

Product Recommendation System

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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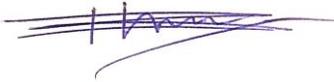
03 JUNE ,2021

APPROVAL

This Project titled “**Product Recommendation System**”, submitted by Auntor Acharja ID:172-15-10047, Md. Zahin Hossain George ID:172-15-9710, Mehedi Hasan ID:172-15-10041 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 03 June 2021.

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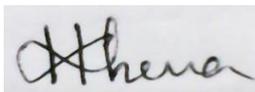
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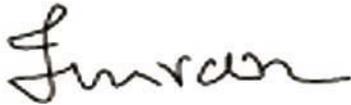
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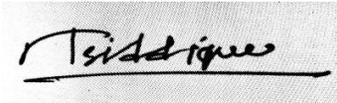
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DECLARATION

We hereby declare that this project has been done by us under the supervision of **Shah Md. Tanvir Siddiquee, Assistant Professor, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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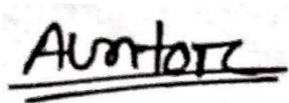
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ACKNOWLEDGEMENT

First, we express our heartiest thanks and gratefulness to Almighty Allah for His divine blessing that makes us possible to complete the final year project/internship successfully.

We are grateful and wish our profound indebtedness to **Shah Md. Tanvir Siddiquee**, Assistant Professor, Department of CSE Daffodil International University, Dhaka. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts, and correcting them at all stages have made it possible to complete this project.

We would like to express our heartiest gratitude to Professor **Dr. Touhid Bhuiyan**, Head, Department of CSE, for his kind help to finish our project and also to other faculty members and the staff of the CSE department of Daffodil International University.

We would like to thank our entire course mate in Daffodil International University, who took part in this discussion while completing the course work.

Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

In recent years, e-commerce draws attention to the spread of online shopping portals, many consumers refer to buying merchandise by reviewing feedback, price, and rating of the preferred product. E-commerce occupies an important role in the everyday life of people and requires a substantial amount of time. It has become so popular that people on social e-commerce platforms exchange a large amount of data and viewpoints, which in turn helps to find useful perspectives for organizations/vendors or customers. So, thinking for better purchase here we have created "Recom" basically a Product Recommendation System for providing suggestions to the customers who are interested in purchasing good quality products. It can analyze online products and ranks them according to product price, and rating. Finally, it recommends a suitable product to the target customers. We hope that our application can help our nation by providing better recommendations for any selected product.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This analysis would address the highlights and method of setting up the application that we felt and managed well ordered to achieve in the last achievement. In specific, this announcement keeps subtleties for the objectives, a show of organization, reach, important prerequisites, and techniques that have been embraced by finally announcing and observing.

An online analysis of any item is a means of categorizing any item on an e-commerce platform. Consumers tend to become aware of the commodity before purchasing a service. An individual wants to purchase a phone, for instance. But he has no idea which e-commerce platform provides a cheaper price for the genuine commodity. If the user knows about the item and sees other customer feedback and ranking of that item, it would be easier. Our 'Product Recommendation System' satisfies this criterion. A customer can easily analyze here, score his consumed service so that other customers can easily locate the desired product there.

1.2 Motivation

Today, there are several e-commerce websites in Bangladesh. Customers of this e-commerce website need a trustworthy forum where they can search and get accurate product feedback. Social media such as Facebook, Instagram, Twitter is very popular among the people of Bangladesh and even worldwide. People give reviews on those social media sites about the product bought there. But sadly, those reviews are not trustworthy at all. We see in the media that through those reviews, some deceptive people make the company. Any owners of the Facebook community are calling for cash from company owners.

If the owners are not able to give them cash, so the owners of the Facebook community post false feedback about the product and it will create a negative impact on the consumers. Above requirements, we were urged to develop an application where people would quickly locate the product by searching for it so that both buyers and shop owners would benefit.

1.3 Objectives

It is a fascinating statistic that 90% of consumers worldwide read online feedback before they use a business. And 80 % of the value of this online feedback [1]. So, we can see that online reviews have a big effect on clients. To see a product value, a visitor must search for the product in our application. In our application, there are three sectors: user panel, admin panel, and search system. An admin will have his id and password. A user can search his product in the search bar. Our Application will provide an efficient outcome with top e-commerce suggestions based on the product rating and price. He/she can also search for a product with individual categories from the sort and filter section. In this way, a user can get his desired product in a good way.

1.4 Expected Outcome

Due to this abundance of knowledge, it becomes impossible to choose the correct product. Consumers become overwhelmed and this imposes a cognitive overload on the customer when finding a product. Through suggesting goods, product review and sales pages that will boost the productivity of discovering a product from the e-commerce industry, our application will solve this issue. This app can be accessed from everywhere in the world. Just two items, our application, and an internet connection would be needed here. As we know many individuals across the globe are highly focused on online reviews, so we will guarantee that they get anticipated service by using our platform. Company owners would also profit by using our platform as they also needed to know how their clients felt after consuming their service.

1.5 Project Management and Finance

Many ways can help to manage a project decently. In our term to build our application, we go through many terms. Some of them are field research, user requirement finding, UX design, application testing, etc. We have tried to find API from an e-commerce company, but we failed to manage it. So, no money is used to build our application.

1.6 Report Layout

This article on the project is divided into seven chapters. The following summaries are given:

Chapter 1 describes the introduction, motivation, expected outcome, and objective of our project.

Chapter 2 explains the background of our project that illustrates similar work on this initiative. The system's comparative analysis and problems are also identified.

Chapter 3 comes with requirement specification which contains business process modeling, logical data model, use case modeling, and description and design requirements.

Chapter 4 explains the architecture specification which contains the specifications for front-end design and back-end design, interaction design, and UX implementation.

Chapter 5 addresses implementation and testing including implementation of the database with the implementation of interactions, implementation of front-end design, testing implementation, test results, and reports.

Chapter 6 addresses the Impact on Society, Environment and Sustainability means what is the impact of our project.

Chapter 7 addresses the conclusion and future scope of what we will do in the future with our project.

CHAPTER 2

BACKGROUND

2.1 Preliminaries

Modern technologies are improving day by day. This is the era of scientific modernity. And one of the blessings of the modern age is e-commerce. Nowadays people are very much addicted to buying e-commerce products rather than wasting time buying that product physically. It saves time. They buy their online product based on customer reviews, ratings, and prices. But it is also a time-consuming thing to check every product quality requirement. To solve this problem, we came up with an idea to build an android based application that will help people to find their desired product easily without any hassle.

Our product recommendation system will provide a platform where any customer can buy their product without any fear.

2.2 Related Works

In Bangladesh, there are no popular recommendation systems in e-commerce. So, buying a product is a hassle nowadays. There are some available websites not for our country, but it is working very well in other countries. Some of them are “Qubit”, “Ever gage”, “Sentient” etc. [2].

Our android application is filling the gap for a better result for what the customer needs. With our application anybody can find his/her desired product with a single click based on genuine rating, and price.

2.3 Comparative Studies

Bangladesh is a developing country. It is growing day by day. There are lots of e-commerce sites in our country. The number of e-commerce is growing day by day. But not all the products of e-commerce are fully trustworthy.

Because in every place there is a mixture of good and bad. So, buying a product is very much difficult these days. There are lots of e-commerce websites in our country, but they cannot say that every time they are selling the perfect product to the customers. There is no helpful website that will suggest what they want with perfect specifications. For example, someone needs a Nokia phone, but he/she does not know which e-commerce website is very much trustworthy to buy his/her specific phone.

So, if there was an application where he/she could search for that phone and get the perfect result of it it will be very helpful for him/her. Our application will try to solve this problem and give the correct result.

2.4 Scope of the Problem

Before buying a product, online customers now truly depend on online reviews and rating [3]. Some people are also depending on social media like Facebook, Instagram. But these platforms are not truly made for recommendation works. Because most of the reviews are fake or paid. Sometimes the Facebook page owners ask for money for giving good reviews to that product. If the owner refuses to pay that money, they give intentional bad reviews. This problem is ruining the whole e-commerce market system.

By realizing this situation, we are trying to build our application where both customers and owners can find their benefits.

2.5 Challenges

Every android application developer faced challenges while building an android application. We are not different from them. While building our android application we also faced some challenges. Firstly, we cannot find a proper design for our application. After finalizing the design, we cannot fix which platform we will use to build our application. Then we select flutter. Which is very popular these days to build an android application. We have failed to manage any API from any e-commerce company in our country, so we have developed a demo API in our application. The hardware configuration to build our application was very hard to manage. We somehow managed that problem and successfully finished our work. The most difficult part is marketing. Marketing is a very important thing which helps the product to find its proper destination. Now, most people are highly addicted to social media platforms like Facebook, and it is also a beneficial platform for marketing. So, we did market our application on social platforms.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

The visualization of business processes is the graphical depiction of the business types or job processes of an entity as a tool for distinguishing future changes. BPM operates to deliver better outputs from a device [4]. The whole framework job method is discussed by the business process model (BPM). This is usually achieved by distinctive maps, such as the flowchart, the description of the data source, and so on. In comparison to business process mapping, business process demonstration is usually used. The programming show technique offers an investigative representation of 'as-is' systems in an entity and differs them from 'to-be types to render them increasingly efficient.

