Final Year Project Report on Virtual Question-Answering bot for e-commerce

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

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APPROVAL

This Project/internship titled **"Virtual Question Answering bot for ecommerce"**, submitted by **"Salma Akter"** ID No: 201-15-13591 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 January 19th, 2023.

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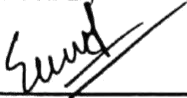**Md. Safaet Hossain**   External Examiner

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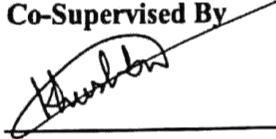University

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DECLARATION

We hereby declare that this project has been done by us under the supervision of **Mr. Md. Sazzadur Ahamed, Assistant Professor, Department of CSE** in Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.
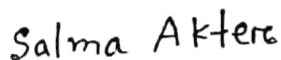
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I am really grateful and wish my profound and indebtedness to **Mr. Md. Sazzadur Ahamed, Assistant Professor, Department of Computer Science and Engineering** in Daffodil International University, Dhaka. Deep knowledge & keen interest of my supervisor in the field of **"**web application development**" to carry out this project. 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.

I would like to express my heartiest gratitude to Dr. Touhid Bhuiyan, Professor and Head, Department of Computer Science and Engineering in Daffodil International University, Dhaka, for his kind help to finish this project and also to other faculty members of the CSE department, Daffodil International University.

Finally, I must acknowledge with due respect the continuous support and patience of my parents.

ABSTRACT

Currently, this project is being worked upon a Web based development project titled **"Virtual Question-Answering bot for e-commerce".** Users will be able to utilize this application to obtain any type of information about the products available for purchase online. Additionally, users will receive any functionality they require. Imagine someone searching for a product. After that, he or she visits an online store. There, he or she discovers a wealth of data regarding this product. However, the user just need specified data. And there, my system will assist in providing precise information one time. Any feature can be searched for, including RAM, CPU, and displays. Additionally, this web app can display product reviews properly to show whether they are positive or negative.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

In essence, my system will be an e-commerce question-answering bot that can be linked into any services provider's website. Any user can access that system to learn whatever they want to know about any e-commerce product. Any IT farm or other type of website where goods are sold and purchased can be the services provider for this website. Users can discuss or ask questions here. Get more systems to examine in the online apps as well.

Today, everyone observes the gathering and posting of data on the websites of all e-commerce businesses. Typically, businesses upload all of their information in a single location or as a text block. Users occasionally need to read the entire description of their product or search for specific information, such as the processor or physical component. They spend more time there. And in this case, I believe that my system can provide a limited number of information-gathering options. A text input area will be available on my system for users to enter their queries.

1.2 Motivation

I was inspired to work on this project because it was difficult to find all the information in one location. For instance, when a user or consumer visits the website of an online retailer, they spend more time looking for the product's specifications. They typically receive succinct answers to their questions or information they were seeking. It can also be challenging to locate. I can enter all the data into our system from here. Users will receive instance information for that at a time. The user can choose what specific information they are looking for. I can provide the help that a customer or user needs using my system.

1.3 Objectives

My primary goal is to quickly and succinctly answer clients' questions by giving them the information they need. My chatbot will respond to every question from the user.

Sometimes we keep all the details about our items on our website so that users or customers can't get information quickly, in this case my system will be able to support the user.

1.4 Expected Outcome

- User will get information about their query shortly.
- No need to read all features or details of any product.
- User will get instance information standby.
- This system will save user's time.
- This system will make online shopping fast.
- User also get extra services such as product quality or others.

1.5 Report Layout

Report layout depicts a sort of summary of every component. All things considered, the following is a brief:

- **Chapter 1:** Motivation, Objectives, result and the report management.

- **Chapter 2:** Problem scope, relevant research, comparative studies, and application challenges.

- **Chapter 3:** Provides a description of the system requirements, use case modeling, logical data model, and design requirements.

- **Chapter 4:** Draw the front and back ends of the design and the UX. Prerequisite for implementation.

- **Chapter 5:** Implementation, Describe how the front-end and back-end designs were put into practice, as well as the testing methodology, functional testing, unit testing, compatibility testing, results, and report.

- **Chapter 6:** Stop talking about it and moving on to the next development.

CHAPTER 2
BACKGROUND

2.1 Preliminaries/Terminologies

Since a few years ago, chatbot technology—for example, question-answering systems—has advanced quickly. Facebook's business account utilizes chatbots as well. And many websites now use virtual chatbots. The primary flaw, in my opinion, is that their chatbot is unable to provide information in a way that meets user needs. And in order to solve this issue, I decided to create a system that could offer assistance.

2.2 Related Works

This section will outline current initiatives and connected research projects that have been assessed in this area.

WooCommerce: Every WooCommerce site needs the ideal search engine to enable speedy product discovery and purchase by customers.

Your ideal WooCommerce search experience Your clients may rapidly identify and purchase the appropriate products with the aid of the ideal search engine for your store. This will make your clients adore your store because it will make finding the things they want to purchase simpler than before. Actual Search Customers can use the Live Search Field to find products as they type, along with photos, price information, and the option to add the item immediately to their shopping basket. Click, type, and buy... It is that simple.

Live Filtering:

While your consumers are searching by keyword, price range, using categories, tags, or any other product features to narrow down the results, our live filters take care of updating the results on the shop page.

Enjoy Simple Shopping:

Your clients will have a very enjoyable purchasing experience with a no-fuzz automated setup that interacts seamlessly with well-liked themes, Storefront and child-themes included. Let them take pleasure in how simple it is to locate the ideal item in your shop.

Search Patterns:

Learn what your customers are looking for in your store to gain useful insights. View historical and current product search data to connect it to your marketing initiatives.

Business Perspectives:

Learn what your clients are looking for, what they can find, and what they can't. Our studies will assist you in identifying the products that your customers are looking for so that you may tailor your store's selection to satisfy prevailing and emerging trends.

Index for Search:

All of your store's products will be automatically indexed by the Search Indexer, which will also keep everything current for you. You don't need to do anything to have your store fully indexed, products ready to be purchased, even when you add, edit, or remove products and related elements.

SearchWP: Searching Ecommerce Product Details. This is not a problem when using SearchWP because Custom Fields and Taxonomy Terms are taken into account while searching, which is crucial for product information as described here! Within WooCommerce, Layered Navigation and custom sorting are supported by SearchWP. Layered Navigation Widgets will still allow users to filter their search results, and using the sorting dropdown will override SearchWP's default relevance-based sorting and respect the selected sorting choice.

