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Recommending Android APPs Using Machine Learning

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Abstract

Users can utilize the application suggestion feature in recent Android operating systems to find a replacement application that is similar to the one they are looking for. The current Google and Google Play store recommendation system is said to suggest apps that are similar to a target application while also taking into account the popularity of each app. It does not, however, account for the security features of each program or the user's preferences. Through app markets, end users can access a variety of mobile applications (or apps) in abundance. These apps frequently produce network traffic, which uses up users' mobile data plans and could even pose a security risk. However, a mobile device's amount and kind of network traffic Due to the absence of a formal assessment methodology, the app in the real world is still only partially known. The cost of network traffic for Android apps in the official Android markets is first measured and analyzed in this study. We conclude from the findings that the traffic costs for apps in various categories vary. Particularly, the cost of network traffic varies noticeably among apps with comparable functionality. Then, in contrast to traditional methods for app recommendation, we incorporate measures for traffic cost into our algorithm. The suggested recommendation algorithm can effectively assist mobile app users in avoiding a variety of potential security and privacy issues brought on by the needless network traffic consumption, according to experimental results.

Keywords: Unsupervised Machine Learning, Recommendation System, Content Based Filtering.

1. INTRODUCTION

1.1 Introduction

The field of app development is flourishing in the present era. There is an Android application for everything, from recreation to education, learning to navigation, fitness and health to tracking. It has become difficult for users to choose apps they want to use and install on their smartphones due to the abundance of Android apps available and the rapid rate at which fresh apps are being added to the list. [1] The use of user data and intent to provide pertinent recommendations for users is a growing topic of research in recommendation systems. using the same strategy. The goal is to develop recommendations that are compatible with the users' tastes and preferences. Collaborative filtering and content-based filtering are two popular methods in this area. [2] In contrast to collaborative filtering, which filters and suggests content based on user activity and content description, content-based filtering uses the user's preferences along with the content description. Hybrid content filtering is another method that is employed in this situation.In order to address the sparsity and cold start difficulties that are related to the earlier methodologies, Hybrid Content Filtering incorporates both Content and Collaborative filtering techniques. [3]

Although there has been a lot of work done in the field of recommendation systems, the idea of using machine learning algorithms to improve the outcomes is still relatively new. Making autonomous models that can learn from available data and automate operations is at the heart of machine learning. Similar outcomes are anticipated when applied for content suggestion purposes. The machine learning-based app recommendation system is a field with lots of untapped potential. It is well recognized that recommendation systems enhance the decision-making process and decision-making quality [4]. The foundation of this project is the usage of a machine learning algorithm to propose apps to users. Users were shown screenshots of several apps that had been gathered and presented. Features are extracted and given to the machine learning model based on user preferences and screenshots of the apps. Through these retrieved attributes, the model learns and makes use of the gaining knowledge to eventually suggest apps to users. The degree of similarity between the apps enjoyed by users and the recommended apps serves as the foundation for app recommendations.

2. Literature Survey

• **[1 P. P. P. D. A ,. P. Singh, "Recommender systems: an overview, research trends, and future directions," Int. J. Business and Systems Research :**, Recommender systems (RS) have become a focus of significant research because they aim to make it easier for users to find products online by making recommendations that closely match their interests. The many recommendation approaches, related problems, and information retrieval strategies are all covered in-depth in this paper's analysis of the RS. It has generated study interest among a sizable number of scholars worldwide because of its extensive uses. This paper's primary goal is to identify the RS research trend. Since 2011 through the first quarter of 2017, more than 1,000 research publications from ACM, IEEE, Springer, and Elsevier have been taken into consideration. This work has produced a number of intriguing discoveries that will assist present and future RS researchers in evaluating and create a plan for their research. This work also looks ahead to RS's future, which could lead to new lines of inquiry in this area.

[2] Y. B. F.O.Isinkaye, "Recommendation systems: Principles, methods and evaluation," Egyptian Informatics Journal: A possible problem of information overload that prevents timely access to things of interest on the Internet has been caused by the exponential development in the volume of digital information available and the number of Internet users. This issue has been largely resolved by information retrieval systems like Google, DevilFinder, and Altavista, but prioritization and personalization (where a system matches accessible content to a user's interests and preferences) of information were lacking. As a result, recommender systems are more in demand than ever. By selecting important information fragments from a large volume of dynamically created material based on the user's choices, interests, or observed behavior about the item [2], recommender systems are information filtering systems that address the issue of information overload [1]. the recommender systems.