There are many advantages of BPM:

- It offers everybody a fair idea about how the operation is performed.
- It increases peculiar control and consistency.
- It gains enhancement of organizational efficiency.
- Recognizes redundancies and unnecessary elements and cuts them down.

3.2 Requirement Collection and Analysis

Selection and review of specifications is an incredibly necessary concept for the design of any unique framework or any Android app of any kind. This satisfies the goal of the consumers and the administrator. As our application focuses on the users' and admin needs, we talked with them and wanted to figure out what our app's requirements were. Nearly all of them raised the prospect of a simple app that they could use quickly. It should work part by part to create or improve any type of project at this point.

Each portion should then improve, and another portion should be developed. It helps us to develop our application properly. Every application that develops worldwide is not always perfect. Our application also has some shortcomings. We tried to figure it out to give the best to its users.

3.3 Use Case Modeling and Description

Additionally, a use case diagram is linked together, showing vocabulary that speaks graphically to the framework operation. In this kind of diagram, each action demonstrates that we can get details regarding the whole action. In a use case diagram, different parts are shown which shows different activities. In other words, it is also called a behavior diagram which shows the whole behavior in a graphical way. Requirements for internal and external influences are collected by using a case diagram. Use case diagram of our application is given below:

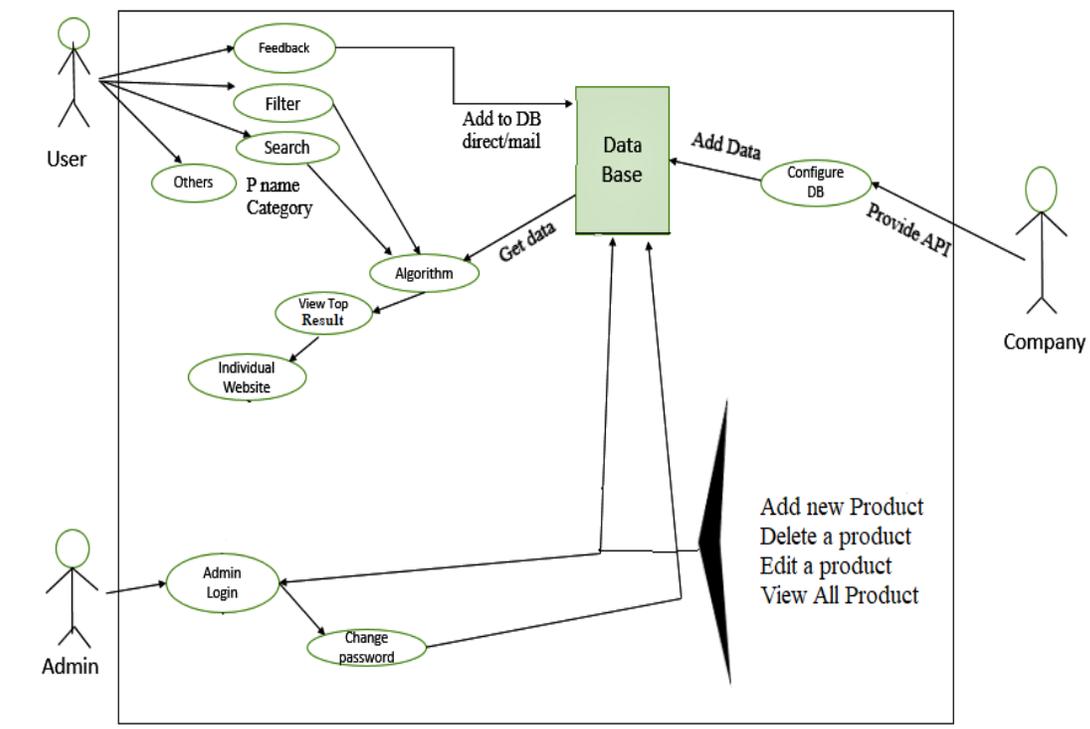


Figure 3.1: Use case Diagram

3.4 Logical Data Model

The Database Relationship Diagram is called the Object Relationship Diagram. For programmers, this partnership renders a database easier. This is our E-R Diagram Design that has helped to better explain database views.

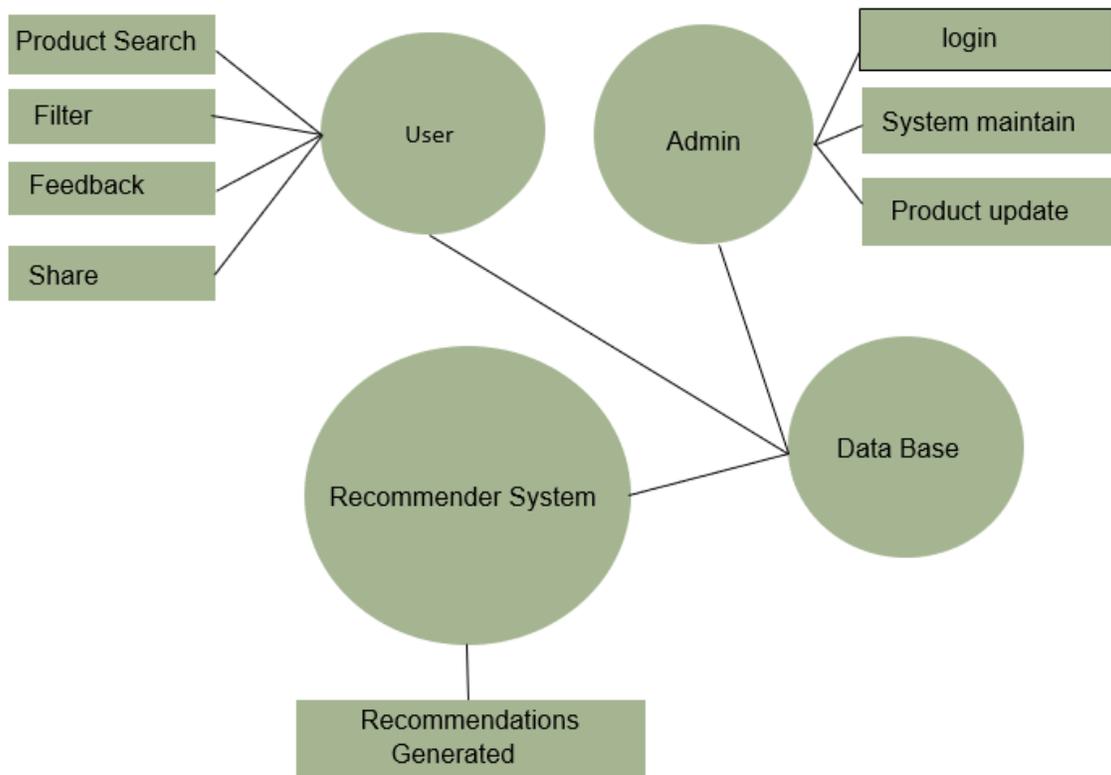


Figure 3.4: Logical Data Model

3.5 Design Requirement

It is delightful to use a well-designed Android program. Our software represents our country's local people and ensures a strong partnership between Bangladesh's clients and e-commerce platforms. As the consumers of our software are our country's residents, we tried to make the app's design user-friendly. It is necessary to provide a successful interface for an Android program. But we can focus on the performance first to draw their customer base. Users normally want fast service, so our key goal is to optimize the UI to make their app experience better.

Design requirement contains:

- Admin panel
- User interface

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

The front-end is the visible part with which users interact with. Developers convert data into a graphical interface with the help of some programming language where users can react. Everything that we see while navigating to the internet is developed with front-end programming. In the early ages, the front-end is not that valuable so that it contains the same common things. But in the modern era developers give more attention to the front-end to make it more attractive to its users. When a front-end design is more attractive and user-friendly, its users will spend more time on it. Nowadays there are lots of languages or platforms to build the front end which makes it faster and easier to develop. One of the best cross-platform UI toolkits to design an awesome user-friendly front-end is flutter. For the front-end of the admin panel, we have used a NodeJS template called Handlebars.js (HVS).

Flutter

It is becoming a prominent new trend each day to use mobile apps. Fortunately, developers who wish to build them will have several development tools available. Flutter, which has recently shown itself to be noteworthy, is one of these techniques. There was no flutter in 2015, so they must use a browser [5]. Chrome developers were dreaming about how they could improve their browsers. This resulted in the team agreeing to take CSS out of the browser engine, which saw a very significant performance boost. To build an application program, Flutter employs the Dart programming language. Google created an open-source UI system for mobile applications which is free.

Also, because you can create an Android version with the same codebase as well as your iOS application, it means that. It comes with the fast development, expressive UI, and its native performance. There are many alternatives to front-end android development, but flutter is growing its community for its advanced features.

Handlebars.js

The handlebar is a logic-free templating engine that creates HTML pages dynamically. It's a Mustache add-on and a few extras. Handlebars add limited reasoning due to the usage of certain helpers, while Mustache is completely devoid of logic (such as if, with, unless each and more). Handlebars is a subset of Mustache, in truth.

