The - YE

A Project Report submitted in partial fulfillment of the requirements for the award of the degree of

Bachelor of Technology

in

Computer Science and Engineering

by

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Semester: VI

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Group Member Details, Problem Statement and Objectives.

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Problem Statement:

There is a need for a more accessible and user-friendly platform for customers to purchase their prescribed medicines. Existing medicine delivery apps have their limitations, including technical difficulties, long delivery times, and limited availability in certain regions. This has led to a gap in research on the use of WhatsApp bots as a potential platform for aggregating local drugstores and providing customers with a more convenient way to purchase their medicines.

Objectives:

• To propose a solution that can serve as a platform for local drugstores to sell medicine .

• To deploy a bot with a wide user base such as Whatsapp to improve accessibility to users.

• Build a platform which enhances ease of access to ordering medicines for users instead of checking multiple apps.

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Abstract

This report outlines a solution for aggregating local drugstores over a WhatsApp bot as a platform for selling medicines, with the added feature of providing customers with information on the nearest stores that have the prescribed drugs ready for sale. The goal of this solution is to make it easier for customers to access a wider range of medicines from their local drugstores through a user-friendly interface, without the need to wander from shop to shop searching for the required medicines.

The report discusses the design and implementation of the solution, including the use of Whatsapp bots' conversational interactions with the customer. The bot can provide customers with a list of the nearest drug stores that have the required medicines available for sale, as well as information on availability (maybe pricing also). This feature is achieved through the integration of a location-based service that utilizes the customer's location to search for nearby drugstores.

The report concludes with an evaluation of the effectiveness of the solution and discusses potential future improvements to the system. Overall, this solution provides a convenient and accessible way for customers to purchase medicines from their trusted local drugstores, while also enabling drugstores to reach a wider customer base and increase their sales. The added feature of providing information on the nearest stores with the prescribed drugs ready for sale ensures that customers can easily locate the medicines they need without wasting time and effort searching from store to store.

Keywords: Whatsapp Business API , Node.js , Google maps api, Fuzzy search , Fuse.js , Beautiful Soup (Python library).

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Chapter 1

Introduction

1.1 Overview of Work

Medicine delivery apps have gained popularity in recent years as a way for customers to order and receive their prescribed medicines conveniently. However, these apps can often be inconvenient due to issues such as limited availability in certain regions, technical difficulties, and long delivery times. Furthermore, some customers may not want to download and use a separate app for ordering medicines.

On the other hand, WhatsApp has a massive user base and is widely used as a messaging platform globally. By using a WhatsApp bot as a platform for selling medicines, customers can conveniently order their required medicines without needing to download a separate app or navigate through a complex user interface. The bot can also provide customers with information on the nearest drug stores with the required medicines available for sale, further enhancing the convenience factor. Additionally, the widespread availability of WhatsApp across various devices and platforms ensures that the bot has a wider distribution advantage compared to traditional medicine delivery apps

.

1.2 Motivation of the Work

The COVID-19 pandemic has brought about significant changes in the way we live our lives, including how we access healthcare services. With lockdowns and social distancing measures in place, many individuals are turning to online platforms to purchase their medicines. However, the existing medicine delivery apps can often be inconvenient and inaccessible, especially for those living in rural areas or with limited access to technology. This highlights the need for a more accessible and user-friendly platform for customers to purchase their medicines. By utilizing the massive user base

and distribution advantages of WhatsApp, a solution for aggregating local drugstores over a WhatsApp bot has the potential to significantly improve the accessibility and convenience of purchasing medicines. Such a solution would not only benefit customers but also provide a boost to the sales of local drugstores, supporting local businesses in these challenging times. Therefore, developing a solution that addresses these challenges and provides a better way for customers to purchase their medicines is a crucial step in enhancing healthcare accessibility and improving the quality of life for individual

1.3 Literature Review

- **WhatsApp Chatbot Customer Service Using NLP and SVM.**

The purpose of developing this system is to simplify and speed up the process of product information exchanges to customers. With an average response of less than 1 second and an average accuracy of 87.75% in classifying text, the chatbot is effective and efficient. The chatbot will classify the text and respond accordingly when given a message. So that the benefits of designing and developing this chatbot are convenience, speed, clarity in the process of customer and seller interaction..

