

**CHAT-BOT SYSTEM FOR COMPUTERS, ACCESSORIES &
REPAIR CENTER RECOMMENDATION**

TMP-23-283

Project Proposal Report

Senadheera H.A.M

B.Sc. (Hons) Degree in Information Technology

Specializing in Data Science

Department of Information Technology

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DECLARATION

I declare that this is our own work, and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Name	Student ID	Signature
Senadheera H.A.M	IT20125998	

The above candidate is carrying out research for the undergraduate Dissertation under my supervision.

.....

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Signature of the supervisor:

Date

ABSTRACT

The creation of a chat-bot system that can recommend computers, accessories, and repair shops to users based on simple natural language-based queries is suggested by this project. The system uses ML and NLP to identify user wants and preferences in order to streamline the process of locating appropriate products and services to user.

Computers, accessories, and repair centers were loaded to the ML model through web scraping so always system is updated with the current products in the market Based on users' queries and previous engagements, the chat-bot system will be able to offer tailored recommendations.

The suggested method may be a useful resource for people with low technical knowledge on and companies looking for dependable and practical ways to improve user friendliness of their systems of websites.

Keywords: Natural Language Processing (NLP), Chat bot, Machine Learning, Web scraping, Computer accessories, Computer repair centers.

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LIST OF ABBREVIATIONS

Abbreviation	Description
SLIIT	Sri Lanka Institute of Information Technology
NLP	Natural Language Processing
ML	Machine Learning
AI	Artificial Intelligence
KNN	K-Nearest Neighbors
GCP	Google cloud platform
NLTK	Natural Language Tool Kit

Table 1 Abbreviations

1.0 INTRODUCTION

Computers are a vital part of our daily life in today's fast-paced society. Computers and related equipment are now essential for everyone, including households, companies, and organizations. The demand for dependable and effective repair services has increased along with our reliance on technology. Finding the ideal item or repair facility that satisfies our unique demands can be a difficult chore, though. The Chat-Bot System for Computers, Accessories & Repair Center Recommendation enters the picture at this point.

Innovative technology called the Chat-Bot System for PCs, Accessories & Service Center Suggestions makes it easier to locate the right goods and services. The system uses natural language processing and machine learning techniques to understand users' wants and preferences trained through data obtained via web scraping. It makes use of chatbot technology to deliver tailored advice based on users' inquiries.

Web scraping is a handy method for gathering substantial volumes of data for machine learning (ML) model training. It entails pulling information from websites. A big and varied dataset, which is essential for training reliable and accurate models, can be gathered by web scraping. To train a recommendation system that gives consumers precise and individualized recommendations. Products, technical specifications, descriptions, reviews, and ratings can be gathered from e-commerce websites. Moreover, the product data will always be fresh.

NLP is used in this system to extract necessary keyword from user queries and inject them to recommendation model. NLP is a rapidly evolving field, and researchers are constantly developing new techniques and algorithms to improve its performance and accuracy. It is a subfield of artificial intelligence that deals with the interaction between computers and human

language. The goal of NLP is to enable computers to understand, interpret, and generate human language.

By examining user-submitted queries written in natural language and finding patterns and connections between query terms and items, machine learning (ML) model is used to train recommendation systems. K-NN algorithms use similarity metrics to discover related items and suggest related items based on the user's search queries.

Image processing algorithms were used to get the specific data from images that the users upload to the system if they don't know specific terms they want to search for. Then the data obtained from images were also send to recommendation algorithm to get the perfect match for the user.

1.1 Background

Because of the surge in demand for tailored recommendations and effective customer care, chatbot systems have become more and more common in recent years. Chatbots are computer programs that mimic human communication by using machine learning and natural language processing techniques. In a number of industries, including e-commerce, healthcare, and customer service, they have shown to be successful at making tailored suggestions for goods and services.

Chatbot systems can assist clients in locating the ideal goods and services in the context of computer repair services and accessory recommendation based on their unique needs and preferences. This may result in greater client satisfaction and loyalty as well as enhanced repair procedure efficacy and efficiency.