3. OVERVIEW OF THESYSTEM

3.1 Existing System

Due to a lack of knowledge about data visualization, it is a bit difficult to deploy machine learning algorithms in the current system. In the current approach, constructing models is done by mathematical computations, which can be very difficult and time-consuming. We employ machine learning tools from the Scikit-Learn toolkit to get around all of this.

3.1.1 Disadvantages of Existing System

- Less feature compatibility
- Low accuracy.

3.2 Proposed System

In the suggested approach, we'll use unsupervised machine learning to create a recommendation system, and we've already built one using a content-based filtering system. Here, we must enter the index number of the particular app to quickly receive up to 10 recommended apps.

3.3 Methodology

In this project work, I used five modules and each module has own functions, such as:

1. System Module
2. User Module

1. User: The user will access the webapp's home page after clicking the url link created by the flask frame work, where they can read the information on our project's about page. The user will then be directed to the login page where they must enter their email address and password in order to access their user home page. From there, they must go to the start recommendation page and enter the app index in order to view the recommended apps for that specific app. The user can finally log out of the website.

2. **System**

When the code in the PyCharm is successfully executed, the system will take you to the web application's home page, and it will then store the user's registration information in a database. When the user enters their login credentials, the system checks the database to see if the information is there; if it is, the login will be successful; otherwise, it will display an error message. The system will then begin pre-processing the data, begin constructing a model, and then produce the suggested outcome.

Algorithms:

1. Collaborative Filtering: This method is solely based on previous interactions between clients and products. Thus, historical data containing all user interactions with the targeted items served as the main input for collaborative filtering. Data is stored in a matrix where the columns represent the products and the rows represent the customers. This method just uses historical data and nothing more, such as current cultural trends. At the most fundamental level, CF can be divided into memory-based and model-based techniques. The simplest strategy is one that relies solely on historical data and straightforward measuring of distance. Model-based approaches fit the potential outcomes using models.

4 Architecture

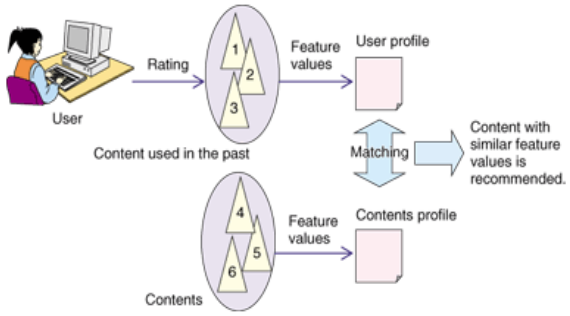

Fig 1: Frame work of proposed method

5 RESULTS SCREEN SHOTS

Home Page:

7. CONCLUSION

✓ A recommender system was developed to aid consumers in finding and obtaining relevant mobile applications. The system is a prototype that was developed after researching related systems and earlier research. It demonstrates the possibilities of application suggestions, analyzes the domain's difficulties, and offers suggested applications to users as soon as they activate the system by using their location. Initial analyses were carried out. Currently, there are a lot of mobile applications being developed and deployed, therefore recommender systems are becoming more and more necessary. The wide range of systems available to address this issue demonstrates the need. Systems like the one in this research show significant promise for solving It is also possible to

identify the issue of helping end users and a commercial opportunity. An application store or portal would benefit from application recommendations, but the data that the system produces also has value.

Future Enhancement

- ✓ Future development of mobile application recommender systems will face several difficulties. There are some issues that affect research on recommender systems in general and others that are particularly related to applications or context-awareness. The problems are highlighted in this part, first in a general sense and then by focusing on elements unique to the ongoing development of the prototype system described in this study. When examining the issue outlined in this paper, there are a number of different perspectives to take into account. One is that of the end user, who needs to find intriguing applications quickly and easily without sacrificing privacy. Researchers have a need to comprehend users in order to modify algorithms and system interactions to meet users' needs while recording and assessing system components. Then there is the commercial viewpoint of looking for ways to benefit from the generated recommendations, which may have an impact on research and the overall system design as well as the usability of the system from the user's point of view.

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