- **Secure Online Medicine Delivery System**

The objective of this study to design and implement a secured home delivery of medicine to the specific customer. The overall idea is to create a smart and secure online based medicine delivery system that will find its application in the field of e-commerce vendors such as Practo, 1mg, Netmeds, etc. It shall not be possible to locate the client's consignment (medicine orders) based on the virtual IDs alone, rather a biometric verification will be carried out at the client's (patient's) end to confirm the authenticity from the client.

1.4 Research Gap

1. While there are existing medicine delivery apps that allow customers to purchase medicines online, these apps have their limitations, including technical difficulties, long delivery times, and limited availability in certain regions. Additionally, the user interface of these apps can be complex and difficult to navigate, leading to a suboptimal user experience. This highlights the need for a more accessible and user-friendly platform for customers to purchase their medicines.

2. Currently, there is a gap in research on the use of WhatsApp bots as a platform for selling medicines. While WhatsApp is widely used as a messaging platform globally, its potential as a platform for selling medicines has not been explored extensively. Research is needed to evaluate the effectiveness and feasibility of implementing such a solution, including the technical requirements, security and privacy considerations, and potential impact on the sales of local drugstores. Additionally, the user experience of such a solution needs to be evaluated to ensure that it is convenient and user-friendly for customers, especially those with limited access to technology. Therefore, there is a need for further research in this area to bridge the gap and provide a better way for customers to purchase their medicines.

Chapter 2

Problem Statement

There is a need for a more accessible and user-friendly platform for customers to purchase their prescribed medicines. Existing medicine delivery apps have their limitations, including technical difficulties, long delivery times, and limited availability in certain regions. This has led to a gap in research on the use of WhatsApp bots as a potential platform for aggregating local drugstores and providing customers with a more convenient way to purchase their medicines. Therefore, there is a need for further research to evaluate the feasibility and effectiveness of using WhatsApp bots as a platform for selling medicines and enhancing healthcare accessibility.

2.1. Research Objectives

- Propose a solution that serves as a comprehensive platform for local drugstores to sell medicine online, expanding their reach and customer base.
- Deploy a bot on a popular messaging platform like WhatsApp to ensure a wide user base, enhancing accessibility and convenience for ordering medicines.
- Build a centralized platform that simplifies the process of ordering medicines, eliminating the hassle of checking multiple apps or websites.
- Enable users to conveniently upload and submit their prescriptions directly through WhatsApp Messenger, streamlining the ordering process.
- Provide a user-friendly interface on WhatsApp Messenger, allowing users to effortlessly browse and select medicines, delivering a seamless and satisfying experience.

2.2. Methodology of the Work

Technical requirements analysis : This step involves identifying the technical requirements of the solution, including the necessary hardware and software components required to develop a WhatsApp bot for selling medicines . This may involve evaluating the available options for developing a WhatsApp bot, such as using third-party libraries or developing a custom solution.

Data collection and analysis: This step involves collecting data on the medicines sold by local drugstores and analyzing the data to identify the medicines that are commonly prescribed by doctors. This data can be used to provide customers with information on the nearest drugstores with the required medicines available for sale

User testing and evaluation : This step involves testing the developed solution with a sample of users to evaluate the user experience and identify any issues or areas for improvement . The feedback from the user testing can be used to refine the solution and improve the user experience.

Chapter 3

Analysis and Design

3.1 Analysis of Medicine Dataset (Source: TATA 1mg)

The WhatsApp Bot that is being developed as a platform for aggregating local drugstores and selling medicines requires a medicine database in order to check the spelling of medicines entered by customers. This is because medicines can have complex and difficult-to-spell names, which can lead to errors and confusion when searching for them.

By having a medicine database, the WhatsApp Bot can cross check the spelling of the medicine entered by the customer against the correct name of the medicine in the database. This ensures that the customer is searching for the correct medicine and helps to avoid any confusion or errors in the ordering process.