Beyond offering thorough search results, a store owner's vital responsibility is to pay attention to what their consumers are looking for. Customer searches provide you a clear picture of what your customers want.

SearchWP offers a wealth of metrics that can help you understand how to optimize and increase conversions on your site (including searches that return no results).

GoMage: Understanding Keywords and Criteria for Product Search. The catalog search is completely at the owner's control when using Magento®. It offers the chance to specify which features of the products will be searchable.

Additionally, it gives users the option to force search engines to show alternative results or websites. Customers can choose between Quick Search and Advanced Search, two search options. Customers can use the quick search by using the search bar in your interface's header at the top.

Results are determined by chance encounters with any searchable items or properties during the search. Please be aware that the settings for product search or properties are important since all product details, such as name and color, are regarded as properties. You can look up everything about any product using a search engine. However, you must confirm that the product is accessible. And for this, you must take the following actions:

In the admin panel, select Catalog - Manage Products. Select the Edit button next to the required product. Open the Visibility drop-down menu, then select either Search or Catalog Search. Restore the changes. Maintaining a Search Term The admin panel may contain all of the saved search terms: Select Search in the Catalog. On this page, two different search options are available for saving. Customers' whole search terms will be immediately saved here in the Magento ® store. Additionally, you may manually enter the search request that your clients would find useful.

Once finished, click the Save Search button to finish configuring the search criteria.

2.3 Comparative Studies

In the "Related Works" section, we looked at several highly significant projects that are excellent and well-known in the chatbot business. I have concentrated on their bot's operation, the variety of servers they use, and any drawbacks.

Customers can access the first two chatbots through a mobile app and a web service. They are also the most successful business. I strive to act in their manner. They employ some additional advanced features. Such a forecasting query, etc. The identical job is done by me after the initial stage of my project is complete.

2.4 Scope of the Problem

I must create an interface that will allow any user to look up information about a company and the services they provide. The user may find all the information in detail. Additionally, users can receive premium help by visiting the office in person. Here, I'll accept user input and let my system handle the inquiries from users. I'll do that by extracting every keyword from the user's content.

2.5 Challenges

My system has encountered a number of problems, such as the user's ability to search using his or her own phrases or sentences in which case my system is unable to recognize and search words in the database. The second difficulty I encountered was answering two or more questions at once.

I believe that this is the fundamental difficulty. And I'll try to update that issue in my subsequent improvement. A user may occasionally ask two or more questions at once. It typically makes sense.

Additionally, I believe that identifying all of the user's keywords is a major shift. I'm working on the answer. I'm hoping I can come up with a solution for that issue.

The third is that users can always provide feedback in other languages. And since I can't handle all other languages in one system, our system must be able to recognize that. My system should ignore and produce a notification to try again if it encounters something similar. Consumers can always offer comments in different languages. And our system needs to be able to understand that I can't manage all other languages in one system. If my system encounters something similar, it should ignore it and send me a notification to try again.

CHAPTER 3
REQUIREMENT SPECIFICATION

3.1 Use Case Modeling and Description

We can observe the user functionality in the figure below. This model is just a chatbot with no further features. The input area allows the user to enter text or any other type of query. There will then be a field for the result display. The output will show here. As simple for user as in Figure 3.1.
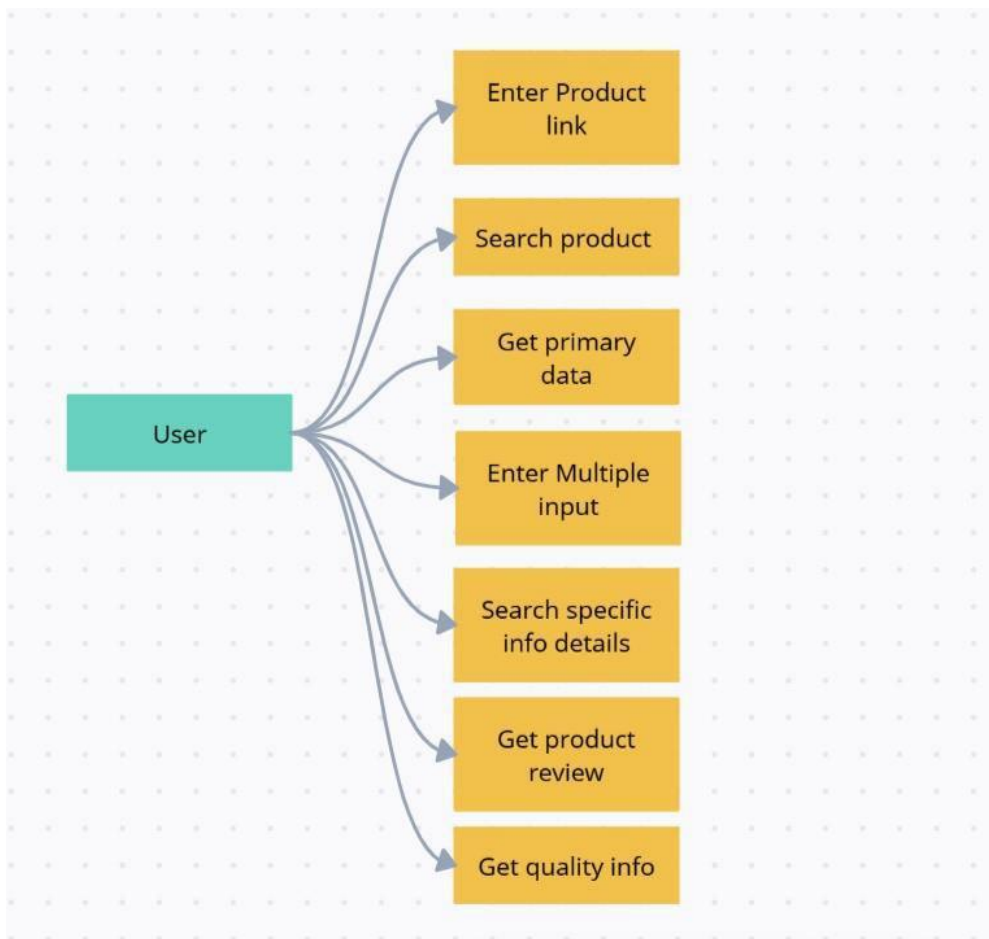