4.2 Back-end Design

The only portion of the application that application engineers or programmers can see is the back end. How the app will interact with its users is usually implemented in a back-end program. The back-end configuration is unavailable to consumers. Almost all serious work is done in the back-end. A user can only use the front-end but the service and calculation programs for the front-end are done by the back-end program. It is the brain of an application. It stores the users and all program information and delivers it when needed.

Node JS

Node.js is an open-source, cross-platform JavaScript runtime environment that runs on chrome's V8 engine that makes it easy to create fast and scalable web applications. The central design philosophy behind the technology is event-driven, non-blocking I/O model that is both lightweight and effective and especially well-suited to data-intensive real-time applications that operate through shared devices [6]. Node.js came into being when the initial creators of JavaScript, the people that developed JavaScript in the first instance, extended it from anything you could only run in a browser to anything you could use on your computer as a standalone program. Node.js also offers a rich library of different JavaScript plugins, vastly simplifying the creation of software utilizing Node.js.

MySQL

To store our data, we have used MySQL. It is a very popular relational database system and is commonly used worldwide.

The figure below demonstrates the back-end configuration of our Android app.

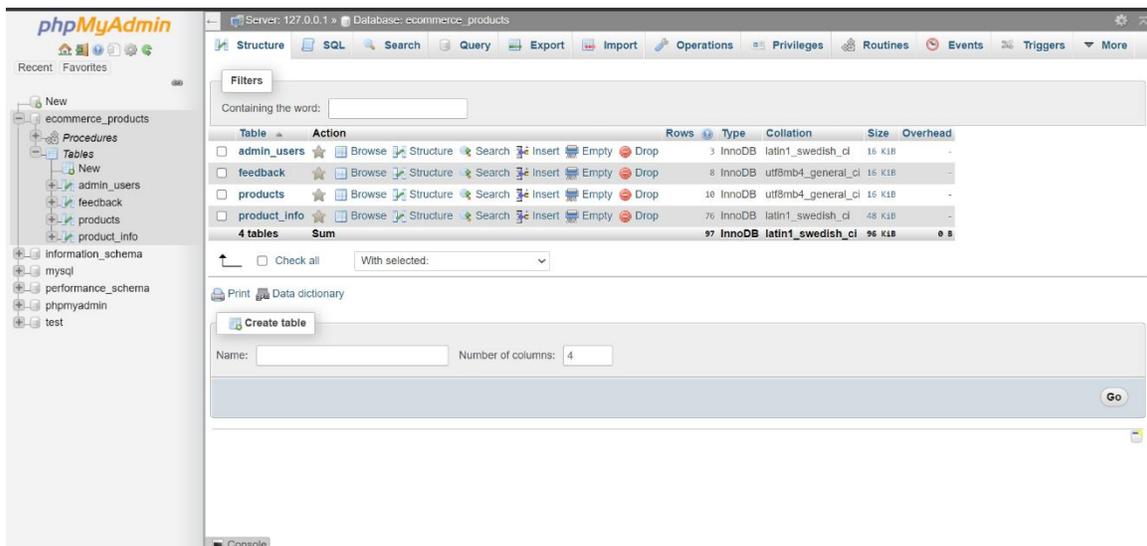


Figure 4.2: Shows database configuration

Duties and Work Processes of the Back-End:

By query to the database, we can get information and we can create and update information. In the backend, server-side authentication should be applied. There will be only admin login information in the database. An admin can only maintain, create, or update the information. No personal information is provided in that database.

We have developed two API using NodeJS. They are Admin API and Product API. Product API passes the information of the product to the front-end for users. Admin API matches the login information in the database and after that admin can maintain the product information. A full-stack application framework has been designed in this way, with the frontend and backend working together.

4.3 Interaction Design and UX

Developing relationships between a customer and the project is critical to the successful operation of the application an interface can be standardized or non-expandable based on how people communicate with it. People choose easy, elegant solutions and solutions that make their lives easier, and more enjoyable. Having app features is essential to accomplish this. So, interaction design is the main chain to connect with the user. The quantity of use that an android app receives, and how easy the app is to use is for the end consumers is strongly correlated with its success. An effort has been made to make UX (i.e., user experience) awesome by giving it to our application. In our simplified structure, we retain our core capabilities while getting the customer more familiar with how things function. It is important to reduce the amount of information that gets placed on our application or take things out, as space and energy use should be optimized. We tried our best to make our app more user-friendly. The main part of an android application is its security. Since programmers are the guardians of the secure code, they must make sure that protection and satisfaction are both kept, as well as user productivity are addressed in software development. We pay attention to the needs of our users by improving the quality of our user interface. We tried our best to make our app secure and no personal information of a user is kept by our application.

4.4 Implementation Requirements

To build a proper application it needs help with various types of tools for various purposes. We have also used different types of tools for design, database, front-end, and back-end development.

4.4.1 Pencil:

There are several forms of materials and applications that are required to complete the build. We used interface elements that were focused on Android. We used the "Pencil" designing tool to build the project demo. It is extremely simple to create a specification for any type of Android application.

4.4.2 Android Studio:

Google's Android Studio is a programming platform for the Android operating system. It is the official IDE for Android creation and is used to build rich Android apps. It also has debugging, monitoring, and rich code editing software.

4.4.3 Emulator:

The emulator is intended to be used to build a simulated interface for which the application's code and data are separately loaded to give it more accurate test results. It runs the same code in the computer depending on the device's current state. It also allows us to select various Android versions.

4.4.4 Android SDK:

To be able to build an Android app, you must use the Android Software Development Kit (SDK) or an Android application simulator. Anything in the expansion pack is ready for creation and testing, all that is needed is included in the concept and component libraries. We used the open-source Java architecture with the Java Software Development Kit (SDK).

4.4.5 Visual Studio:

Visual Studio is a free source code editor for Windows, Linux, and macOS developed by Microsoft [7]. It is a lightweight and powerful code editor. Visual Studio's software and services allow developing apps about any device and language simple.

4.4.6 Xampp:

XAMPP is an Apache Friends-developed free and open-source cross-platform web server solution stack kit that includes the MariaDB database, Apache HTTP Server, and interpreters for PHP and Perl scripts [8]. It has clear encrypted access to the servers. Data is saved locally while offline.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

The method of database deployment will be defined in this portion. Previously we described that MySQL is the main DBMS of our main database. MySQL is a relational database that allows secure access to the database directly. Instead of creating one large table that contains all the data, a relational database distributes data through many tables. Speed is improved by the database arrangement into directories, which are divided into separate blocks and datasets tailored for performance. With various software configurations like thread-based SQL is a client/server architecture that has many processes and facilitates diverse applications and several programming interface variations, which includes thread-based administrative tools (APIs). The database administrators should establish who gets what data, as well as how they obtain it, edit, and user authentication for MySQL systems. Admin panel can only access the information and have the only right to change it with their identification.

5.1.1 Database Design

To create a detailed knowledge model of a database, database administration would expand the available database configurations. All the details about both intelligent and physical goals and limits, followed by the development of a database that uses this knowledge. Any material has definite credits in a fully ascribed knowledge model. A database collects and preserves details in such a manner that it meets knowledge requirements. The ultimate aim is to render data access for the client easy, fast, inexpensive, and adaptable. There are also several specific aims, such as regulator retaliation for failure, defense, security, and execution.

A table is created out of a set of records that are closely connected. Database tables are prepared to schedule and store information to the appropriate systems. The two sections of a database are:

- i) Primary key: To ensure the data in each column is unique, a primary key is used.
- ii) Foreign key: An area on the program works as a connector between the tables. Normalization is a technique for avoiding table duplication.

5.1.2 Database Management System

A database with resources and/background data an administration system (DBMS) is a product that is designed to define, monitor, and retrieve information inside a database, and an operations administration framework (DBMS) is designed to oversee the details. To put it another way, the database management system tends to monitor details such as names, field definitions, document definitions, and record structures mostly. Furthermore, it does the same for the criteria that support and regulate this material. The use of a DBMS helps to relieve clients of IT resources from restricting constraints.

Some of the popular DBMS that are used worldwide:

- SQL Server
- MongoDB
- MySQL
- Oracle

5.1.3 MySQL

MySQL is a well-known source software for SQL database connections. MySQL is a widely used RDBMS for creating web-based databases. For our proposed scheme, we use MySQL as a database [9]. It is reasonably priced.