Moreover, a medicine database can provide additional information such as dosage and instructions for use, which can be useful for both customers and drugstores. This can help customers make informed decisions about their medicines and can assist drugstores in providing the correct medicines and dosage to customers.

3.1.1 Sourcing the database

We have scraped the website of **TATA 1mg** for a list of medicines. This list of medicines are stored in a json format. This list of medicines was scraped using a python script with Beautiful soup library.

Here are some additional details about the scraping process:

- The Python script uses the requests library to make a request to the TATA 1mg website.
- The **Beautiful Soup library** is used to parse the HTML response from the website.
- The list of medicines is found on the website using the **find_all()** method.
- The information about each medicine is extracted using the **text()** and **find()** methods.

- The list of medicines is stored in a JSON file using the **json.dump()** method.

We also implemented a search functionality so that our bot could crosscheck the spelling of the medicines input by users .

3.1.2 Searching the database

We tried a variety of methods including cosine similarity, levenshtein distance, euclidean distance.

Cosine similarity : Cosine similarity is a measure of similarity between two vectors. In the context of string matching, it can be used to measure the similarity between two strings.The cosine similarity between two strings is a number between 0 and 1. A value of 1 indicates that the two strings are identical. A value of 0 indicates that the two strings are completely different.

Here are the results of Cosine Similarity :

```
Search term: crocene

More is Better

{ term: 'Aspirin 500mg Tablet', score: 0.22019275302527214 }
{ term: 'Crocin 500mg Tablet', score: 0.5222329678670935 }
{ term: 'Bacrocin 2% Ointment', score: 0.6030226891555273 }
```

Fig 1: Cosine Similarity

Levenshtein distance : Levenshtein distance is a string metric for measuring the difference between two sequences. Informally, the Levenshtein distance between two words is the minimum number of single-character edits (i.e. insertions, deletions or substitutions) required to change one word into the other. **Lesser the distance , more similar are the two words**.

Here are the results of Levenshtein distance :

```
Search term: crocen

Less is Better

{ term: 'Aspirin 500mg Tablet', score: 18 }
{ term: 'Crocin 500mg Tablet', score: 15 }
{ term: 'Bacrocin 2% Ointment', score: 14 }
```

Fig 2: Levenshtein Distance

Euclidean distance : Euclidean distance can be used to measure the similarity between two strings. To do this, we first need to convert the strings into vectors. This can be done by creating a vector for each character in the string. The value of each vector element is the position of the corresponding character in the alphabet. The Euclidean distance between two strings is a number between 0 and 1. A value of **0** indicates that the two strings are **identical**. A value of **1** indicates that the two strings are **completely different**.

Here are the results of Euclidean distance :

```
Search term: crocen

Less is Better

{ term: 'Aspirin 500mg Tablet', score: 37.255872020394314 }
{ term: 'Crocin 500mg Tablet', score: 32.2490309931942 }
{ term: 'Bacrocin 2% Ointment', score: 44.36214602563767 }
```

Fig 3: Euclidean distance

Fuzzy Search : This algorithm is used to search for strings that are similar to a given string, even if they are not an exact match. It takes into account factors such as misspellings, transpositions, and typos. This algorithm can be used to find the closest match for a misspelled medicine name in the database.

Result of Fuzzy search

```
Less score is Better
 [
  { searchTerm: 'crocen' },
  { term: 'Crocin 500mg Tablet', score: 0.3556368284111493 },
  { term: 'Bacrocin 2% Ointment', score: 0.37966934024342136 }
]
```

Fig 4: Fuzzy Search

But, we found the best results using Fuzzy search with nearly accurate closest similar words.

The dataset consists of nearly 68000 medicine names. So any marginal accuracy improvement counts . Plus setting a threshold for similarity allows us to filter out bad possibilities which can prove to be dangerous.