Figure 3.1: Use Case Model

3.3 Logical Data Model

A logical data model demonstrates how users and systems are related. How the user interacts with the system and how everything is carried out The system uses a database to retrieve data while the user uses the system's interface to obtain information.
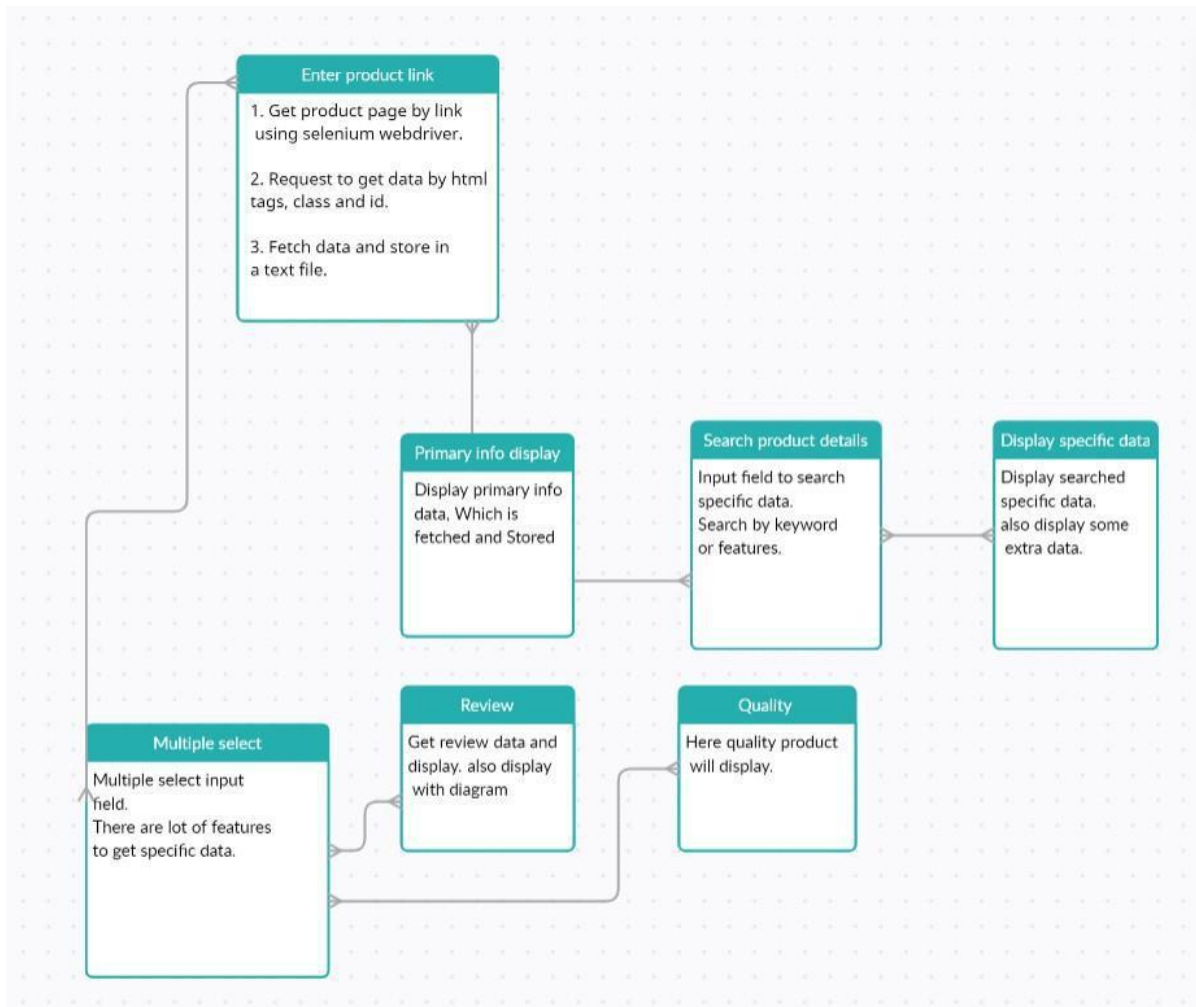
Figure 3.2: Logical Data Model

3.4 Design Requirements

Our main objective is to give clients an application that is easy to comprehend and straightforward. Our task's setup is so user-friendly, therefore we tried to design our program in a similar manner.

Designing requirements for users:

- Chat templet
- Input text field
- Display result field
- Multiple select input field

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-End Design

Input text field

A chat window will be the initial interface. It appears to be a chatbot. I then made a field for users to enter their query. If a user presses the enter key on the keyboard after entering text, the send button will immediately activate.
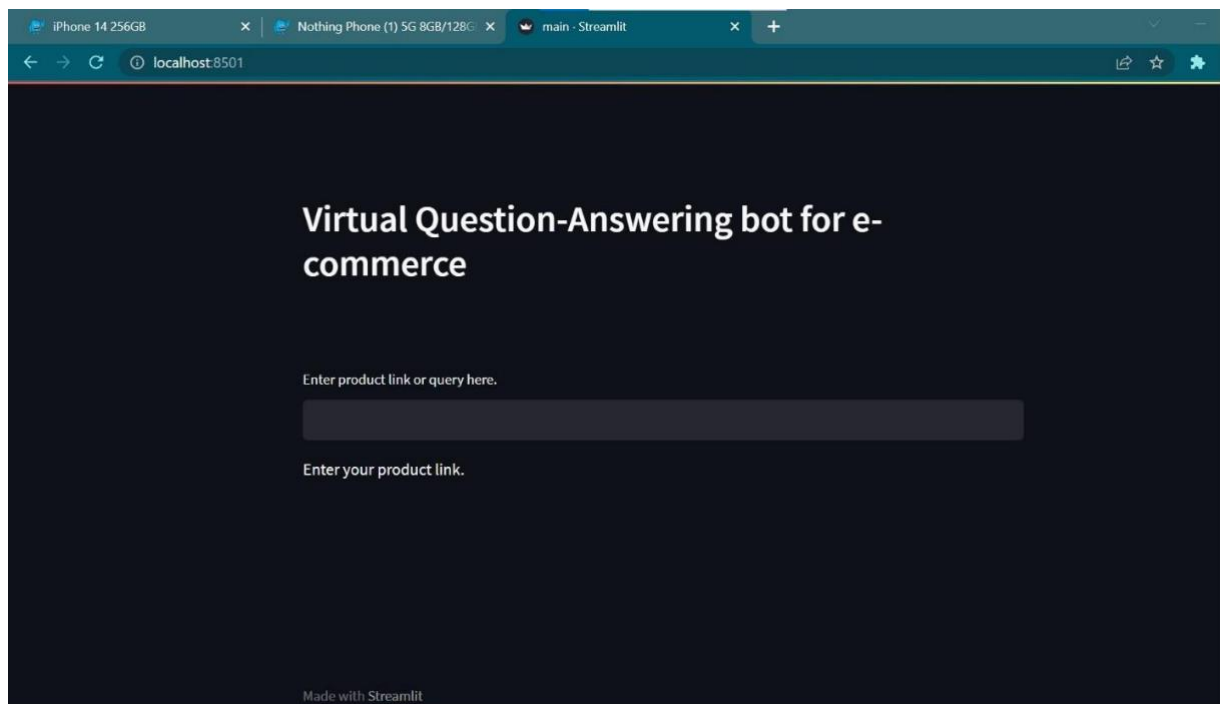
Figure 4.1.1: Input text field