Without a question, Oracle provides an outstanding database, but the resulting expenses would keep many MySQL consumers

from accessing it for free. It is possible to build and use it, but there is no expense involved with doing so. The Back-end database of our application is given below:

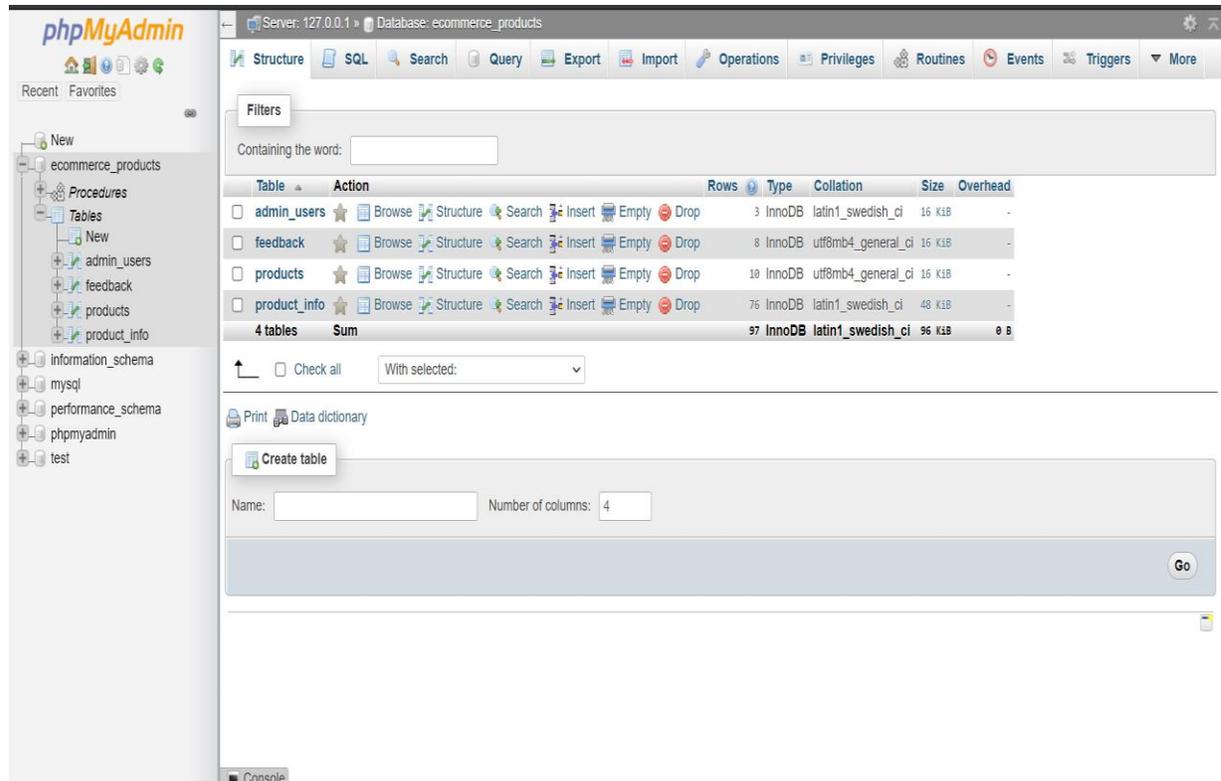


Figure 5.1.3: All Tables of Database

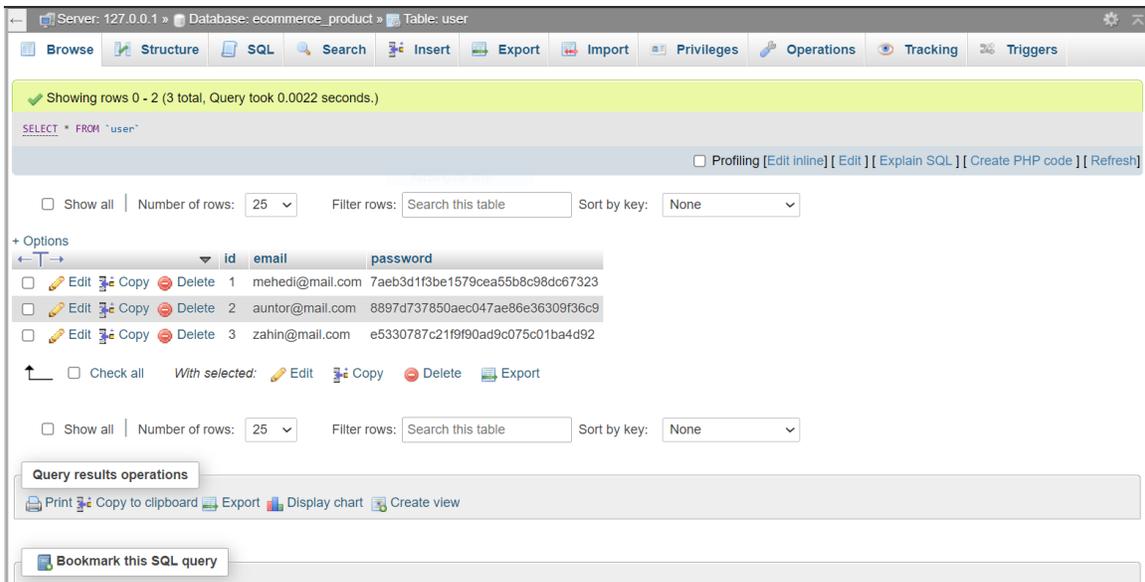


Figure 5.1.4: Admin users

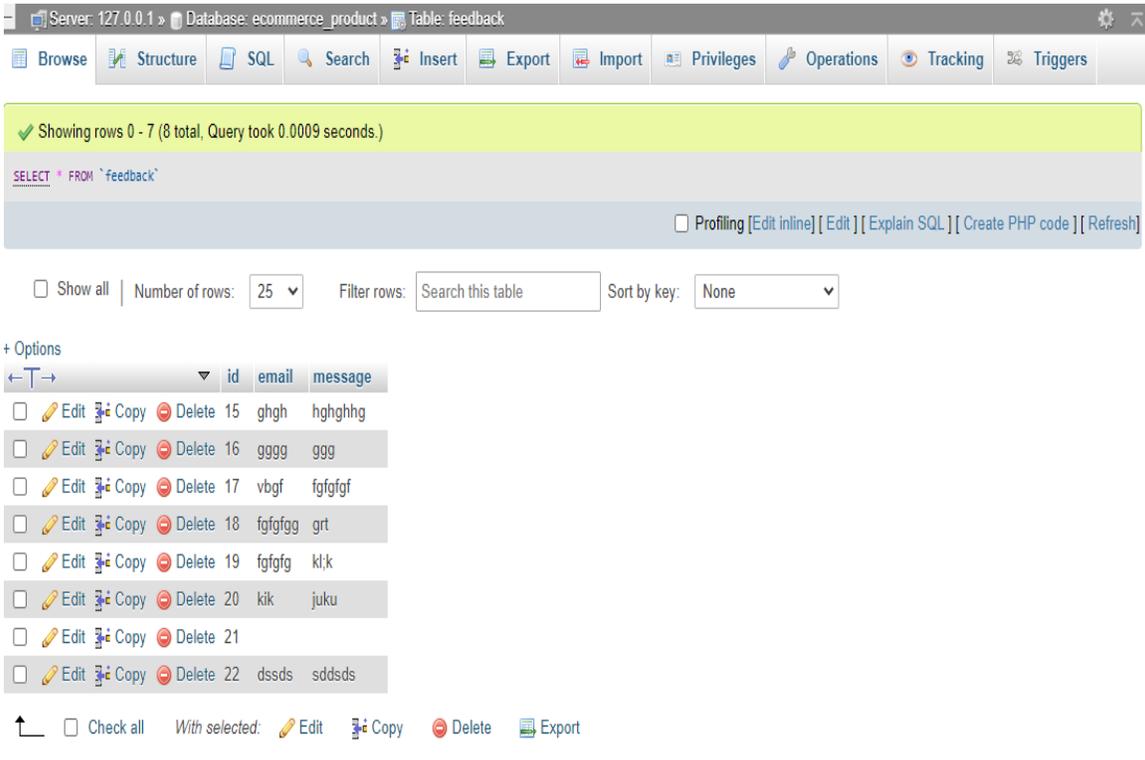


Figure 5.1.5: Feedback table

Server: 127.0.0.1 » Database: ecommerce_product » Table: products

Showing rows 0 - 9 (10 total, Query took 0.0009 seconds.)

SELECT * FROM `products`

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

+ Options

	product_id	product_name
<input type="checkbox"/> Edit Copy Delete	1	Xiaomi Cc9
<input type="checkbox"/> Edit Copy Delete	2	Hitachi AC
<input type="checkbox"/> Edit Copy Delete	3	Sony Smart Tv
<input type="checkbox"/> Edit Copy Delete	4	Redmi Note10
<input type="checkbox"/> Edit Copy Delete	5	Samsung A50
<input type="checkbox"/> Edit Copy Delete	6	Konka AC
<input type="checkbox"/> Edit Copy Delete	7	Walton 4k Smart Tv
<input type="checkbox"/> Edit Copy Delete	8	Vision Room Heater
<input type="checkbox"/> Edit Copy Delete	9	Walton Washing Machine
<input type="checkbox"/> Edit Copy Delete	10	Realme X2