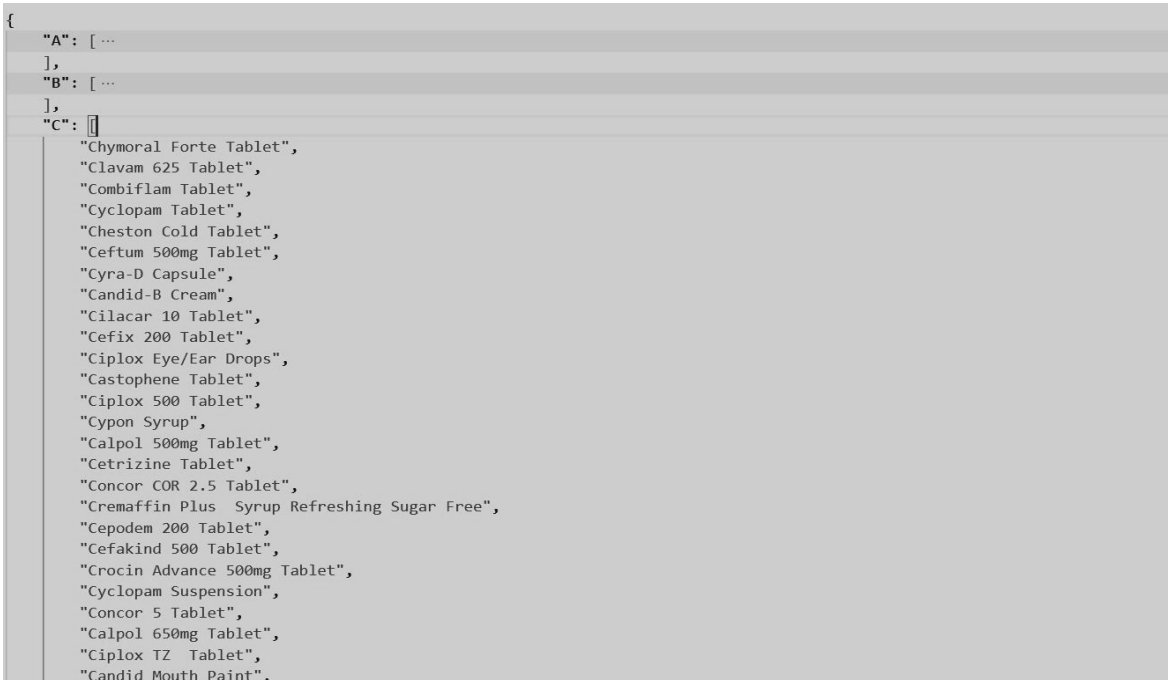


Fig 5: JSON Medicine File Snapshot

3.2 Design of the Whatsapp Bot

3.2.1 Tech Stack

The Tech Stack to be utilized for this project includes:

Node.js: Node.js is an open-source, cross-platform JavaScript runtime environment that allows you to run JavaScript code on the server-side. In this context, Node.js can be used to build the backend of the WhatsApp bot, handling user requests, processing orders, and interacting with APIs.

Google Maps API: The Google Maps API allows developers to access Google's mapping platform, which includes features like geocoding (converting addresses into latitude and longitude coordinates) and place search. In this case, the Google Maps API can be used to find nearby drug stores based on the user's location.

WhatsApp Business API: The WhatsApp Business API is a messaging platform that allows businesses to interact with customers on WhatsApp. In this context, the WhatsApp Business API can be used to send messages to users regarding their orders and to receive messages from users regarding their orders and any issues they may have.

Fuse.js: Fuse.js is a lightweight JavaScript library for fuzzy searching. In this context, Fuse.js can be used to search for drug stores based on user input, even if the user misspells the store name or only provides partial information.

Our fuzzy search uses a modified implementation of Bitap Algorithm under the hood.

Bitap Algorithm :

The Bitap algorithm is a type of string matching algorithm that allows for approximate matching of text. It is also known as the shift-or, shift-and, or Baeza-Yates-Gonnet algorithm. The algorithm works by determining if a given text contains a substring that is "approximately equal" to a specified pattern, where the degree of approximation is measured in terms of the Levenshtein distance. If the substring and pattern are within a certain distance k of each other, then the algorithm considers them to be equal.

To perform this task, the algorithm first creates a set of bitmasks containing one bit for each element of the pattern. This allows the algorithm to use bitwise operations, which are very fast, to perform most of the computation.

