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Smart Phone Recommendation System

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ABSTRACT: Recommendation System is a system that seeks to predict or filter preferences according to the user's choices. Recommendation systems are utilized in a variety of areas including movies, music, news, books, research articles, search queries, social tags, and products in general, It is a simple algorithm whose aim is to provide the most relevant information to a user by discovering patterns in a dataset. The algorithm rates the items and shows the user the items that they would rate highly. An example of recommendation in action is when you visit Amazon and you notice that some items are being recommended to you or when Netflix recommends certain movies to you. They are also used by Music streaming applications such as Spotify and Deezer to recommend music that you might like. They gradually learn your preferences over time and suggest new products which they think you'll love. We can make this application using python language and collaborative based filtering algorithm.Collaborative filtering tackles the similarities between the users and items to perform recommendations. We include a data set with user id, ratings, item number and time spent. With these data we use mapping technique and correlation concept to match user id and ratings.

KEYWORDS: smart phone recommend, python, machine Learning, SVD algorithm, KNN algorithm.

I. INTRODUCTION

When combined with recommender system technology, mobile phones are quickly taking the lead as the major means of accessing information for users, both for personal and professional use. By offering more individualized and targeted material, recommendation strategies can improve the usability of mobile systems and lessen the detrimental consequences of information overload. After China, India is the world's second-largest market for smartphones. In 2017, there were over 134 million smartphones sold in India; by 2022, that number is expected to rise to about 442 million. In terms of the average amount of time smartphone users in Asia Pacific spent on mobile websites, India came in second. India has become a very appealing market for foreign vendors due to the combination of very high sales volumes and average smartphone customer behaviour. Consumer behaviour shows that while making a purchase, 97% of consumers use search engines, compared to 15% who use social media. 90% of the time, a user will inquire about a smartphone if a merchant is successful in publishing it at the appropriate location and according to their behaviour or preference. The usage of recommendation and personalization systems has become necessary due to the advancement of computers, the quick development of mobile phone platforms like the Apple iPhone and Google Android, and the demand for m-commerce. The path of internet usage is shifting toward mobile devices; while these can take many different forms, for the sake of this study, we will focus on smartphones that have characteristics that allow them to access the internet and information in an appropriate manner. Additionally, there are restrictions on mobile devices' network connections, hardware capabilities, and usability features like screen size. These days, mobile devices are widely used and regarded as the main means of accessing the information environment. But as more and more people use these devices and the amount of information on the internet increases, there is a growing need to address the difficulties associated with mobile computing settings. These days, it's crucial to deal with information overload, and that, along with the restrictions that most of these devices have (such screen size, CPU speed, and memory capacity), leads us to employ recommendation technologies. Systems that make recommendations are concerned with dynamically customizing the data they receive. The recommendations' purpose is to help the user choose what to buy, who to add as a friend on social media, and what news to read. Personalization systems are among the most useful tools because of the abundance of information available on the internet. Furthermore, as the design and development of such a system integrates knowledge and expertise from several computer science disciplines, it should be mentioned that it is an extremely difficult procedure. In spite of this, a number of reputable techniques have been created in recent years, some of which are being applied in commercial settings.

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II. LITERATURE SURVEY

In order to get required knowledge about various concepts related to the present application, existing literature was studied. Some of the important conclusions were made through those are listed below.

With the advent of personalized mobile phones, privacy has become a critical consideration. For the system to make appropriate recommendations, it needs to access certain private data. But it's important to remember that privacy is a major issue, and using recommenders in mobile situations is frowned upon[1,2].Context awareness is currently widely used in a number of application domains, such as m-commerce and travel services that are mostly utilized for travel. Recommender system customization is also a common feature of m-commerce technology [3, 4].The recommendations are meant to help the user choose what to buy, who to add as a friend on social media, or what news to A recommender system is a tool that helps users make decisions in complex information settings.