Check all | With selected: Edit Copy Delete Export

Figure 5.1.6: Product table

Server: 127.0.0.1 » Database: ecommerce_product » Table: product_info

	id	website_name	product_id	price	review	rating	Product_url	product_image_url
Edit Copy Delete	1	gsmarena.com	1	32500	5	5	https://www.gsmarena.com/xiaomi_mi_cc9-9749.php	https://fdn2.gsmarena.com/vv/bigpic/
Edit Copy Delete	2	mobiledokan.com	1	32000	7	4	https://www.mobiledokan.com/xiaomi/xiaomi-mi-cc9/	https://www.mobiledokan.com/wp-con
Edit Copy Delete	3	gizmochina.com	1	32399	6	5	https://www.gizmochina.com/product/xiaomi-mi-cc9/	https://www.gizmochina.com/wp-cont
Edit Copy Delete	4	91mobiles.com	1	32500	9	5	https://www.91mobiles.com/xiaomi-mi-cc9-price-in-i...	https://www.91-img.com/pictures/134
Edit Copy Delete	5	gizmochina.com	1	32500	7	5	https://www.gsmarena.com/xiaomi_mi_cc9-9749.php	https://www.gizmochina.com/wp-cont
Edit Copy Delete	6	gizmochina.com	1	31500	4	4	https://www.gizmochina.com/product/xiaomi-mi-cc9/	https://www.gizmochina.com/wp-cont
Edit Copy Delete	7	gizmochina.com	1	32500	8	4	https://www.gizmochina.com/product/xiaomi-mi-cc9/	https://www.gizmochina.com/wp-cont
Edit Copy Delete	8	gadgets.ndtv.com	1	31999	3	5	https://gadgets.ndtv.com/xiaomi-mi-cc9-price-in...	https://i.gadgets360cdn.com/products
Edit Copy Delete	9	gizmochina.com	1	31750	7	4	https://www.gizmochina.com/product/xiaomi-mi-cc9/	https://www.gizmochina.com/wp-cont
Edit Copy Delete	10	gizmochina.com	1	31000	4	5	https://www.gizmochina.com/product/xiaomi-mi-cc9/	https://www.gizmochina.com/wp-cont
Edit Copy Delete	11	bestelectronicsltd.com	2	31500	8	4	https://www.bestelectronicsltd.com/home-appliances...	https://www.bestelectronicsltd.com/w
Edit Copy Delete	12	gizmochina.com	1	32000	4	4	https://www.gizmochina.com/product/xiaomi-mi-cc9/	https://www.gizmochina.com/wp-cont
Edit Copy Delete	13	gizmochina.com	1	32541	7	4	https://www.gizmochina.com/product/xiaomi-mi-cc9/	https://www.gizmochina.com/wp-cont

Console

Figure 5.1.7: Product info table

5.2 Implementation of Front-end Design

The project aims to develop a recommendation android application. Here we tried our best to make a user-friendly application. The front-end is the platform that mainly interacts with the users. Ecommerce customers are the main audience of our application. On the front page of our application, we arranged the main logo of our android application. When the user first opens our application, it shows the application logo on the first page. It is given below:

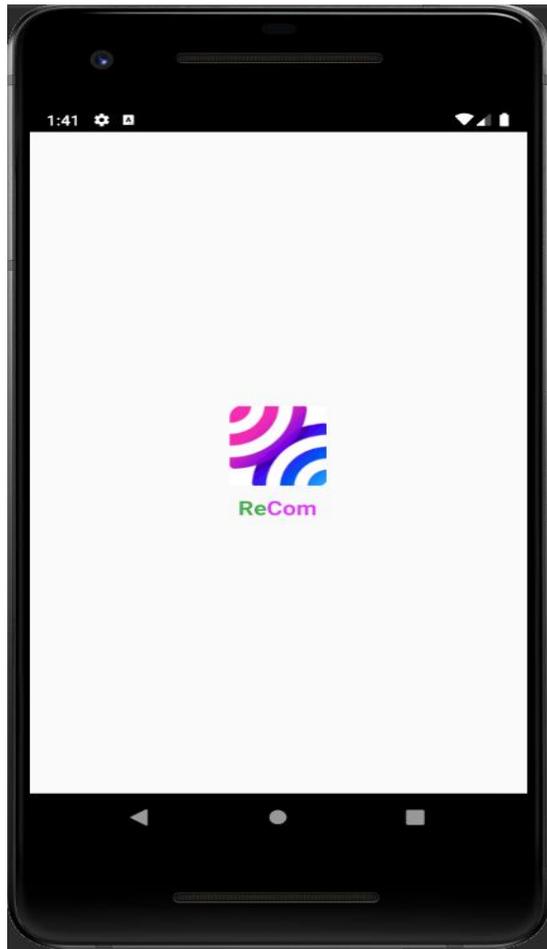


Figure 5.2: Logo of application

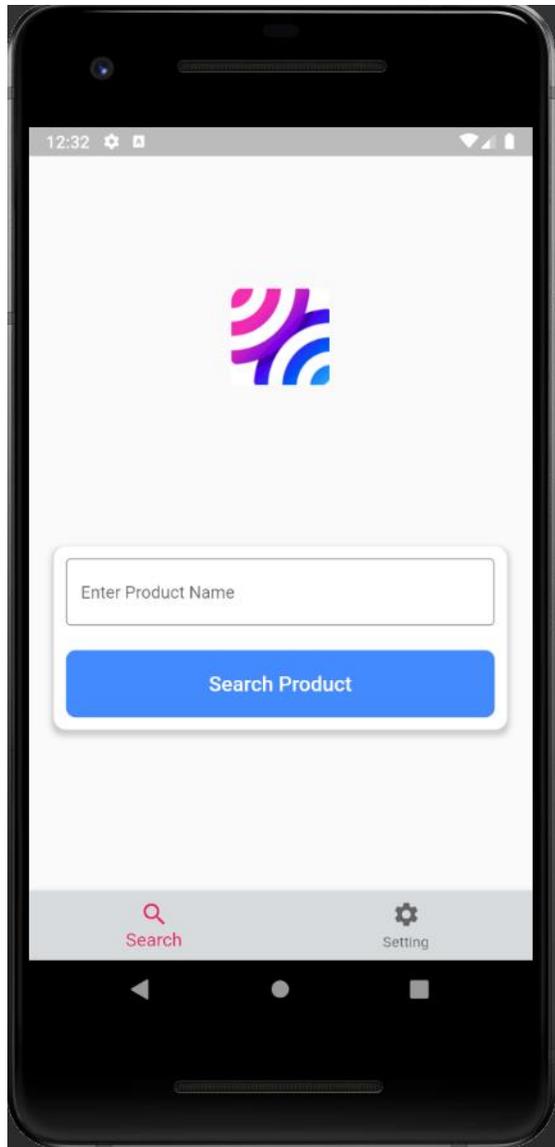


Figure 5.3: Homepage

After showing the logo, it goes to the home page within a second, where users can search for their desired product.

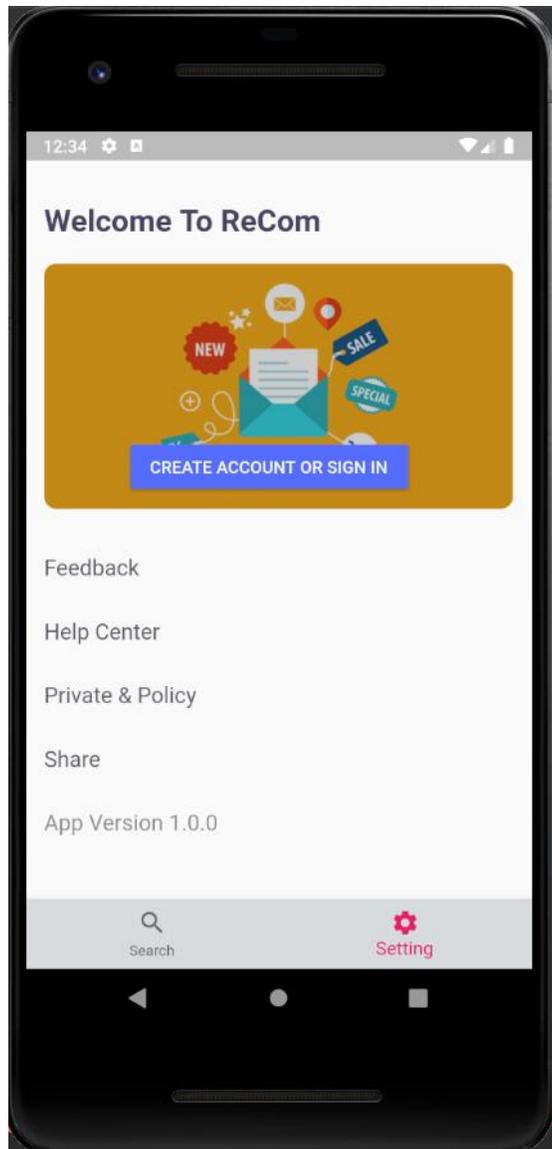


Figure 5.4: Setting

On the Home page, users can also find the Settings option where he/she can find Feedback, Help Center, Privacy and Policy of our app, app version info, share option and create an account or sign in option.