1.2 Literature

The employment of chatbot systems in a variety of areas, including e-commerce, healthcare, and customer service, has been the subject of numerous studies. There is little research available in the area of recommended computer repair services and accessories. However, the literature review that follows offers some pertinent studies:

From one study by Gao et al. (2021) [1] explored the usage of a chatbot system for debugging computer hardware. The study discovered that the chatbot system was efficient at locating and recognizing hardware problems and making repair suggestions.

Wang et al (2019).s [2] investigation on chatbot systems for tailored recommendations in e-commerce was part of another study. The study discovered that chatbots were efficient at making individualized suggestions for goods and services, increasing client loyalty and happiness.

The usage of a chatbot system for customer care in the context of online buying was investigated by Chen et al. in a paper published in 2020 [3]. According to the study, the chatbot system was efficient at responding to consumer inquiries promptly and accurately, which increased customer happiness and loyalty.

Overall, the research indicates that chatbot systems can be useful in delivering individualized recommendations and effective customer service across a range of industries, including computer repair services and accessory recommendation. Exploring the efficiency and constraints of chatbot systems in this particular setting requires more investigation.

1.3 Research Gap

Even though there are various research publications about chat bot systems and E commerce platforms and as well as the device recommendation systems and repair center recommendations there were no publications all of them considered as a one thing collectively.

Despite the fact that image processing and NLP are both strong methodologies, merging them might be difficult. The integration of image processing and NLP needs to be investigated in order to improve the precision and efficiency of the chat-bot system.

Robustness of the Chat-Bot System: The Chat-Bot System must be capable of coping with a variety of inputs from users and circumstances [6]. It is important to look into ways to make the system dependable and robust, especially while working with web-based unstructured data.

In the proposed recommendation system price, user reviews and availability of the devices will be considered when giving recommendations rather recommending based on the technical specifications of the devices.

Most of the existing systems use only a single model to give the recommendations to the user but in the proposed system I'm planning to use both content based and collaborative based recommendation algorithms to recommend devices and repair centers for the user.

2.0 RESEARCH PROBLEM

It is now simpler than ever to purchase computer hardware thanks to the advent of e-commerce companies selling a wide range of computers, computer parts and as well as computer repair shops. However, Despite the abundance of choices, some customers have trouble choosing the best product for their needs. Many customers want to be certain that the product or component they are purchasing meets their needs, but the overwhelming number of possibilities can make it challenging to go through and locate what they need. Users frequently end up buying unnecessary excess gadgets or the wrong product altogether as a result, resulting in money being wasted and aggravation [4].

In traditional search engines it relies on user entering precise keywords to get relevant results, still this procedure produces an overwhelming number of links and webpages to look through this might be time-consuming and frustrating for visitors to have to search through the entire website in some circumstances to discover what they're searching for [5].

If the user is not very keen on technology and he doesn't has much knowledge on the specific technical requirements of the device he want he might have to enter some natural language based search query but this wouldn't be much effective if the search engine doesn't understand what the users is trying to express.

Proposed chat bot system aims to address all above mentioned problems by developing AI powered chat bot and integrating it the to the e commerce sites and even acting as independent chat bot type search engine.

3.0 RESEARCH OBJECTIVES

3.1 Main Objectives

The major goal of this research is to offer people a precise, individualized solution that can meet their unique needs. The Natural Language Processing (NLP) and image processing techniques that will be used in the chat bot system are intended to extract user requirements. By applying these strategies, the chat bot will be able to understand the user's queries and deliver appropriate responses that are tailored to their needs.

A recommender system built into the chat bot system will be taught using web scraping data. This implies that the chatbot will have access to a huge database of knowledge about the various goods and services on the market. The recommender system will be able to offer consumers the correct product for them based on their unique needs by analyzing data obtained from NLP and images processing from the inputs of the chat bot, and these inputs will be passed through two recommendation models to get the most optimal results.