Link to wiki page of the algorithm : https://en.wikipedia.org/wiki/Bitap_algorithm

3.2.2 Working of the Whatsapp chatbot

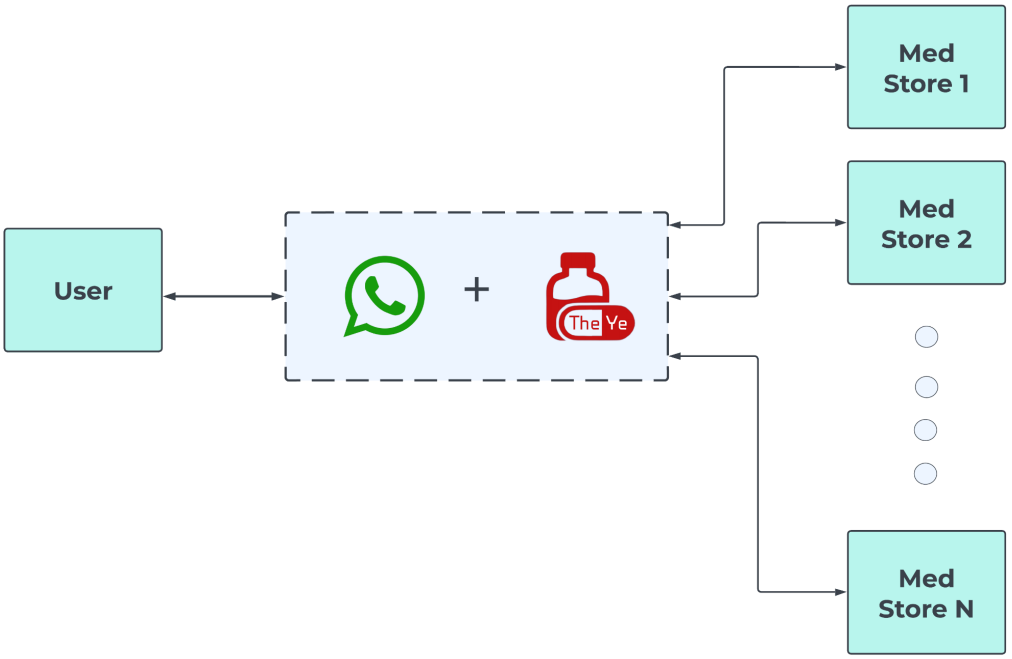


Fig 6: Simple Diagram of The-YE Bot

The chatbot lets users order medicine by entering the medicine name or uploading a prescription image. The chatbot then sends the order request to nearby drug stores registered on the system.

If a drug store accepts the order, it becomes responsible for fulfilling it. The chatbot uses the user and drug store's location data to find the nearest store for quick delivery.

The drug store can either deliver the medicine to the user's home or keep it ready for pickup. The chatbot notifies the user about the expected delivery time and any additional charges for delivery. If the drug store chooses pickup, the chatbot provides the store's address and contact details to the user.

