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ijirset@gmail.com



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Implementation of Mobile Phone Recommendation System

Jinisha Shailesh Gehlot, Tanaya Prakash Bornare, Rutika Dilip Kasar, Mrinalini Yogeshraj Netkar

U.G Student, Department of Computer Engineering, SSBT's College of Engineering and Technology, Bambhori,
Jalgaon, India

U.G Student, Department of Computer Engineering, SSBT's College of Engineering and Technology, Bambhori,
Jalgaon, India

U.G Student, Department of Computer Engineering, SSBT's College of Engineering and Technology, Bambhori,
Jalgaon, India

U.G Student, Department of Computer Engineering, SSBT's College of Engineering and Technology, Bambhori,
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Abstract: Mobile phones have become essential in social life. Today mobile phones become a basic need of individuals, as a communication device across the globe. Information and communication technologies have contributed tools and technologies in the area of e-commerce that have introduced new way of shopping. Recently there has been tremendous growth in smartphone market due to which online market sales have also increased. The obvious market competition complemented by advanced functionality and feature is building the consumer's mobilephone decision-making challenging. The number of options available in the market are overwhelming and makes challenging to choose right product. mobile recommendation system can help to solve this problem. Recommendation systems have become part and parcel of everyday life by which people receive recommendations. assessment of recommendation systems rests entirely on the evaluation of the quality of the recommendation and at the same time on their functioning of the recommendation algorithm used to make the decision. Therefore we propose a web application to provide a user with the best recommendations for the mobile phone according to the user's specifications and requirements.

KEYWORDS: Recommendation, Smartphone, Cosine Similarity, Mobile phone

I. INTRODUCTION

Today mobile phones become a basic need of individual, as a communication device across the globe. The technological advancements in the telecommunication industry has paved the way for the exponential growth of cell phone technology [3]. The number and usage of cell phone devices is increasing day by day [3]. The advances in mobile phone technology and the competitive fight among the mobile phone manufacturers created the situation that almost every day a new model of a mobile phone is being introduced in to the market [2]. The major factors that influence consumers in selecting a mobile phone to use include: innovative features, image, price, personal recommendation, durability and portable aspects, influence of media, post-sales service and soon.

There are several online e-commerce websites and portals that provide a way to search for cell phones based upon search criteria. As the cell phone market is so huge and diverse, not all smartphones have good quality in terms of specifications and features to fulfill customer needs [3]. Though mobile phones have several features in common, manufacturers still try to bring uniqueness to their products by adding some more new features to the existing features [2]. This made mobile development a challenge and manufacturers have welcomed the challenge with a great set of innovative designs. Therefore it is inevitable to run with innovative updates and at the same time, it is most desirable to know the trending thoughts of potential customers. In this project, we present a web application that uses web scraping and a machine learning algorithm. The web scraping technique is used to extract and reprocess data from multiple e-commerce platforms to analyze the reviews and to provide more precise results. The tool will help users to get quick useful insights from reviews data which can save time, money, and effort. This makes it easier for users to choose the smartphone best in terms of specification and features from a large market.

Objectives

- Using such web apps, one can find the perfect smartphone that the user wants to be based on their requirements. For this, we are providing updated data collected from various online platforms for the perfect recommendation of a phone.
- Provide recommendations based on recorded information on the user's preferences. These systems use information filtering techniques to process information and provide the user with potentially more relevant items [2]. Deliver Relevant Content to the user.
- Users to get quick useful insights from reviews data which can save time, money, and effort. Reduce Workload and Overhead.
- Accuracy: Accuracy is always of great concern to a developer. For this we are providing updated and accurate data for perfect recommendation of phone. so the user can get there required product.
- Speed : Because of optimized coding, Page loads are much quicker than others

II. RELATED WORK

The research aims over recommending an appropriate smartphone to the user thus helping them to take better and wise decisions. It also suggests the best smartphone-based on ratings given by other users. Thus, the user gets to know the most popular smartphone. The research is carried out for various smartphones available in the market and the data sets of the smartphone are collected respectively. The proposed recommendation system will be analyzing the data set using machine learning algorithms such as Cosine similarity. Recommendation systems are based on a recommendation algorithm and contextual information collected in a database to provide recommendations of items or services to users, the Recommendation system is a most powerful tool to make decision-making easier for the user, especially for a volatile products like smartphones.