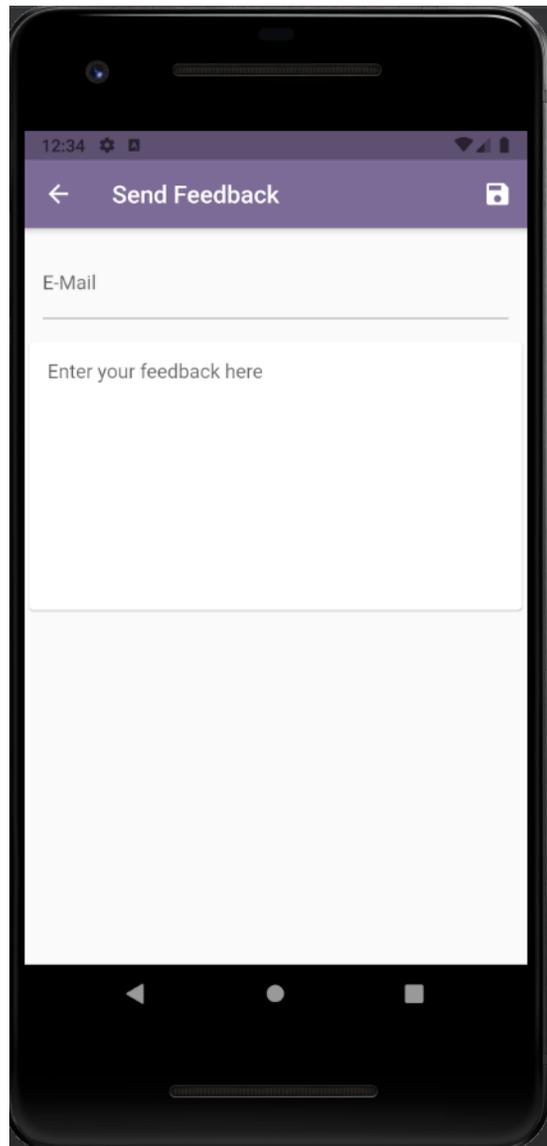


Figure 5.5: Feedback

In the feedback option users can give their valuable feedback associated with their email address.

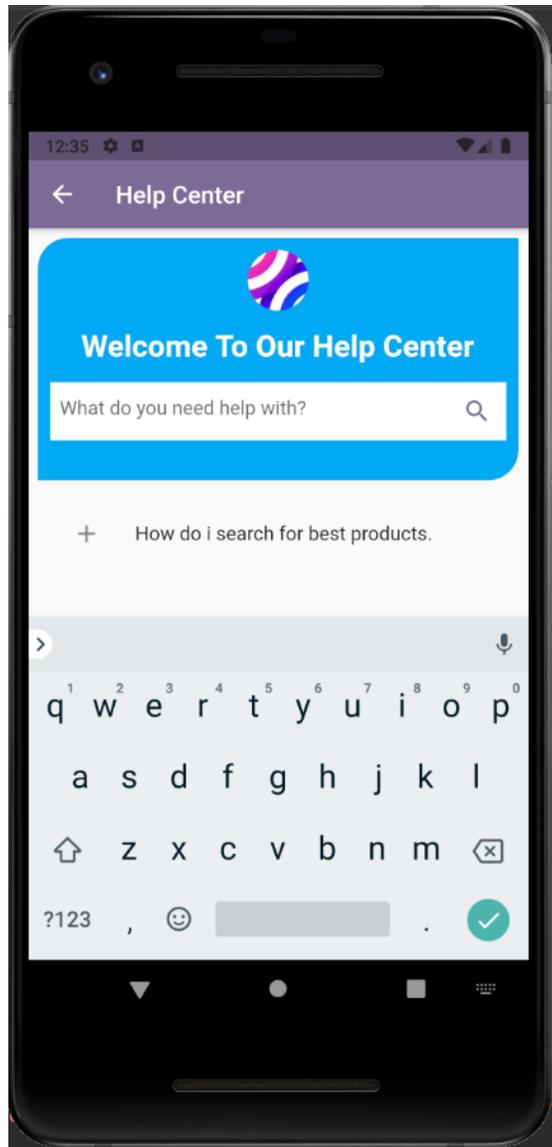


Figure 5.6: Help Center

Users can find and get help from the admin panel in this section. There are also some common questions in that section.

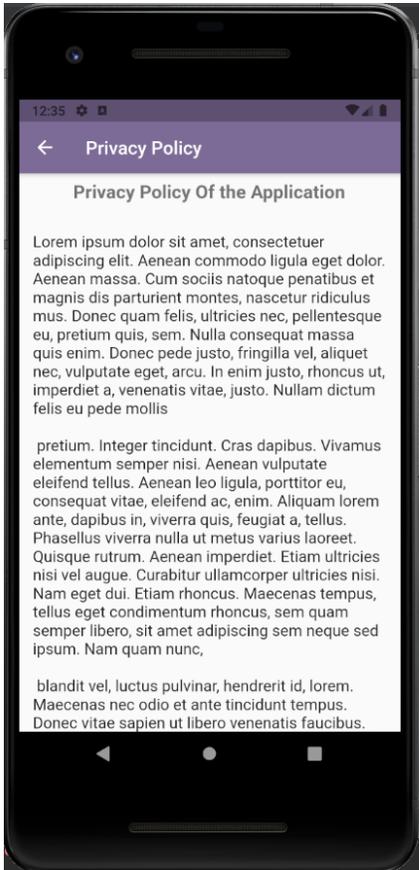


Figure 5.7: Privacy Policy

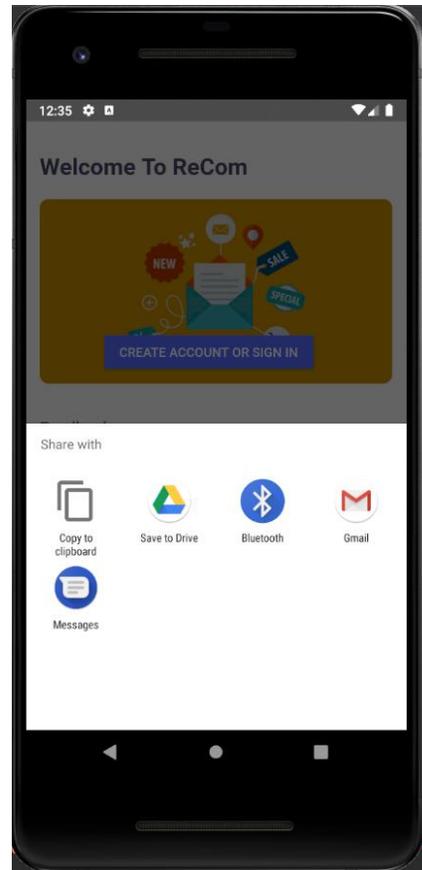


Figure 5.8: Share

There is also a privacy policy and share option where users can learn about privacy policy and share our application to another device by Bluetooth, mail or drive, and many other options.

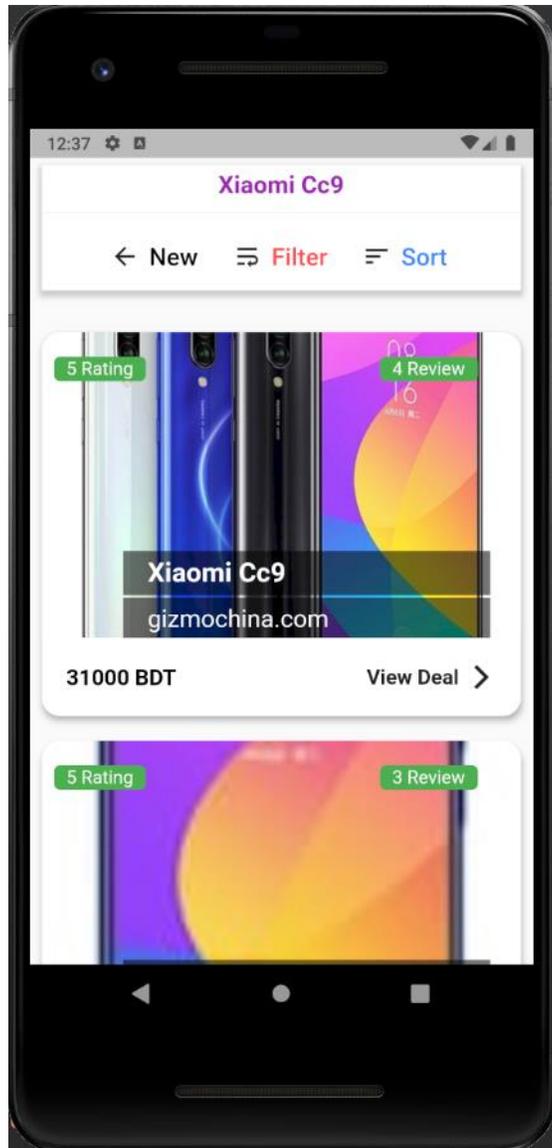


Figure 5.9: Searched product

After searching for a product our application shows a product in a decent manner with proper details.