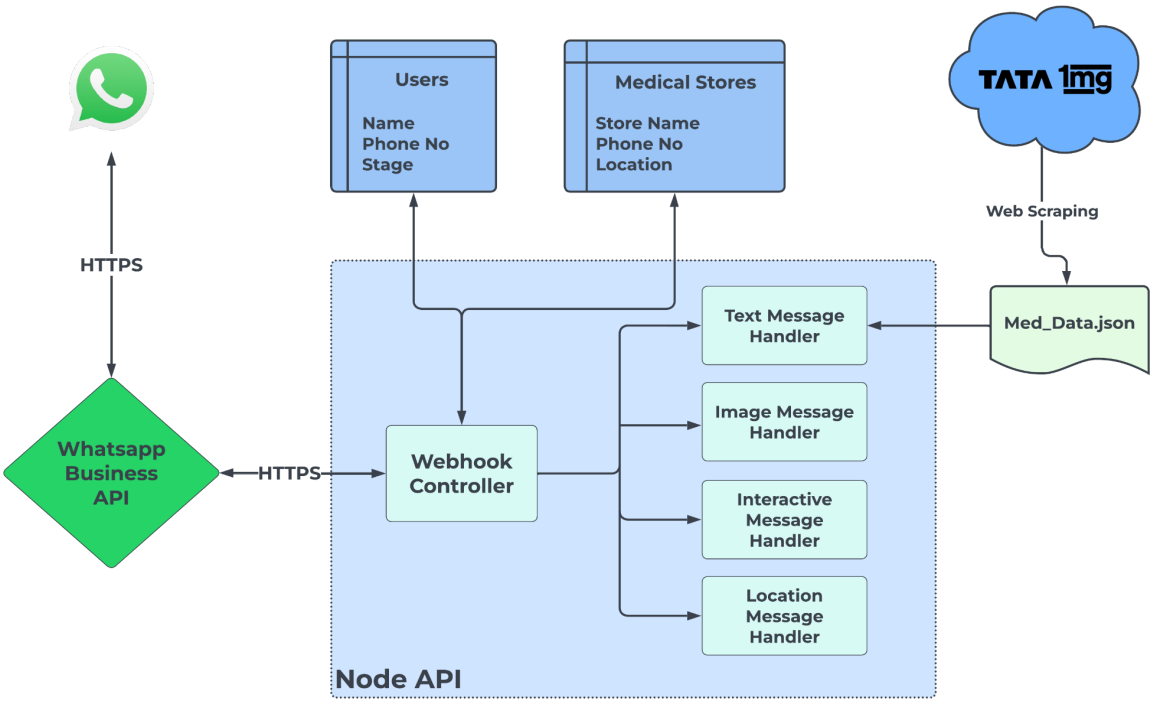


Fig 7: Internal working of the Node API

1. The WhatsApp messenger serves as the user client, through which customers can communicate with the bot. To enable communication between the WhatsApp messenger and the bot, we have used the WhatsApp Business API, which uses HTTPS to ensure secure communication. The bot, in turn, communicates with a Node.js server over HTTPS.
2. We have also stored the medicine data in a JSON file, which is used by the bot to search for medicines entered by the customer. To obtain this medicine data, we have scraped information from the TATA 1mg website using the BeautifulSoup Python library. This has allowed us to create a comprehensive list of medicines with accurate spellings.(Almost 65000 medicine records)

3. To further enhance the search functionality of the bot, we have implemented fuzzy search using external libraries such as Fuse.js. This allows the bot to approximate the spelling of medicines entered by the customer, thereby improving the chances of finding the correct

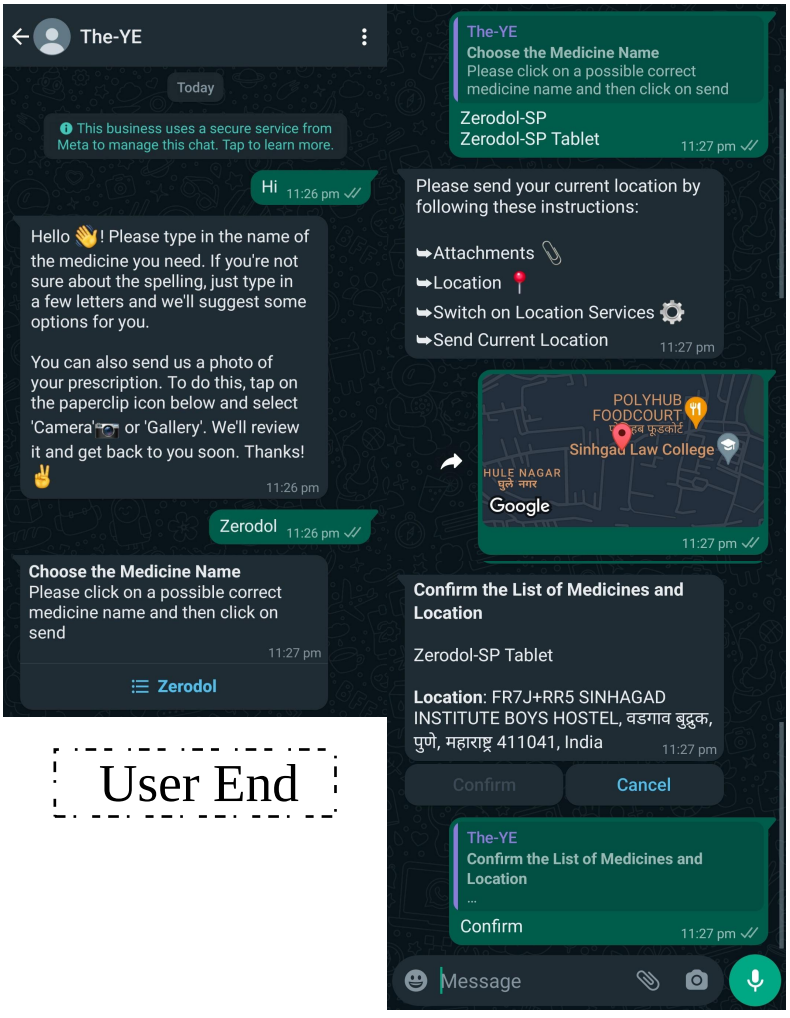
medicine.This functionality is handled by the Text Message handler.