III. METHODOLOGY

A commonly used approach to match similar documents is based on counting the maximum number of common words between the documents. But this approach does not work when the size of the document increases, the number of common words tends to increase even if the documents contain different topics. The cosine similarity helps to overcome this as it does not count the common words like the Euclidean distance approach [1]. Mathematically, Cosine similarity measures the cosine of the angle between two vectors projected in a multidimensional space. In this context, the two vectors are arrays containing the word counts of two documents When plotted on a multidimensional space, where each dimension corresponds to a word in the document, The cosine similarity captures the orientation (the angle) of the documents and not the magnitude. for magnitude, we can compute it using the Euclidean distance instead. The cosine similarity is advantageous because even if the two similar documents are far apart by the Euclidean distance because of the size they could still have a smaller angle between them. Smaller the angle, the higher the similarity . In cosine similarity, data objects in a data set are treated as a vector. The formula to find the cosine similarity between two vectors is,

$Cos(x,y) = \frac{x \cdot y}{||x|| * ||y||}$ where,

$x \cdot y$ = product (dot) of the vectors 'x' and 'y'.

$||x||$ and $||y||$ = length of the two vectors 'x' and 'y'.

$||x|| * ||y||$ = cross product of the two vectors 'x' and 'y'.

Proposed System Architecture

This section introduces the system architecture that under lies all processes involved .
Software Requirement Specification (SRS) :-

A. Product Features -

The system shall provide a uniform look and feel between all the pages of the user interface. The user interface shall compatible with all screen sizes. Personalized push notifications shall be implemented for a user-friendly experience.

B. Assumptions

It is assumed that the user will possess decent internet connectivity. A minimum 2Mb connection is required.

C. Functional Requirements

The Machine learning-based system takes the user's requirements as input then the system monitors and analyzes the data set and recommends the most relevant smartphone which provides suitable recommendations to the user. There are many features of a smartphone such as RAM, ROM, Camera, Battery, Processor, Price, and size. The system will ask the user to provide the above-mentioned features as per their requirement and the system will show the mobile recommendation accordingly. Recommendation System collects information about user interests and attributes of items. Preferences are analysed and the system will advise the user to make the right decisions to buy the right products.

D. Non-Functional Requirements

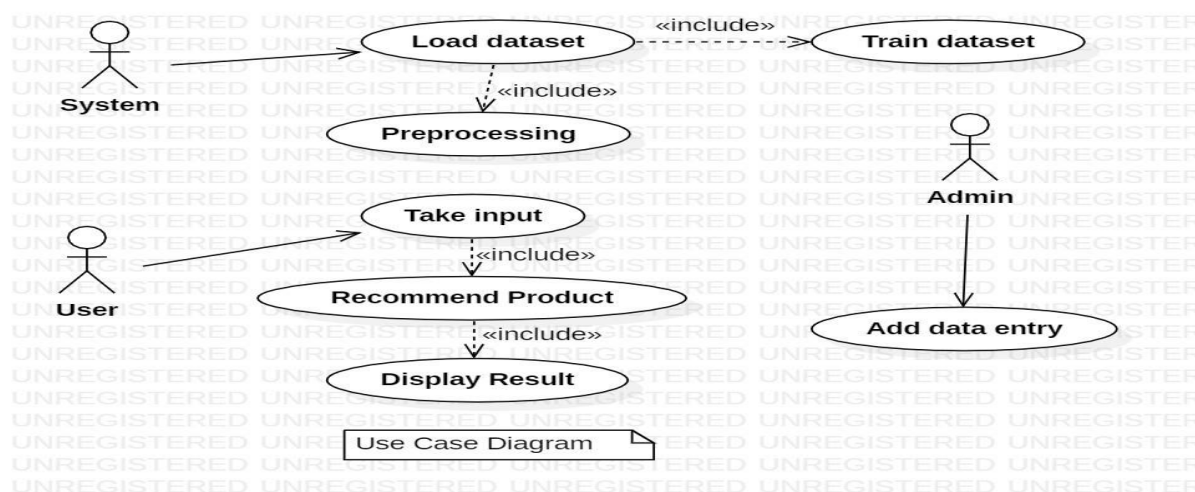
- Usability - The system shall compatible with all screen sizes and resolutions.
- Availability - The system shall work with basic internet connectivity.

E. External Interfaces

- User Interface - user interface environment shall be organized during the development phase as a flexible, easy-to-update, dynamically configurable system, which accesses mainly values stored in the database
- Hardware - The system shall compatible with all different screen sizes and resolutions.
- Software various python libraries will be used according to need while development. Front-end will be created on the web using HTML, CSS, and JavaScript. web frontend is connected to python back-end.