Output Text field
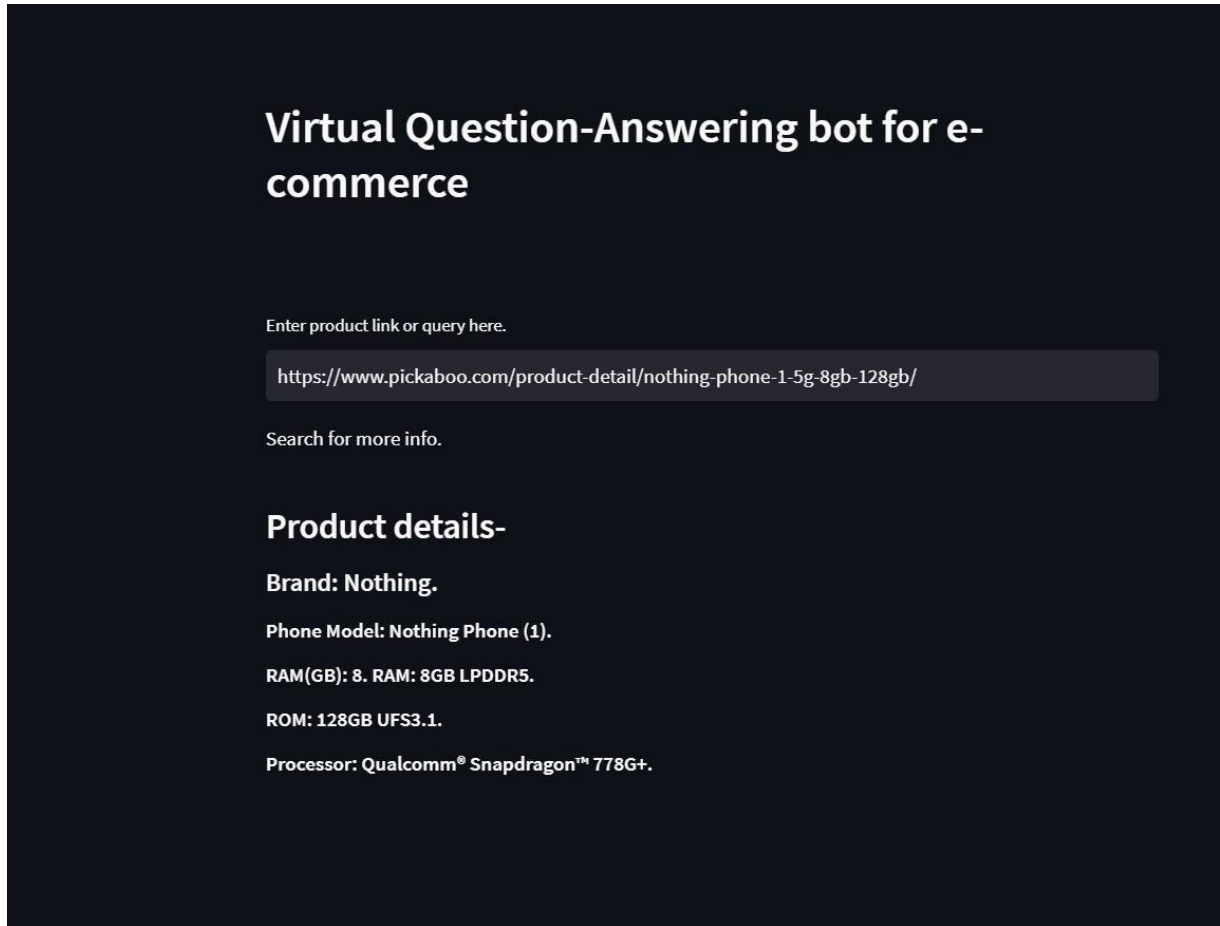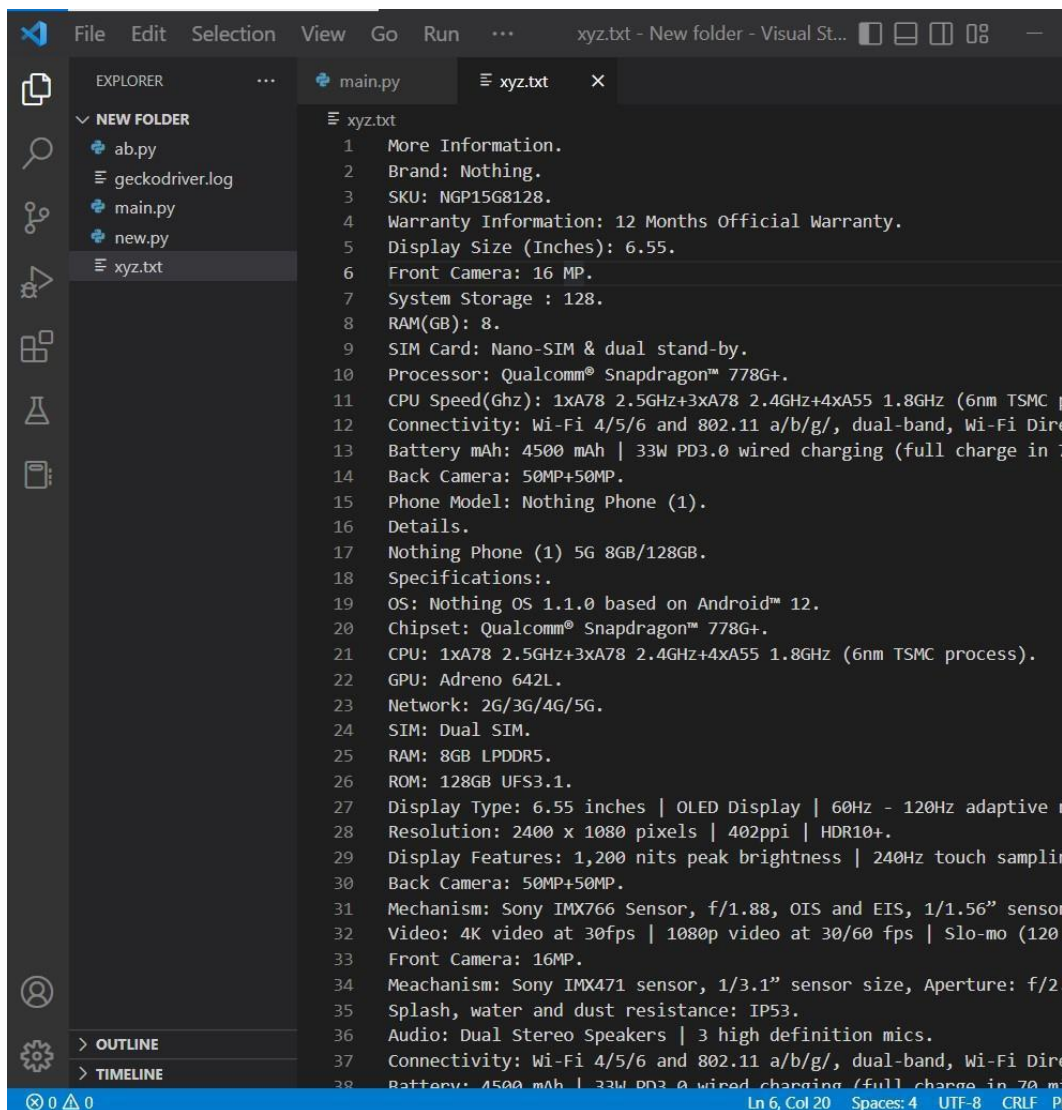
Figure 4.1.2: Output text field

