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(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

Department of Computer Science & Engineering

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Project Synopsis On

Gadget Recommendation System

Under The Guidance Of

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INDEX

INTRODUCTION

Recommender systems are machine learning systems that help users discover new products and services. Every time you shop online, a recommendation system is guiding you towards the most likely product you might purchase.
Recommender systems are an essential feature in our digital world, as users are often overwhelmed by choice and need help finding what they're looking for. This leads to happier customers and, of course, more sales. Recommender systems are like salesmen who know, based on your history and preferences, what you like.

Recommender systems are so commonplace now that many of us use them without even knowing it. Because we can't possibly look through all the products or content on a website, a recommendation system plays an important role in helping us have a better user experience, while also exposing us to more inventory we might not discover otherwise.

Some examples of recommender systems in action include product recommendations on Amazon, Netflix suggestions for movies and TV shows in your feed, recommended videos on YouTube, music on Spotify, the Facebook newsfeed and Google Ads.

Thus, building a Gadget Recommendation System is concerned with the following problems:

- People with non-technical backgrounds find it difficult to choose a product for them. As they are ignorant to technical details they end up choosing the wrong product.
- E-commerce sites like Amazon and flipkart suggest buyers the products that give them the maximum profit.
- Tech YouTubers are mostly biased to suggest products. Moreover due to quick technical development it is difficult to study every product and make the right choice
- Local sellers most of the times convince buyers to buy the products that give them the maximum profit

The common issue in the above mentioned problems is that the user requirements are never considered to suggest products to the user. Thus, the solution we are providing is as follows:

- Collection of data about concerned products from different e-commerce sites using data scrappers
- Processing the collected data and the user reviews
- Asking user requirements through a form
- Suggesting the best possible outcome using an algorithm from our dataset

This recommendation system can be used at a variety of instances. Some of which are as follows:

- Primary consumers can use it to take suggestion while buying electronic smart gadgets like smartphones, laptops, smartwatches, earphones, etc
- Online and offline sellers can use this to help their customers to fulfil their needs.
- Gadget companies can use this recommendation system to study product market and user requirements.

RELATED WORK

Paper 1 Shakila Shaikh; Sheetal Rathi; Prachi Janrao;"Recommendation system in E-commerce websites: A Graph Based Approached"

Summary –

Different techniques such as content-based, collaborative, and hybrid methods were proposed here. In Collaborative Filtering the algorithm generator recommendations based on a few customers who are most similar to the user. Technique is to rank each item according to how many similar customers purchased it. In Content-based recommender systems the properties of the product or services are utilized for recommendation. The properties of a product or services under consideration are analyzed and are matched with other properties of the products present in the database . The similar property products are then displayed as the recommended products.

Limitations –

1. In collaborative filtering if the algorithm discards the most popular or unpopular items, they will never appear as recommendations, and customers who have purchased only those items will not get recommendations.

2. In a content based model the model can only make recommendations based on existing interests of the user. In other words, the model has limited ability to expand on the users' existing interests.

3. Content -based models build keyword, category, and author indexes offline, but fail to provide recommendations with interesting, targeted titles. They also scale poorly for customers with numerous purchases and ratings.

Paper 2 Greg Linden, Brent Smith, and Jeremy York;"Amazon.com Recommendations Item-to-Item Collaborative Filtering"

Overcome the limitation in paper 1 –

Cluster models have better online scalability and performance than collaborative filtering because they compare the user to a controlled number of segments rather than the entire customer base.

Summary –

To find customers who are similar to the user, cluster models divide the customer base into many segments and treat the task as a classification problem. The algorithm's goal is to assign the user to the segment containing the most similar customers. It then uses the purchases and ratings of the customers in the segment to generate recommendations.

Limitations –

1.In cluster model because the similar customers that the cluster models find are not the most similar customers,

2.The recommendations they produce are less relevant.

3. Online user–segment classification becomes almost as expensive as finding similar customers using collaborative filtering.

Paper 3 Pradeep Kumar Singh,Pijush Kanti Dutta Pramanik,Avick Kumar Dey,Prasenjit Choudhury;"Recommender Systems: An Overview, Research Trends, and Future Directions"

Overcome the limitation in paper 2 –

The key to item-to-item collaborative filtering's scalability and performance is that it creates the expensive similar-items table offline.

Summary –

The item-to-item collaborative algorithm's online component looking up similar items for the user's purchases and ratings scales independently of the catalog size or the total number of customers; it is dependent only on how many titles the user has purchased or rated. Thus, the algorithm is fast even for extremely large data sets. Because the algorithm recommends highly correlated similar items, recommendation quality is excellent. Unlike traditional collaborative filtering, the algorithm also performs well with limited user data, producing high-quality recommendations based on as few as two or three items. The proposed system is able to successfully integrate recommendations.

PROBLEM DESCRIPTION

It becomes very difficult at times to choose an electronic gadget at times. Be it a smartphone, laptop, earphone or any other gadget, there are new launches in every category. Thus, it becomes very difficult for people to get to know all the gadgets and then make a choice for themselves. Infact, people ask for various opinions, visit various stores, surf the internet and still end up choosing a product that is wrong for them or not the perfect fit. This is the scenario with people of both technical and non-technical backgrounds.

Finding gadgets that meet all your requirements and also fit into your budget gets very confusing while choosing the perfect product on your own. Both online and offline market sellers recommend products that best bring profit to them rather than fulfilling user requirements.