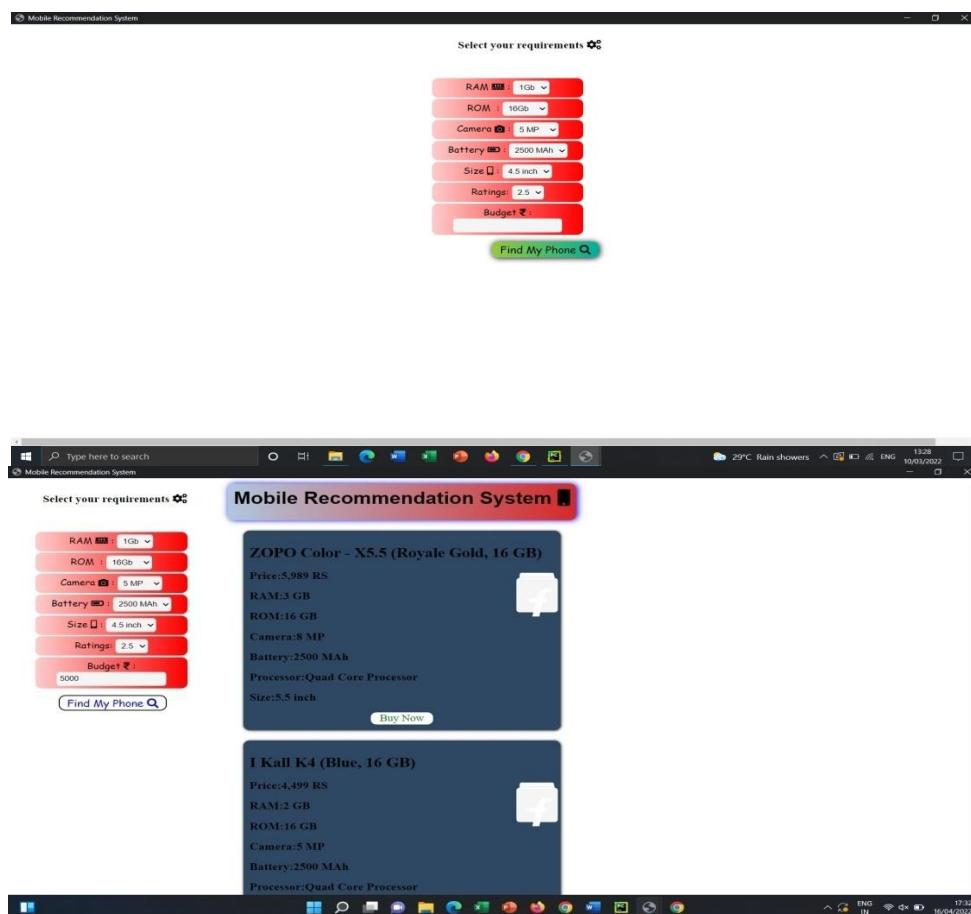
F. Use case Diagram

Use case Diagram: A use case diagram shows the interaction between the external entities and the system. These entities are known as Actors which have a specific role in the system. Use cases show the functions of the system. The figure given below shows the use case diagram of the proposed system. The purpose of the Use Case diagram is to show or know the functionality of the proposed system. This use case diagram of the proposed system contains some of the basic functionalities such as Load data-set, Display result and Recommend product, etc.

**IV. RESULT AND DISCUSSION**

The Machine learning based system takes the user's requirements as input then the system monitors and analyzes the data set and recommends the most relevant smartphone which provides suitable recommendations to the user. There are many features of a smartphone such as RAM, ROM, Camera, Battery, Processor, Price, and size. All options will be provided on the system, the user will fill all options as per the requirements and the system will show the mobile recommendation accordingly. Recommendation System collects information about user interests and attributes of items. Preferences are analyzed and the system will advise the user to make the right decisions to buy the right products. The

given below screenshots show the same.



V. CONCLUSION

We approached the problem of Smartphone recommendation using a web-based System. In general, the number of choices is overwhelming so there is a need to filter, prioritize and efficiently deliver relevant information to the user. Recommendation systems are very powerful to extract valuable information which benefits the user. We used the Cosine Similarity algorithm which is a metric used to measure how similar two attributes are. It compares the attribute of two smartphones on a normalized scale. The System enhances the user experience by giving fast and coherent suggestions so it can help to increase user satisfaction.

VI. FUTURE WORK

The system can also in the future be extended to be synchronized with databases of electronic devices like PC, microwaves, refrigerators, etc. so that users will be able to get personalized recommendations and take correct decisions in their web browsing experience. A direct link to the product can also be provided to user so that the user can directly land on the product page.

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