4. Within the Node.js server, we have stored user models and drugstore models that contain relevant information about the respective agents. The user models store information such as user ID, location, and contact details, while the drugstore models store information such as store name, location. This flow of data is controlled by a webhook controller.
5. After the Interactive Message Handler confirms the order specifications. If the user gives a prescription image then the Image Handler confirms the order specification and then all the drug stores in the vicinity receive the order. The Location Handler deals with the location of the user . The user could opt for home delivery and the user's location would be sent to the drug store. Meanwhile if the user intends to go to the shop , then the user would be given location details of the store .

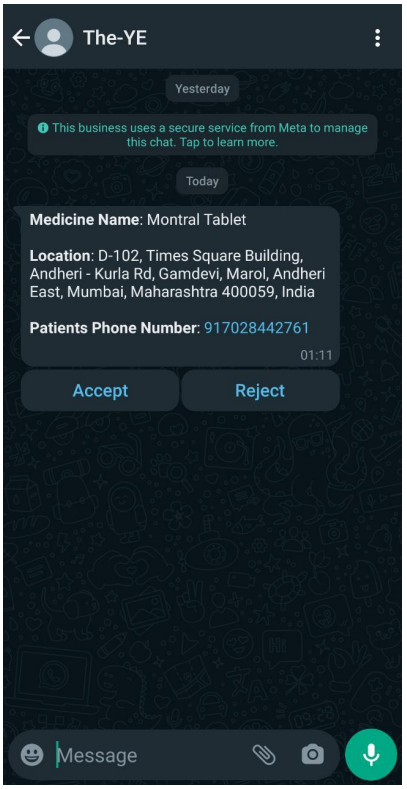
Chapter 4

Results and Discussion

The development of a WhatsApp bot as a platform for aggregating local drugstores and selling medicines has been successful. The bot provides a user-friendly interface for customers to search for medicines, view the nearest drugstores with the required medicines available for sale, and place orders. The solution has been tested with a sample of users, and feedback has been positive, with users appreciating the convenience and accessibility of the platform. The bot has also shown to be effective in providing customers with quick access to the medicines they require, without the need to wander around shop to shop. The solution has the potential to enhance healthcare accessibility and provide a better way for customers to purchase their prescribed medicines.



User End



Store End

Chapter 5
Conclusion and Future Scope

In conclusion, the use of a WhatsApp bot as a platform for aggregating local drugstores and selling medicines is a feasible and effective solution for enhancing healthcare accessibility. The solution provides a user-friendly interface for customers to purchase their medicines, with the added convenience of being able to find the nearest drugstore with the required medicines available for sale. The solution has the potential to address the limitations of existing medicine delivery apps and provide a better way for customers to purchase their prescribed medicines. Further research can be conducted to evaluate the scalability and impact of the solution and to identify potential areas for improvement. Overall, the development of a WhatsApp bot for selling medicines is a significant step towards providing accessible and convenient healthcare solutions.