We can access the display area. Our output message will appear here.

I utilized a free, streamlit Python package for the design section. where every built-in feature is present. We only need one method to create input text, field buttons, and the entire design.

4.2 Database

A text file was used for the database component. Where I kept all the data pertaining to the business and its services. I tried to keep my approach basic. Because we don't require any large amounts of data, like images or videos, for this project. I'm only using text right now. I kept my data in a text file because of this. This data get automatically stored in text file when program fetch data from web site.

Figure 4.2.1: database

This a automatic process to store data which is user get from ecommerce site. And with 2 lines of code I can create a text file and store data at a same time. I can easily import a text file or database into my system. like in figure 4.2.2
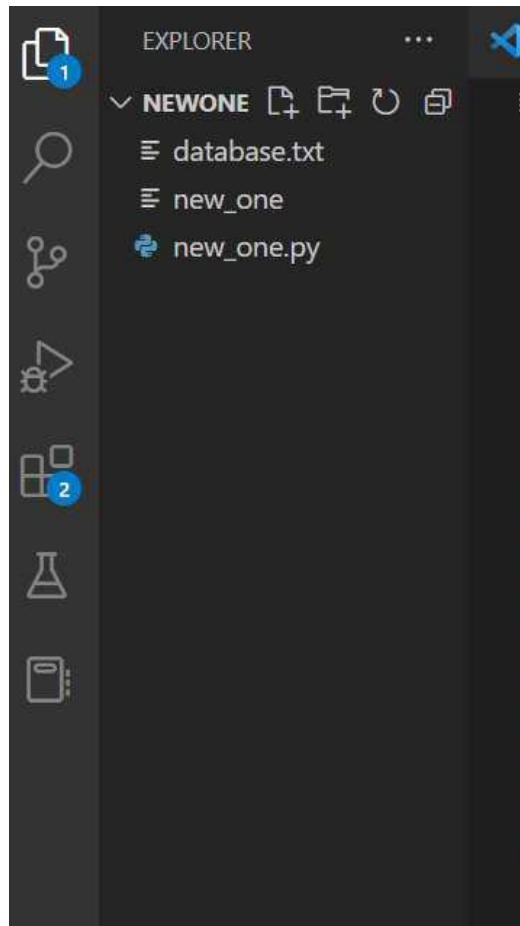

Figure 4.2.2: Importing database into system

Here I don't need to connect with database or Sql server. Because it's just a text input. And I have to search text from here. So for that I made it simple.

4.3 Implementation Requirement

I created a chatbot templet and utilized the Python module streamlit for the user interface. Then, some machine learning libraries are utilized, including sklearn for determining data similarity, selenium for data retrieval, and the nltk and numpy libraries. For the matching text from my database, I also used cosine similarity, a sklearn module.

Requirements for Our Application's Software:
- Visual studio or other python IDE.
- Python version 3.6 or higher
- Machine learning library numpy sklearn (cosine similarity and count vectorizer)
- Nltk library for string preprocessing
- Streamlit library for chatbot interface
- Selenium web driver to fetch data

Hardware Requirements for Our Application:
- Any computer that support minimum python 3.6 or more

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Storage

Despite the fact that it is a chatbot project, we must work with a lot of text data. I kept all of my text data in a text file for storage purposes.

Why did I only utilize a text file? Why not use a SQL database?

I don't require any video or image data for this project. All I need is text data. I simplified the database or storage for that purpose. What is currently being used to store corporate data? I kept all of the text in a text file. And I can just upload that text file to my system.

The database component was a text file. where I stored all the information relating to the company and its products. My strategy aimed to be straightforward. because for this project we don't need any significant volumes of data, like photographs or videos. I'm currently solely utilizing text. Because of this, I kept my data in a text file. When a program retrieves data from a website, it automatically stores that data in a text file.