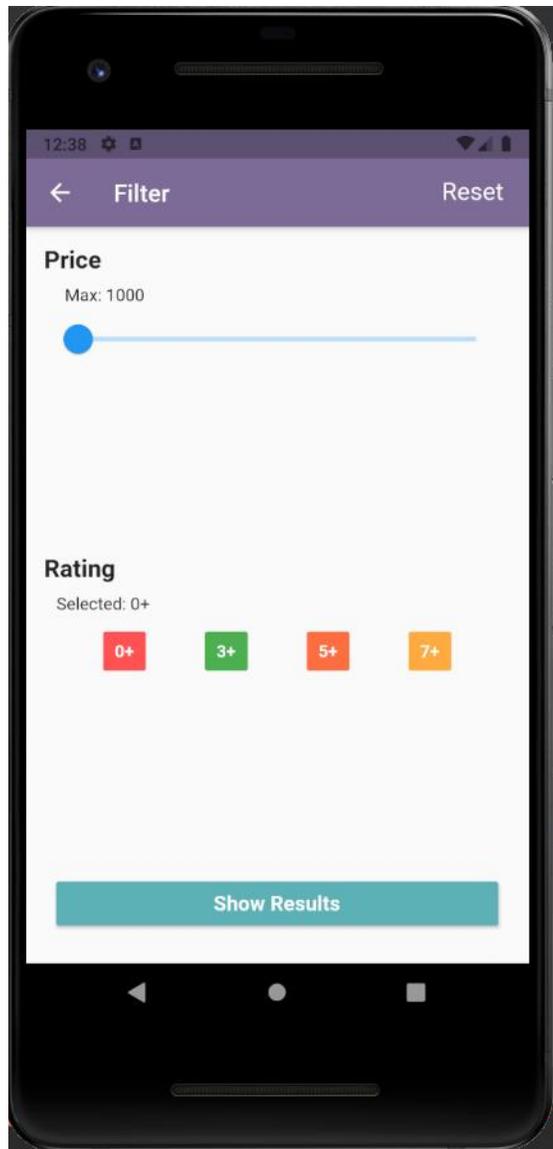


Figure 5.10: Filter

There is a filter and sorting option where a user can fix their product based on their price and rating.

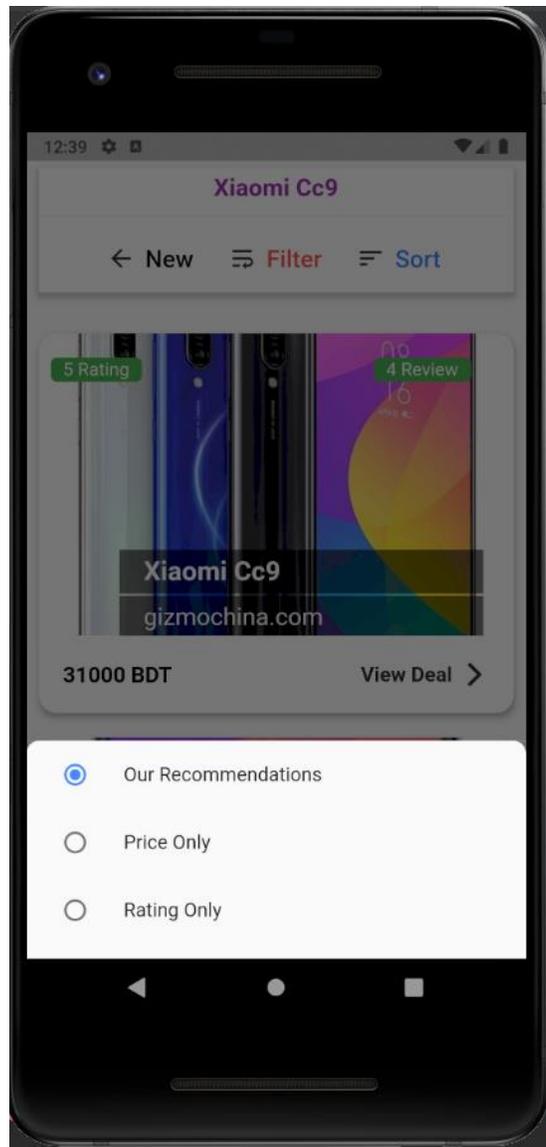


Figure 5.11: Sort

The sorting option sorts the search product based on our recommendation, only price or rating.

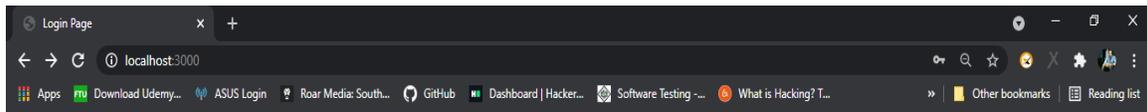


Figure 5.12: Admin login page

To enter in the admin panel or control panel, the admin needs an email with the password. Here admin can do necessary changes to their panel.

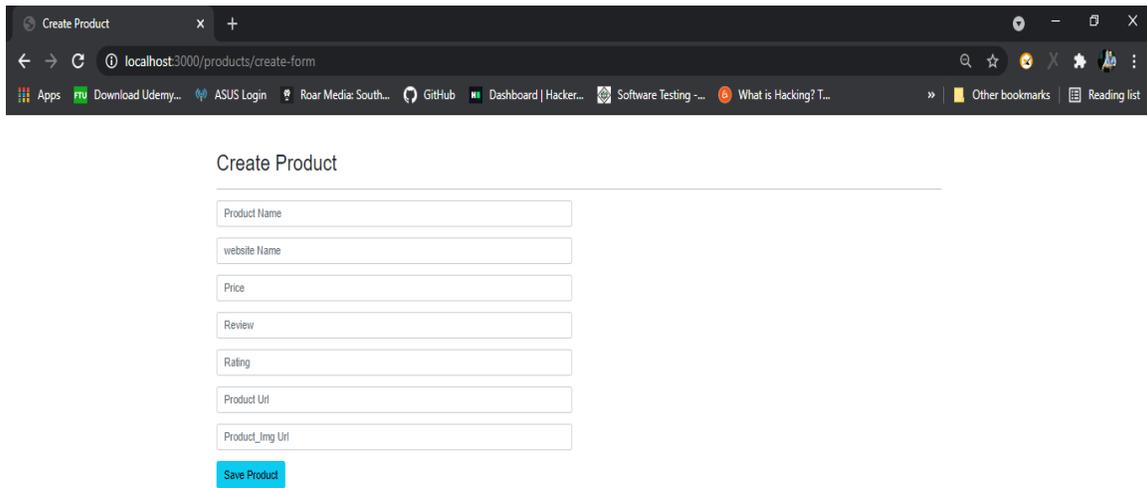


Figure 5.13: Create product

After logging in to the admin panel, an admin can create a product by giving necessary information of a product with the help of creating a product page.

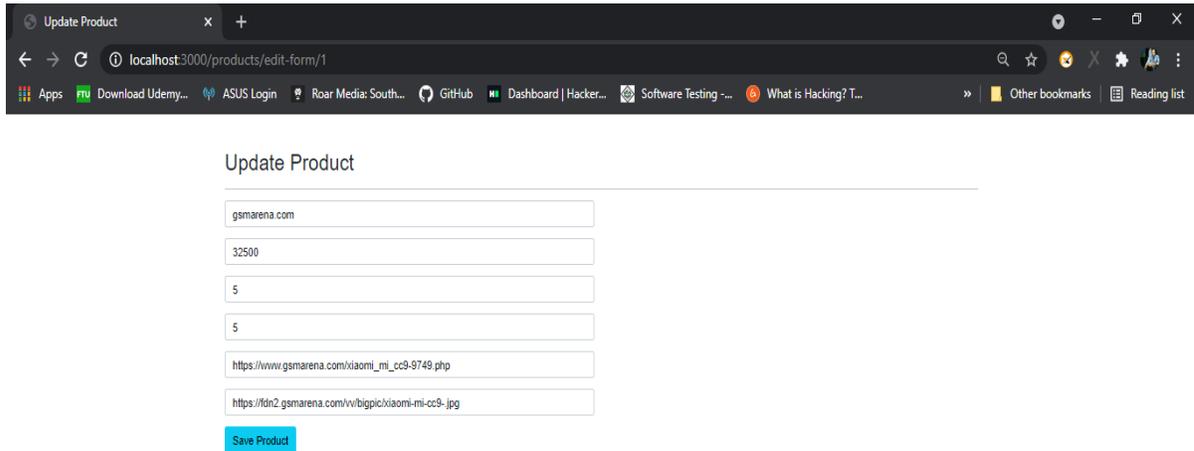


Figure 5.14: Update product

After creating a product, a user can update product information if needed with the help of the Update product page.