3.2 Specific Objectives

- Web scraper for scraping devices and repair centers based on user reviews and processing video reviews to train the ML recommender system.
- Image processing for computer accessory identification.
- NLP model for retrieving features from natural language-based queries from the user.
- Device and repair center recommendation system model trained from the scraped data from the web and accepting the user query based on NLP & Image processing as parameters.
- Get the most accurate result set from running multiple models
- Chat-bot based interface for proving all the above requirements for the user.

4.0 METHODOLOGY

4.1 System Overview

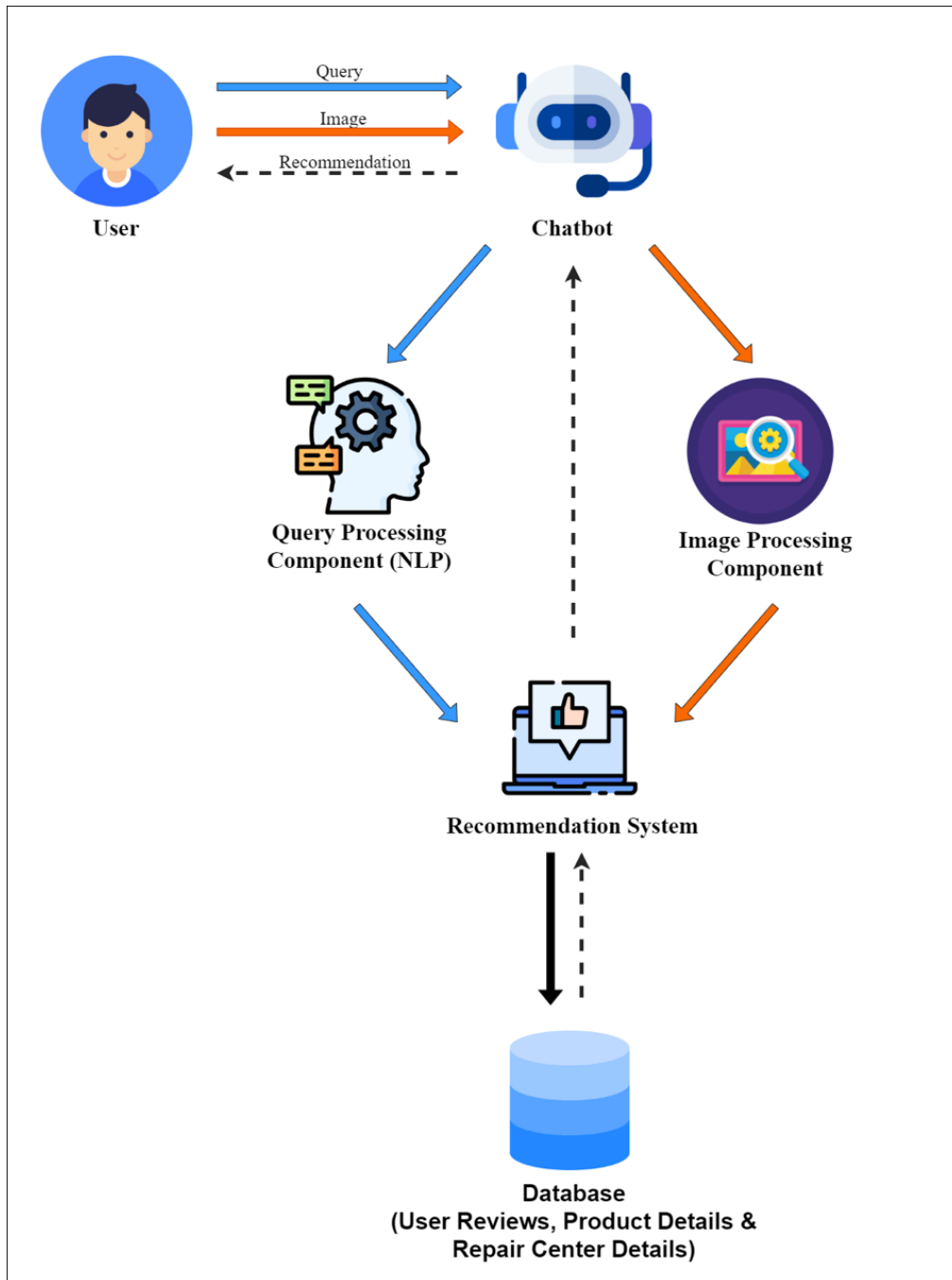


Figure 1 Overall System diagram

4.2 System diagram for the Recommendation model

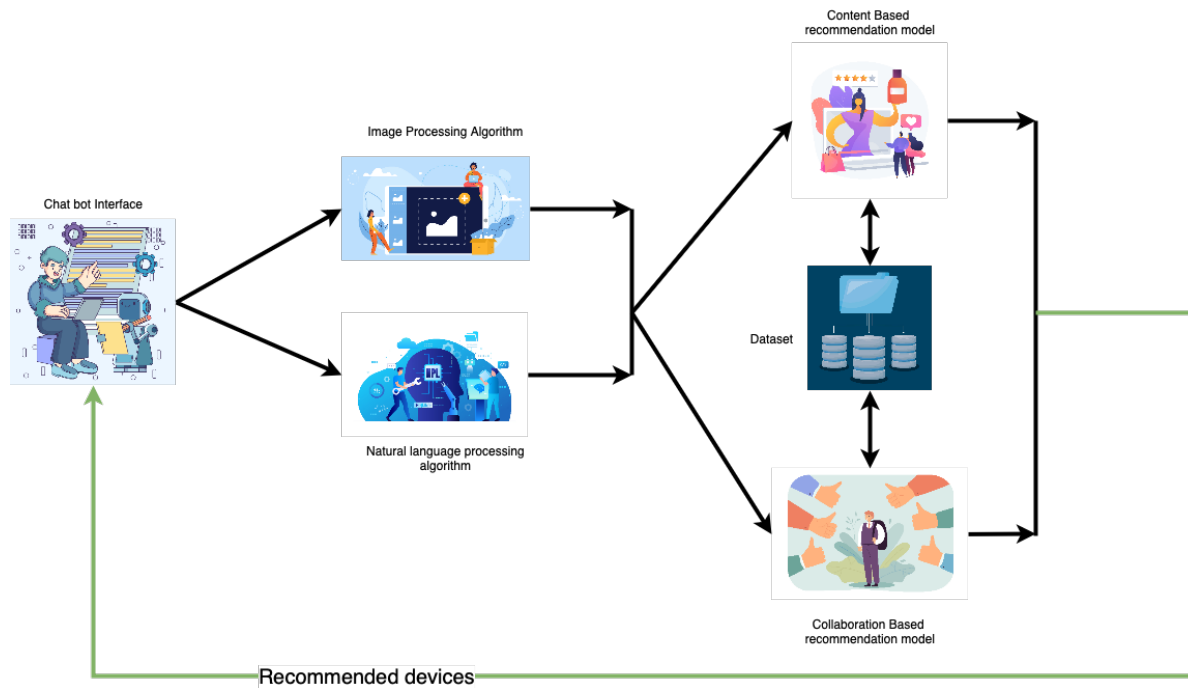


Figure 2 system diagram for recommendation model

4.3 Implementation

As the first step of the system user will give input the system as a image, technical query or natural language based query or may be a hybrid of those types. Then according to the type of the user input system will direct the input to the NLP algorithm or the Image processing algorithm. After going through NLP & Image processing algorithms necessary features and parameters with be extracted from the query and pass them to the recommendation models.

In this system for the highest accuracy of recommendations the above features will be passed through content-based recommendation model and a collaborative based recommendation model for gaining the highest accuracy.

Rather than using an existing dataset we choose to create our own dataset by web scraping from different websites so we can get a proper dataset which will cater the requirements of our system. Next data will be preprocessed and save to the database. Since the data is obtained

via web scraping and the web scraping algorithm will be run periodically the data will be always UpToDate.