This procedure of automatically storing user-provided data from e-commerce websites. Additionally, I can create a text file and store data simultaneously with just two lines of code. A text file or database can be readily imported into my system. I don't need to connect to a database or SQL server in this situation. simply because it is a text input. And from here, I have to seek for text. So I kept it simple for that.
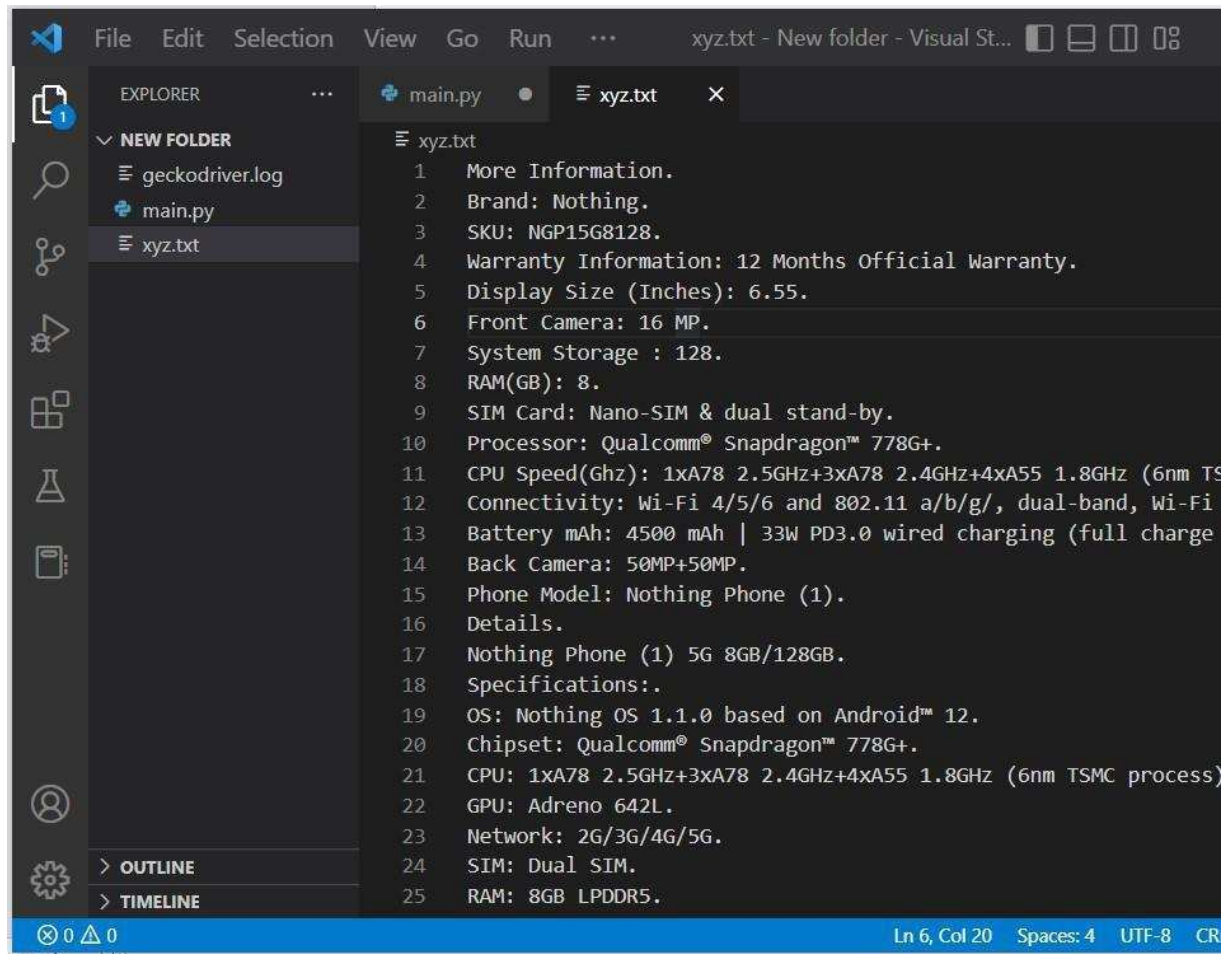
Figure 5.1.1: Storing data in text file
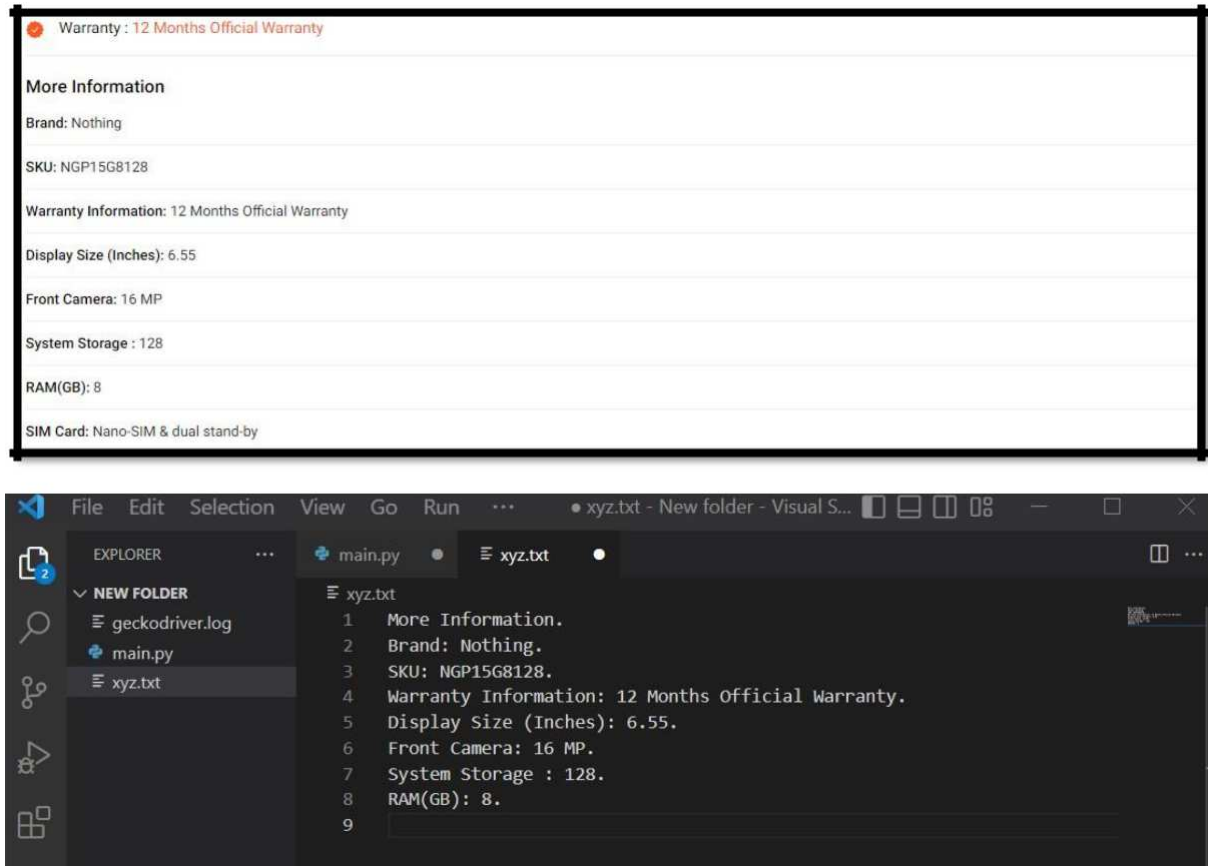
Continuously fetching data and storing.