The proposed solution of using a WhatsApp bot as a platform for aggregating local drugstores and selling medicines has significant potential for future enhancements and scalability. Some of the potential future scopes for this project are:

1. **Integration of third-party delivery aggregators:** Currently, the WhatsApp bot provides customers with information on the nearest drugstores with the required medicines available for sale. However, the solution can be enhanced by integrating with third-party delivery aggregators to provide customers with the option to have their medicines delivered to their doorstep.

2. **Subscription models for local stores:** The solution can be further enhanced by providing local drugstores with the option to subscribe to the platform, allowing them to list their medicines and services on the bot. This can provide an additional revenue stream for the platform while also providing customers with more options for purchasing their prescribed medicines.

3. **Expansion to other healthcare products and services:** The solution can be expanded to include other healthcare products and services, such as medical equipment and consultation services. This can provide customers with a comprehensive healthcare platform, with easy access to a range of healthcare products and services.

4. **Integration with electronic health records (EHR)**: The solution can be integrated with EHRs to provide customers with a more personalized and seamless experience. This can include features such as automatic prescription refills and reminders for medication schedules.

Overall, the future scope for this project is significant, with potential for expansion and scalability in the healthcare sector. With the continued growth of digital healthcare solutions, the use of a WhatsApp bot as a platform for aggregating local drugstores and selling medicines has the potential to revolutionize the way customers purchase their prescribed medicines, providing accessible and convenient healthcare solutions.

References

[1] Adamopoulou, E., & Moussiades, L. (2020a). An Overview of Chatbot Technology. IFIP Advances in Information and Communication Technology. https://doi.org/10.1007/978-3-030-49186-4_31

[2] Rahman, A. M., Mamun, A. A., & Islam, A. (2017). Programming challenges of chatbot: Current and future prospective. 2017 IEEE Region 10 Humanitarian Technology Conference (R10-HTC). https://doi.org/10.1109/r10-htc.2017.8288910.

[3] Sarkar, D. (2016). Text Analytics with Python: A Practical Real-World Approach to Gaining Actionable Insights from your Data (1st ed.). Apress.

[4] Stöckl, A. (2017). Classification of chatbot inputs. En ligne https://www. researchgate. net/profile/Andreas_Stoeckl2/publication/318661551_Classification_of_Chatbot_Inputs/links/597642e8a6fdcc8348aa52e4/Classification-of-Chatbot-Inputs. pdf.

[5] Korde, V. (2012). Text Classification and Classifiers:A Survey. International Journal of Artificial Intelligence & Applications, 3(2), 85 – 99. https://doi.org/10.5121/ijaia.2012.3208

[6] Saadah, M. N., Atmagi, R. W., Rahayu, D. S., & Arifin, A. Z. (2013). SISTEM TEMU KEMBALI DOKUMEN TEKS DENGAN PEMBOBOTAN TF-IDF DAN LCS. JUTI: Jurnal Ilmiah Teknologi Informasi, 11(1), 19. https://doi.org/10.12962/j24068535.v11i1.a16

[7] Al-Shibli, A., Al-Jaradi, S. (2017). Electronic pharmacy system (EPS): Case study in Oman. International Journal of Computation and Applied Sciences, 3(3): 284-291.

[8] Kumar, S., Bano, S. (2017). Comparison and analysis of health care delivery systems: Pakistan versus Bangladesh. Journal of Hospital & Medical Management, 3: 1-7. https://doi.org/10.4172/2471-9781.100020

[9] Fung, K.W., Kayaalp, M., Callaghan, F., McDonald, C.J. (2013). Comparison of electronic pharmacy prescription records with manually collected medication histories in an emergency department. Annals of Emergency Medicine, 62(3): 205-211. https://doi.org/10.1016/j.annemergmed.2013.04.014

[10] Yousif, J.H., Alattar, N.N. (2017). Cloud management system based air quality. International Journal of Computation and Applied Sciences, 3(1): 145-152.

[11] Link to wiki page of Bitap algorithm : https://en.wikipedia.org/wiki/Bitap_algorithm