Both of these models were trained using the web scrapped data of the devices, repair centers and the user reviews, so the model will be UpToDate with the latest devices and repair centers in the market. Because of this reason the availability and prices of the devices will be updated periodically, and the accuracy of the results will be very much higher. From content based recommendation model devices with similar specification will be extracted and from the collaborative based recommendation model devices similar users bought will be extracted.

Finally the system will compare both result sets from both models and retrieve common results and displayed it to the user with the different shops where the user can buy the device and display how the price varies in various shops.

4.4 Commercialization

Commercializing a Chat-Bot system for laptops, accessories, and service center recommendations can be a successful business venture if handled effectively. In order to do so there are certain factors to be considered.

The most initial and crucial factor is identifying the target market and potential buyers of the developed product. In that case, we propose this system towards computer selling companies. In such ways, they will be able to increase their sales & customer base as well.

In comparison to the competition seen in the available market, there are none to rare instances where we see Chat-Bot systems. Hence, commercializing such a product would be very useful. In addition, we don't see such system in the Sri Lanka market as well. So, implementing such a system would raise customer satisfaction and raise develop the competition in the Sri Lankan market as well.

As proposed, shown below is the product logo. We are targeting Sri Lankan e-commerce platforms, computer retail shops & repair centers to promote this product.

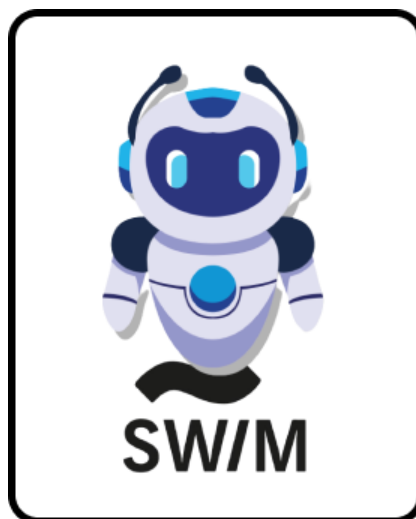


Figure 3 Logo to used when commercializing.

5.0 TOOLS AND TECHNOLOGIES

As proposed for the moment we are looking forward using the following tools and technologies:

Tools & Technologies:

- IDE: VS Code
- Google Collab
- GitHub as version controlling
- python

Algorithms

- Content based recommendation model.
- Collaborative based recommendation model

6.0 WORK BREAKDOWN STRUCTURE

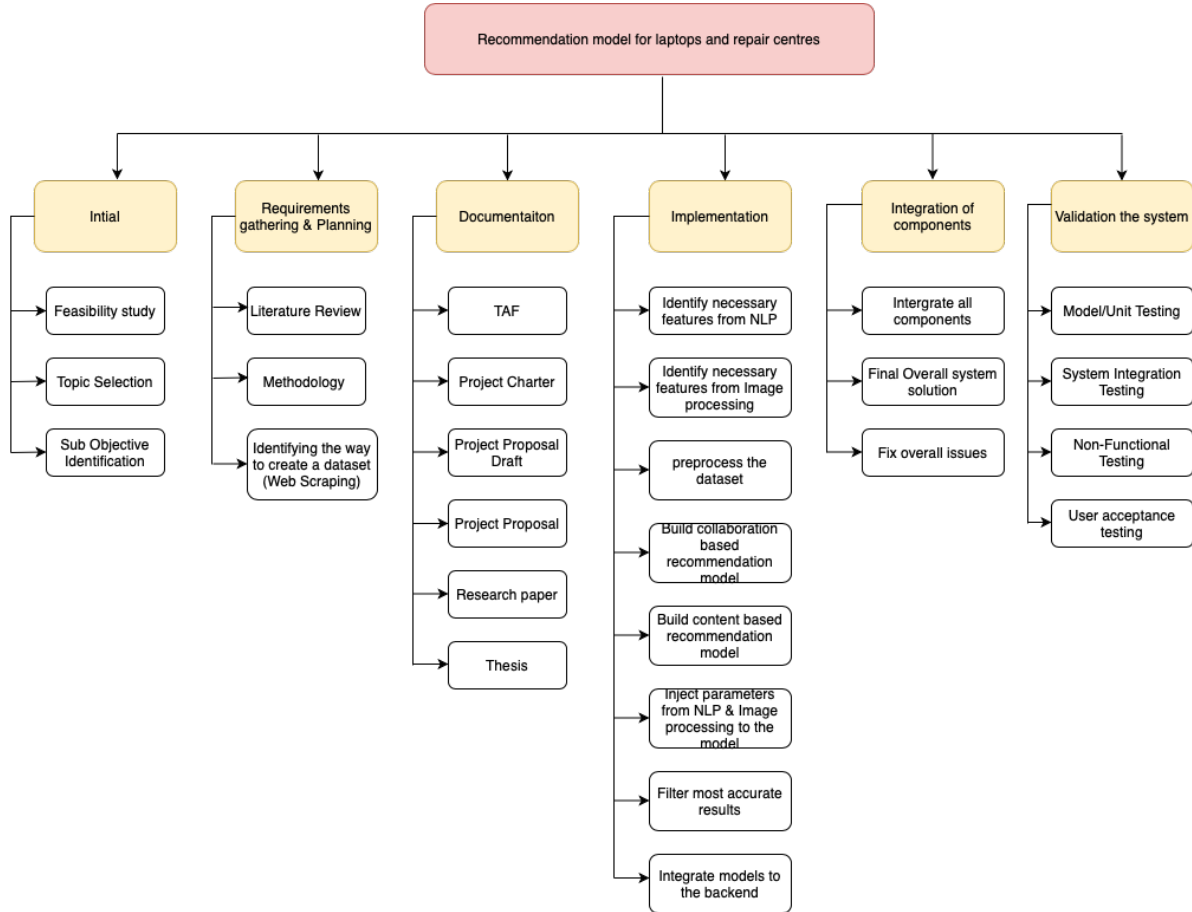


Figure 4 work breakdown structure

7.0 GANTT CHART

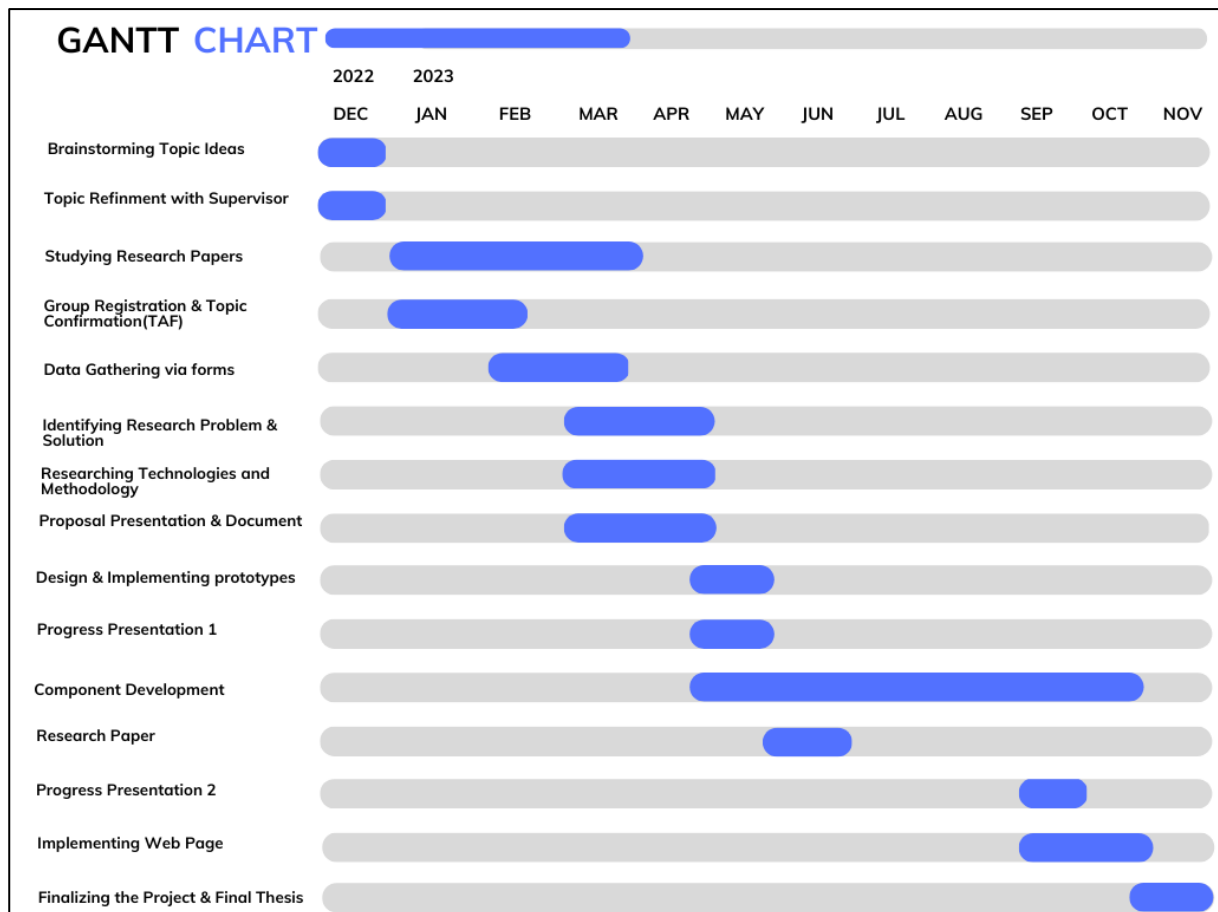


Figure 5 Gantt chart

8.0 BUDGET BREAKDOWN

The total budget for this proposal is Rs.8,000, which will cover the expenses necessary for the project. Members of our team will bear this cost.

Materials and Supplies:

The materials and supplies cost are estimated to be Rs. 5,000. This includes the cost of Google Cloud and other infrastructure costs, printing costs, and cost of other necessary supplies.

Other Expenses:

The remaining budget of Rs.3, 000 will be allocated for any other expenses that may arise during the research project, such as unforeseen costs related to the research design or implementation.

REFERENCE LIST

- [1] Gao, S., Wu, X., Liu, M., & Lu, J. (2021). Hardware Troubleshooting Based on Chatbot System. *Journal of Physics: Conference Series*, 1792(1), 012045.
<https://iopscience.iop.org/article/10.1088/1742-6596/1792/1/012045/meta>
- [2] Wang, Y., Sun, J., & Zhang, X. (2019). Design and implementation of a chatbot system for personalized recommendations in e-commerce. *Journal of Ambient Intelligence and Humanized Computing*, 10(3), 957-965.
<https://link.springer.com/article/10.1007/s12652-018-0929-1>
- [3] Chen, C. H., Chang, H. C., & Chang, Y. S. (2020). The effect of chatbot use on customer satisfaction in online shopping. *Journal of Retailing and Consumer Services*, 54, 102057.
<https://www.sciencedirect.com/science/article/abs/pii/S0969698919310622>
- [4] Ozturk, A. B., & Bilgihan, A. (2019). Chatbots as a new e-commerce paradigm: Examining the effects of affective and cognitive trust, satisfaction, and perceived quality on loyalty. *International Journal of Information Management*, 49, 430-442.
- [5] Huang, H. Y., & Rust, R. T. (2018). Artificial intelligence in service. *Journal of Service Research*, 21(2), 155-172.
- [6] Robustness of the Chat-Bot System: "chatbot system robustness", "chatbot system reliability", "dealing with unstructured data in chatbot systems"