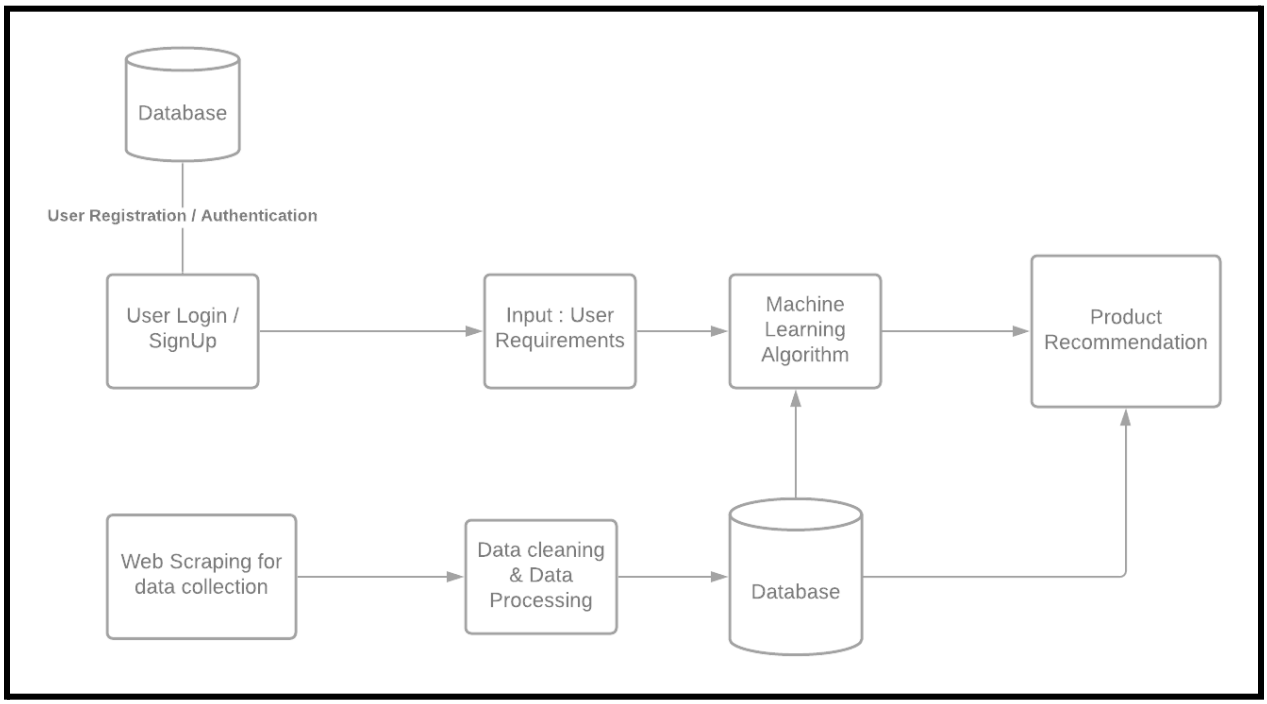
PROBLEM STATEMENT

Most people(both with technical and non-technical backgrounds) are in a dilemma about which gadget will be a perfect fit for them as the number of new launches is increasing every day.

OBJECTIVES

1. To get a dataset containing the information of the gadgets.
2. To Design and develop a platform that suggests laptops, smartphones, earphones, and other gadgets that meet most of the user's technical requirements.
3. To ensure maximum customer satisfaction by suggesting the product in less time.

METHODOLOGY



Architectural Diagram : Gadget Recommendation System

1. **User Login / Signup**
    - Users will be asked to fill a form for both login and signup.
    - If the user is signing up the data will be stored in the database
    - If the user is logging in the data will be authenticated using the database

2. **User requirements**
    - After the user successfully logs in they will have to answer certain questions.
    - These questions will be according to the gadget they want to be recommended.

- There requirements will be further sent to the machine learning algorithm

3. Web Scraping

- Using a web scraper the specifications of various devices from GSMarena, Flipkart or Amazon will be collected.
- It will be implemented using Beautiful Soup or Scrapy Python library.

4. Data pre-processing and Cleaning

- The data obtained from web scraping will be processed and cleaned.
- After the data is in a useful format it will be stored in a csv file in the database.

5. Machine Learning Algorithm

- The user requirements will work as input for the machine learning algorithm.
- Using the cosine similarity algorithm , it will find out the product that matches most of the user requirements from the database.
- It will be sent to the product recommendation module

6. Product recommendation

- The product specifications, image, pros and cons, etc will be displayed.

FACILITIES REQUIRED

Hardware requirement:

1. Personal computer with 4GB RAM
2. 32 bit Operating System
3. 500 GB Hard Disc

Software requirements:

1. Google chrome,Mozilla Firefox or any other browser

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1. Greg Linden, Brent Smith, and Jeremy York;"Amazon.com Recommendations Item-to-Item Collaborative Filtering",IEEE,7, 76 - 80,22 January 2003

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3. Pradeep Kumar Singh,Pijush Kanti Dutta Pramanik,Avick Kumar Dey,Prasenjit Choudhury;"Recommender Systems: An Overview, Research Trends, and Future Directions",International Journal of Business and Systems Research,15(1),14–52,January 2021