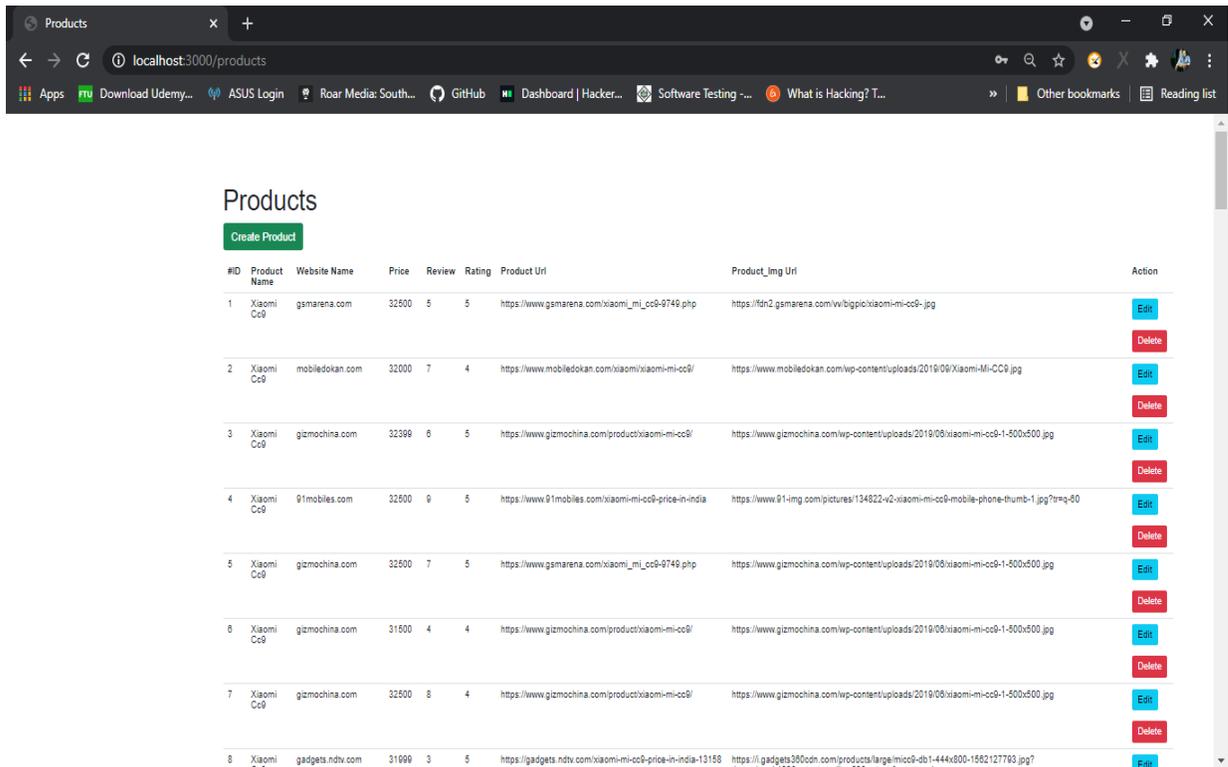


Figure 5.15: Products

After creating or update a product, the whole products list is shown on the product page and only the admin panel can do further changes to the list.

5.3 Implementation of Interaction

There is no easy way to determine the kind of decision a business can make in that kind of environment; we can just expand the possibilities to options and see which choices get tried by the customer. Good device design means that it not only looks good but still performs well with usability. The user-centered design focuses on how the user can be helped by a certain feature and create the feeling of confidence that they will get the help by doing something instead of denying their needs or ignoring them. In the approach of seeing our app come to life and be relevant to the consumer, we sought to create a simpler and more approachable product. We made our application easy to access and intuitive so the user would have a more user-friendly experience. We have used flat buttons, text fields, and icons.

With the help of the libraries, we can easily interact with users. It helps to build a better communication bridge with the users.

5.4 Testing Implementation

Before launching an app, we should test it first. It usually takes a lot of actions to validate a piece of software. An application will not function properly if it has not been checked to operate. The knowledge you gain from running testing will contribute to an effective evaluation of how wide the margin for error is and help you fix or update the app. It should be examined daily. There are a series of testing that has been done before releasing an application. They are given below:

Unit testing:

Levels and approaches are evaluated in unit processing. It aims to see how the functions are functioning properly. Software engineers are in charge of unit testing.

When a piece of code is changed, unit checks will notice it. It removes glitches as original functionalities are modified, or it reduces faults and inconsistencies in newly developed features.

Verification testing:

The method of checking the propriety of an application improves or decreases the consistency of the application in a test and deployment step is a Verify script execution script to determine if the system meets its design and implementation specifications, it is essential to verify the system's fulfillment.

Validation Testing:

QA professionals perform the validation testing. It is a very high-level test. Mechanical/Visual, technical, functional, and conformance validation on the device verifies whether it is following the specifications, having done which it executes. It not only examines the user's desires but also determines whether the device satisfies the goals of the organization.

System Testing:

The very expensive method of creating applications is an element of the system planning process isometric process external boundary systems instead of testing is regarded as a comprehensive implementation. To be specific, the environment is any situation where the aim is to find an end-to-end solution, in which case any given scenario must finish by the end of a test. Expanding the configuration tests so that you verify and identify and every input before you check the output is completed.

5.5 Test Results and Reports

This analyses the performance of the project according to an official definition of performance goals.

Expedited surveys which present the conclusions of the results in an organized and effective manner, the operational state must meet the objectives, and the results should describe the progress of the evaluation, whether those objectives and results are to be adequately recorded. we should conclude by looking at the evaluation report that the application is done or not. Several methods of monitoring are used to see if the project is ready to go after the evaluation report is done and which working environments our app performs best. If we will always return a positive answer, we will be able to declare our application to be valid and free of errors. However, we will keep monitoring our framework for updates, considering the outcome of the tests so far.

CHAPTER 6

IMPACT ON SOCIETY, ENVIRONMENT & SUSTAINABILITY

6.1 Impact on Society

Our Android application Created for helping people by automated product suggestions. It gives customers a hassle-free e-commerce tour. Our Android app gives a layout to the users for searching a product then it gives the best suggestion to the user. The important appearance of our app is that it can be used in a single product search. No need to search for the product on other e-commerce sites. Although there are a lot of social consequences to the Internet that have long been basic to all of us, its presence has shaped every aspect of our lives. Every day, traveling to the bank to make cash deposits or withdraw money, or going to the shop to buy items and basic goods has become extremely challenging due to a lack of time, the human being's job has become too demanding, and, as a result, internet payments have become an increasingly important part of our culture. Here are android application helps people with a single search. It shows the top result according to its price and rating, so no need to go to different websites and search for the same product and waste our valuable time.

6.2 Impact on Environment

Online shopping is becoming increasingly widespread across the world. Bangladesh is also increasing with many e-commerce impacts. In the pandemic situation of 2020 e-commerce creates a huge number of customers. E-commerce comes along with the recommendation system, so if we want to talk about the environmental effect of our recommendation application, we must have to talk about the e-commerce sector also. Transportation emits a significant amount of CO₂. Reducing the number of road journeys is an obvious way to reduce greenhouse pollution.

Recommending the right product also reduces the waste of paper because no return of product made [10]. Deforestation, which leads to global change, will benefit from a shift to a paperless world. We do our part to lower our carbon emissions through these practices. Besides, recyclable packaging of products must be utilized for the sake of the climate.

6.3 Ethical Aspects

The application would improve the e-commerce industry's efficiency by bridging the connectivity distance between consumers and sellers. Customers can justify their buying products in a good way. This would improve the e-commerce seller's consistency and morals. Besides, as a single search can find the best product from e-commerce, it will be easier for the customers to choose the right product and give a positive impression to the e-commerce industry. As a result, all the e-commerce sellers will be able to focus on giving the right product to the customer. In this way, the e-commerce sector will grow rapidly.

6.4 Sustainability Plan

Sustainable management practices can maintain efficiency, whereas a sustainability strategy can improve the finished product. Resources will be conserved, and time and money will be saved, thanks to operational productivity. Companies that have sustainability strategies are most likely to achieve their objectives. Our application will be used mainly by the e-commerce customers, sellers, and admin panel. Customers and sellers can use this application by creating a user account with the type of their position. After the process, they can do their work of searching for a product or adding a product. The whole process is controlled by the admin panel. They can make any change in the system if they want to.

CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 Discussion and Conclusion

Through our efforts, we have completed our mission of recommendation android application. It will give a good effort to contribute to the growing e-commerce industry in our country. Our application 'Recom' will be a game-changing platform to Bangladesh. This project had to meet two challenges. The first was to provide a user-friendly system for consumers and the second was to support sellers. All the processes, including browsing, zoom, and tag alignment are accessible to the whole population such that nobody is left believing that they are getting the wrong one. We anticipate that our activities will go off without a hitch. Because of the valuable features of our program, we anticipate that our website would attract a large number of potential users who have never done any e-commerce shopping before.

7.1.1 Limitations

Although all aspects (i.e., in our world) are imperfect, it is difficult to improve on all things that have been produced. The limitations we have as part of the project did not anticipate during the development remain unchanged, though, and these changes are completely unexpected. To this project, the task of establishing the initial foundations is simply to help things start. When we first set out to overcome the current Android's shortcomings, we strove to lower its constraint. That is not the end of the story yet, however, as changes will be made to expand it in the future.

The below are some of our app's limitations:

- Our device can only be accessed through the internet.

- No Sign-in option for users.
- It is not globally available.
- Only for android users.
- Users cannot buy products through our app.

7.2 Scope for Further Developments

In terms of making, it is easy for consumers to discover applications and possible opportunities, “Recom” has a lot of space to develop. Some of the possible improvements to make in the near future are mentioned below:

- Users can buy products from our application.
- Review-based suggestions.
- Cross-platform.
- Global product recommendation.
- Fake rating and pricing detection.
- More accurate suggestion.

APPENDIX

8.1 Appendix: Project Reflection

Last year in the pandemic situation, we worked hard on our project. We utilize the time to gain more knowledge and proper experience to complete our project. This project required a lot of effort and time and energy on our behalf. As we first started working on our dream, we had no idea how we were going to finish it. A well-thought-out proposal, on the other hand, would help us finish this project. Every time we face any problem while doing the project our supervisor sir supports us. Finally, we express our gratitude to Almighty ALLAH and our noble supervisor, Sir Shah Md Tanvir Siddiquee, for their unwavering assistance and guidance during the session.

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