Additionally, recommender systems were described as a tool that assists users in searching through knowledge data relevant to their interests and preferences from the standpoint of e-commerce. The definition of a recommender system is a way to support and enhance the social process of making decisions based on recommendations from others in situations where one has sufficient firsthand knowledge or expertise with the options. Recommender systems offer tailored, exclusive content and service recommendations to users, addressing the issue of information overload that they typically face. A number of methods have recently been developed for developing recommendation systems that can make use of content-based, hybrid, or collaborative filtering.The most developed and often used method is collaborative filtering. Collaborative filtering finds other users who have similar tastes and uses their recommendations to suggest products to the current user. Several application domains have seen the implementation of collaborative recommender systems. Group Lens is an architecture focused on news that uses teamwork to help users find articles in a large news database. Ringo is an online social information filtering system that builds user profiles based on album ratings through collaborative filtering. To enhance its recommendation system, Amazon employs algorithms for topic diversification. In order to get around the scalability problem, the system employs collaborative filtering, which creates an offline table of comparable items using an item-to-item matrix.Then, based on the users' past purchases, the algorithm suggests additional products that are comparable to these ones online.

Conversely, content-based strategies connect user attributes to content resources. Unlike collaborative techniques, content-based filtering algorithms often base their predictions on user information and reject contributions from other users. Fab is an example of a content-based recommender system that primarily depends on user ratings to generate a training set. Letizia is one of the other systems that makes use of content-based filtering to assist users in finding information on the Internet. The system employs a graphical user interface to help people navigate the Internet;

2.1 Literature review Summary

This literature survey provides an in-depth exploration of recommender systems in the context of mobile applications and various domains such as m-commerce and travel services. It discusses the importance of privacy in personalized mobile experiences and the ethical considerations of using recommender systems on mobile platforms. The survey delves into different types of recommender systems, including collaborative filtering and content-based filtering, highlighting their methodologies and applications in various domains like news, social media, and e-commerce (e.g., Amazon's recommendation system). Additionally, it touches on context awareness and how it influences recommendation accuracy and user experience. Overall, the survey emphasizes the significance of recommender systems in decision-making processes while addressing privacy concerns and ethical implications.

III. PROPOSED SYSTEM

In this project, provide users with phone recommendations based on features. Using machine learning methods for recommendation in this case.The recommendation is made using the Collaborative based Recommendation system, which uses the SVD and KNN algorithms.Collaborative filtering techniques leverage judgments made by both current and previous users to create a model based on prior behavior. Next, items that the user could find interesting are predicted using this model.In recommendation systems, the KNN-based collaborative filtering algorithm and SVD algorithms are commonly employed techniques. Predicting user preferences by finding other users who share those tastes and using their ratings to generate recommendations is the core idea behind collaborative filtering.

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IV. METHODOLOGY

Using sophisticated algorithms, a smartphone recommendation system suggests the best smartphone options to consumers based on their needs, interests, and usage habits. This system makes recommendations that are customized to each user's preferences and needs, which improves the user experience. Fundamentally, the recommendation engine makes use of an extensive dataset that includes details on different smartphones that are sold on the market. The specs included in this dataset include, but are not limited to, CPU speed, storage capacity, battery life, display resolution, camera quality, and price. It also includes user-generated information, such as reviews, comments, browsing history, and previous transactions. Data collection and preprocessing, which involves gathering, organizing, and cleaning raw data in order to extract pertinent features, is the first step in the recommendation process. After the data has been analyzed, machine learning approaches including content-based filtering, collaborative filtering, and hybrid methods are used to produce customized suggestions.

Data modelling overview.
The project workflow is shown in the block diagram. First, gather the mobile phone dataset, which contained information on the author, the nation, the data, the domine, and more. which each show the specifics of the mobile phone model. The data was then processed, and the train and test datasets were divided. Next, use SVD and KNN algorithms to facilitate collaborative recommendation. Following the training phase, a machine learning model with mobile phone information is built, and consumers are recommended to purchase a new smartphone based on this model.

