarize its effectiveness in enhancing user experience, increasing sales, and improving customer satisfaction. It would also highlight the significance of tailored advice in driving engagement and loyalty. Additionally, it might discuss areas for future improvement, such as refining algorithms, incorporating user feedback, and adapting to changing market trends. Overall, the conclusion would emphasize the significance of recommendation systems in the e-commerce landscape and their role in driving business success.

REFERENCE

[1] Cao Xuecong, Li Zhaoming, Chen Sisi. "Design and Implementation of E-commerce Recommendation System Model Based on Cloud Computing", vol. 16, no. 1, pp. 1-16, 2021.

[2] Marwan M, Kartit A, Ouahmane H. "A Framework to Secure Medical Image Storage in Cloud Computing Environment. Journal of Electronic Commerce in Organizations", vol. 16, no. 1, pp. 1-16, 2018.

[3] Herzfeldt A, Wolfenstetter T, Ertl C, et al. "The Role of Individualization and Project Learning for Cloud Service Profitability. Journal of Electronic Commerce in Organizations", vol. 16, no. 2, pp. 64-82,2018.

[4] Bauer E. Improving Operational Efficiency of Applications via Cloud Computing. IEEE Cloud Computing, vol. 5, no. 1, pp. 12-19, 2015.

[5] Somalee Datta, Keith Bettinger, Michael Snyder. Corrigendum: Secure cloudomputing data. Nature Biotechnology, vol. 34, no. 10, pp. 588-591, 2016.

[6] Datta S, Bettinger K, Snyder M. Erratum: Corrigendum: Secure cloud computing for genomic data. Nature Biotechnology, vol. 34, no. 10, pp. 1072-1072, 2016

[7] Liu Mingyue. "About the services of big data and cloud computing for e-commerce . Information and Nature Biotechnology", vol. 34, no. 10, pp. 10-1072,2016

[8] Prof. Namrata Shinde, Pradnya Panmand, Pranjali Kapate, Aditi Hedau. "Social Media To E-Commerce Cold-Start Product Recommendation Using Microblogging Information". International Journal for Research in Engineering Application & Management (IJREAM). ISSN : 2454-9150 vol-08, Issue-01, APR 2022

[9] Ghosh N, Ghosh S K, Das S K. SelCSP: A Framework to Facilitate Selection of Cloud Service Providers. Cloud Computing IEEE Transactions on, vol. 3, no. 1, pp. 66-79, 2015.

[10] Mi Rensha Aini. Research on the Application of Cloud Computing in E-commerce. Computer Knowledge and Technology, vol. 11, no. 22, pp. 186-188, 2015.