Figure 5.1.2: adding text file into system

5.2 Implementation of Front-end Design

We divided our entire project into two sections in accordance with my specifications. One is for users, and the other is for the company's back end.

User Section design
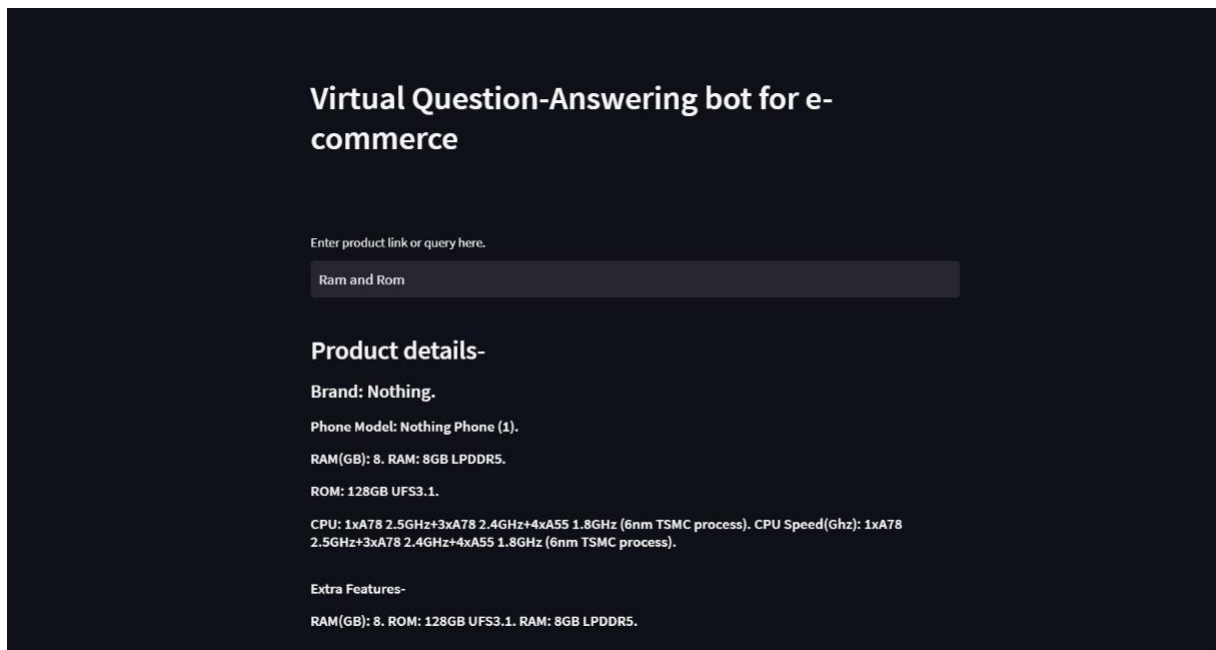This is my overall interface for user.

Figure 5.2.1: User section

Here, we can observe that the chatbot's top has an input text area.

Input from the user will be made in this part. The system will process the query from this input section. This input part is linked to my project's storage. First, I'll get rid of any words that aren't related to the core term, such as of, a, for, and so on.

Then I will extract every keyword that was provided by the user. I then turned every keyword into a vector. The actual keyword is controlled by that vector.

The vector can identify each keyword. Then, using the text data I've stored, my algorithm will look for similarities. I used the discover cosign similarity function for that.
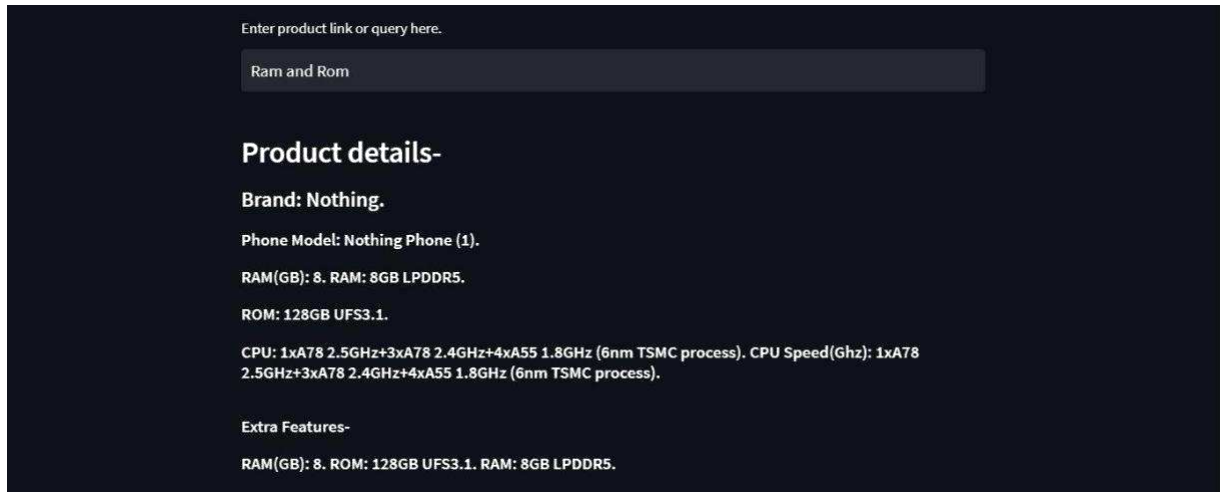
Figure 5.2.2: Display section

Here, I'll display some essential information that consumers have requested. And I won't reveal all the information in detail at once. In addition, I will display any specific data requested by the user adjacent to the main data. And those particular details will function as added features.

I start by getting the user's product link. Then I use the Selenium Web Driver to send a request to the web. The exact HTML tags field was obtained by that web driver. I convert all of the data into string type using html tags. I then save this information in a text file. which is a python-coded automated process.