Training And Model Build
Knn and the established SVD model and algorithms should be used for training.

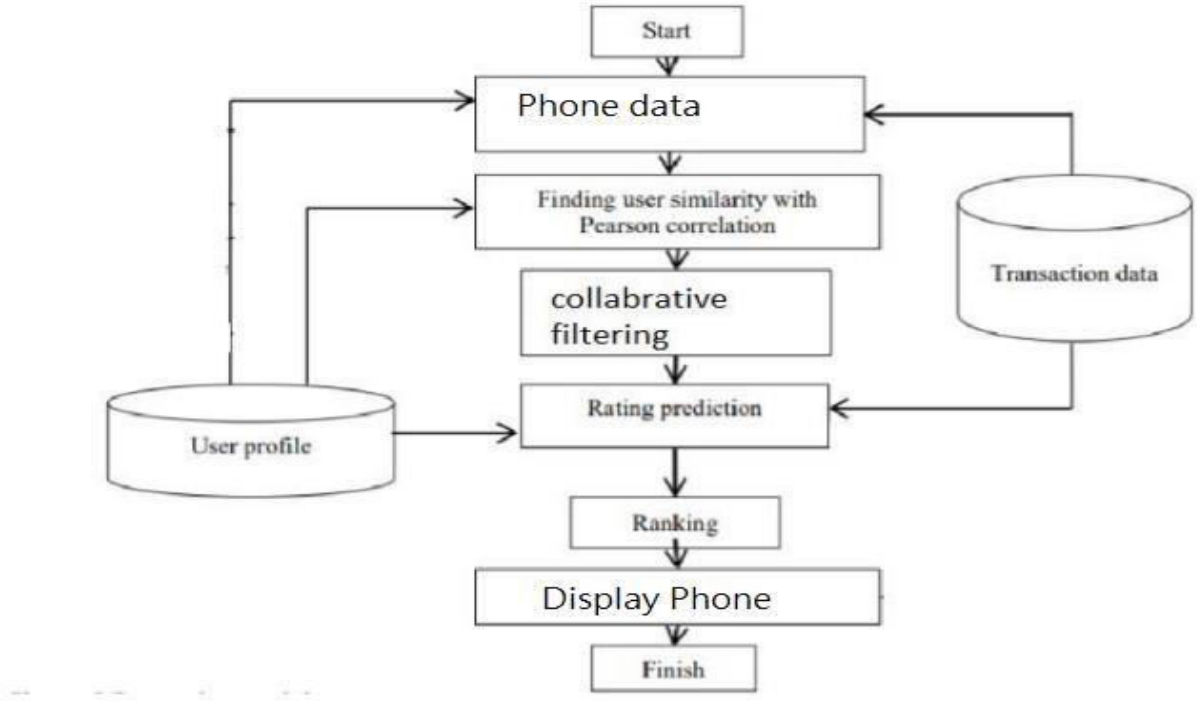

Fig 5.1: Methodology diagram

Gather all of the dataset samples in.csv format, use correlation to detect similarities, and then engage in cooperative filtering. Applying a user profile with all the phone's information will help with that. Utilising phone transaction data, forecast the rating and ranking. Show the suggested phone number and shut down the system.

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DATA DESCRIPTION

The information provided includes the following: domain: the website where the rating was obtained; extract: the rating content; author: the name of the person who gave the rating; country: the country to which the person who gave the rating belongs; data: the date of the rating

- product: the name of the item or cell phone that received the rating;
- score: the phone's average rating
- score_max: the phone's highest rating
- source: the location where the evaluation was obtained

All other features are of object type, with the exception of score and score_max, which are of float type. Datetime is required for the feature date. Additionally, it appears that the columns author, extract, score, and score max have Null values.