The user or customer may then inquire about any product characteristics. Following that, I added a second multiple input select field. Here, the user can choose numerous inputs at once and view the precise data they need.
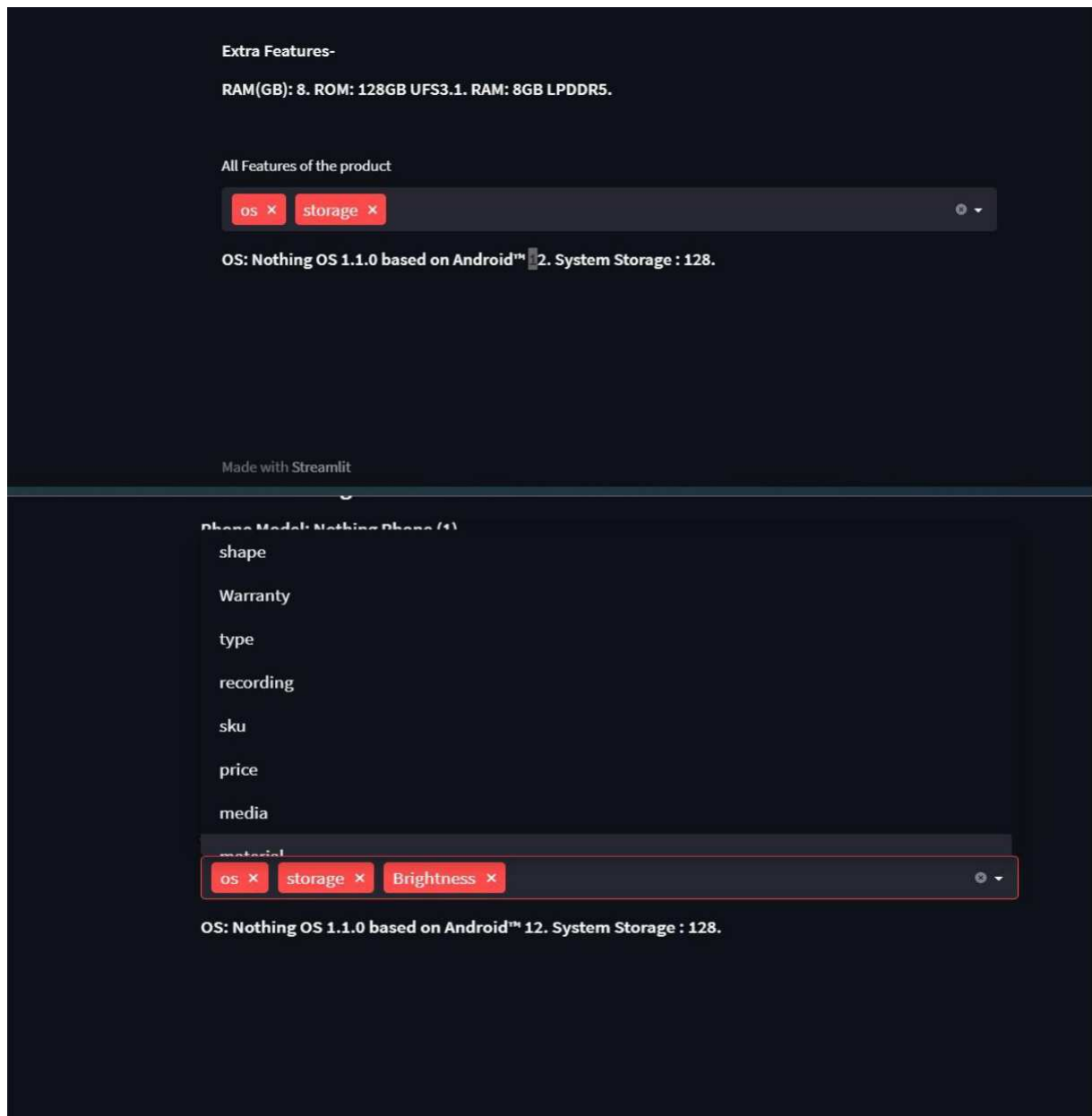
Multiple input field

Figure 5.2.3: Multiple input select field

Then, the user or customer can ask about any product features. I then created a second multiple input select field after that. The user can select many inputs at once and view the necessary data.

5.3 Implementation of Interactions

I made an application with the client's wish to use a simple, approachable, and engaging as our main focus in mind. I was able to connect with the big base directly thanks to the technique I used. My users can engage with my program considerably more as a result.

5.4 Testing Implementation

When several of my initiatives were still in the planning stages, I put my work to the test. Despite the fact that we lack qualified testers and have learnt about them through business expertise, I am quite familiar with customer needs. I can therefore say that I carry out all testing, including acceptance, integration, and unit testing. I also develop unique, special prerequisites for the objective of this exam in order to attain perfection.

Table 5.4.1: Testing implementation

01	Checking if the service runs
02	Checking for a text input field
03	Checking the user may contribute
04	Checking for the extra asked questions to display correctly
05	Checking the technology can extract keywords and do accurate matching.
06	Checking the display part is operational.
07	Checking whether or if the output message is shown correctly
8	Checking my system produces results on time or late
9	Checking is my system cashing after taking input?
10	Checking my system is available for usage by many businesses using their own text data.

5.5 Test Results and Reports

Table 5.5.1 shoes the outcomes of the tests, as the test cases presented in the earlier part of this chapter.

Table 5.2: Result of testing implementation

01	Checking if the service runs	Success
02	Checking for a text input field	Success
03	Checking the user may contribute	Success
04	Checking for the extra asked questions to display correctly	Success
05	Checking the technology can extract keywords and do accurate matching.	Success
06	Checking the display part is operational.	Success
07	Checking whether or if the output message is shown correctly	Success
08	Checking my system produces results on time or late	Success
09	Checking is my system cashing after taking input?	Success
10	Checking my system is available for usage by many businesses using their own text data.	Success

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Conclusion

The phrase "Every firm is a technology business" was one of the catchphrases of the previous ten years. Every company in every market and industry started utilizing mobile for work and communication, sharing their data with the cloud, and utilizing as-a-service solutions to reduce operational costs, grow their clientele, and enhance employment opportunities. Whether you like it or not, that time has not yet come, but it soon will.

6.2 Scope for future developments

- Develop a user-interactive application for customers that is fully integrated with the other apps created for this program.

- Increasing customer friendliness and technology.

- Adding more choices in response to customer input.

- Finally, I'll make this system intelligent so that it can provide more services to the business.

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