V. RESULTS

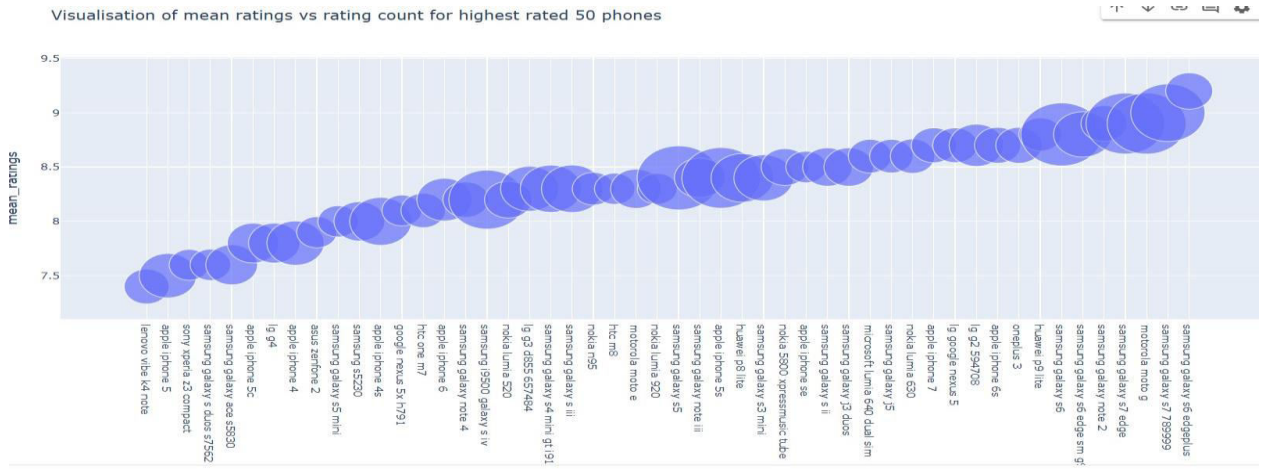

FIG 5.1: RATINGS

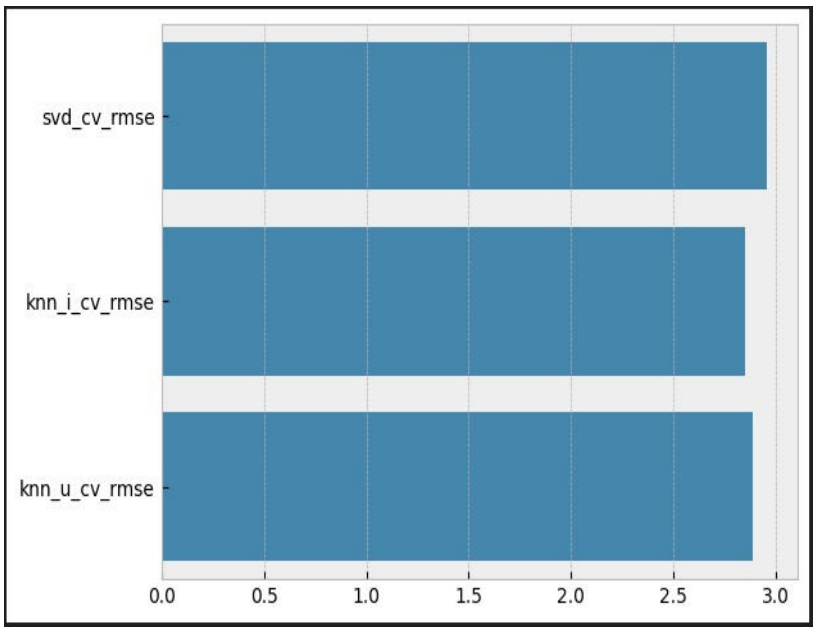

FIG 5.2: EFFICIENCY

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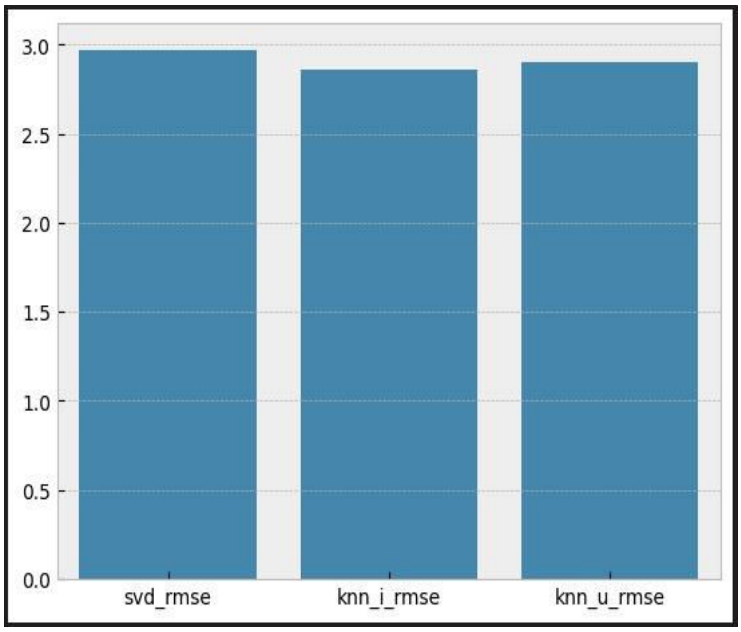

FIG 5.3: EFFICIENCY USING ALGORITHMS

:

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Top 5 recommendations for all test users are:

Luca -> [('huawei p8 lite 2017', 9.54580999682166), ('motorola c975', 9.355991319296889), ('huawei ascend mate 7', 9.338604166135665), ('huawei ascend mate', 9.335522032799714),

Andre -> [('motorola moto g', 9.403306327732883), ('nokia 1200', 8.533290535169897), ('samsung gt b2100', 8.499674037906336), ('samsung galaxy s iii neo i9300i', 8.1667092029455

Samuel -> [('htc first', 10), ('lg g2 594708', 9.716274423343407), ('blackberry passport', 9.431273565204009), ('samsung sgh e635 sgh e630', 9.319522951000842), ('lg d686 g pro

Cliente Amazon -> [('lg k500n', 10), ('huawei nova', 9.641332610208144), ('huawei shotx', 9.5636256463249 85), ('samsung s5611', 9.1113307229721 06), ('htc desire eye m910x', 9.05

Barbara -> [('lg dare vx9700', 10), ('alcatel one touch idol 2 mini', 9.820981530077 86), ('motorola moto g', 9.490816589484176), ('huawei y635', 9.25454518856927), ('samsung sgh

Amazon Customer -> [('acer liquid s1', 10), ('sagem my x 2', 10), ('siemens m55', 10), ('siemens a50', 9.8953065076511 08), ('wiko cink slim', 9.762924325461144)]
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FIG 5.4: RECOMMENDATION FOR USERS

VI. CONCLUSION

A recommendation system is a tool that suggests products to users, either to buy or not. The phone recommendation system in this case was created by utilizing the SVD and collaborative filtering KNN algorithms to suggest the system to the user based on the collected dataset. Here, the system is recommended using both an item-based and user-based approach. This could help the user feel less confused about their purchase. In summary, the smartphone recommendation system is a major step forward in improving user experience and streamlining the process of choosing the best smartphone. This system provides customized recommendations based on user behavior, needs, and

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preferences by utilizing large datasets and advanced algorithms. By utilizing methods including content-based filtering, collaborative filtering, and hybrid approaches, the recommendation engine efficiently examines user information and smartphone specs to produce precise and pertinent recommendations. By comprehending intricate patterns in user behavior, optimization techniques such as matrix factorization, deep learning, and natural language processing improve suggestion accuracy even further. Furthermore, in order to keep recommendations current and indicative of changing demands, the recommendation system constantly learns from and adjusts to shifts in user preferences and industry trends.

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