



# **An Undergraduate Internship on The Automation of Conversations through Digital Channels to Improve Customer Service**

By

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Science in Computer Science

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# Attestation

This is to certify that the report is completed by me, Sabbir Hossain Abed (1631190), submitted in partial fulfillment of the requirement for the Degree of Computer Science and Engineering from Independent University, Bangladesh (IUB). It has been completed under the guidance of Md. Asif Bin Khaled. I also certify that all my work is genuine which I have learned during my Internship. All the sources of information used in this project and report has been duly acknowledged in it.

Sabbir Hossain Abed

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Signature

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Date

Sabbir Hossain Abed

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Name

# Acknowledgement

I would like to firstly thank my parents for their unconditional love and support. Without their help, I would not have been able to become the person I am today. They have taught me the valuable lesson of humility, hard work, and above all, to be kind to others.

I would like to thank my honourable faculty and supervisor, Md. Asif Bin Khaled, Lecturer, Department of Computer Science and Engineering, Independent University of Bangladesh, for his guidance, patience, time and effort, during the period of my Internship.

I would also like to express my gratitude to Shuvo Rahman, CEO of Alice Labs, for giving me the opportunity to complete my Internship, under his company. The team at Alice Labs have helped me grow significantly as a software engineer, and has guided me at every step of the way during my 3 months of Internship. The experience I have gathered during this time will surely help me in the next phase of my life.

# Letter of Transmittal

April 15, 2021

Md. Asif Bin Khaled

Lecturer

Department of Computer Science and Engineering

Independent University, Bangladesh.

Subject: Internship Report Submission Spring, 2021.

With due honor and respect, I, Sabbir Hossain Abed, from Spring 2021, Section 10, would like to submit my Internship report. This report is written to kindly inform you that I have completed my internship program and its report. My internship started from 1st February, 2021, to date. I completed my internship at Alice Labs Pte. Ltd.

This report is based on my work at Alice Labs, during the period of my internship. The goal of my internship was to gain experience of what it is like to work under a company. During my time at Alice Labs, I was able to gather technical knowledge on how Alice operates, the structure of the company, and how the day-to-day operations are carried out. Regarding the field of my work, I was able to translate my skills of my undergraduate program at Independent University, Bangladesh, and grow as a computer science engineer.

Alice Labs comprises of a team of passionate tech enthusiasts, that work hard to make a positive impact in the world of technologies. software craftsmen who learn, collaborate, and innovate together. The team has supported me through out the period of my internship, and has provided me with the guidance I needed to develop my skills. I hope that this report fulfills all the requirements, and is up to your expectations.

Sincerely,

Sabbir Hossain Abed, 1631190

# Evaluation Committee

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# Abstract

A recent study suggests 75 percent of people leave a digital shop, if they do not get a reply within 5 minutes. The short attention span requires e-commerce businesses to cater to the customers need quickly.

The rise of e-commerce through social media platforms, has been realized in recent years. Customers interact through various channels, such as Facebook and Instagram. A single business often have pages on these various channels, that are used to interact with people. The difficulty lies in managing customer queries, as the multiple channels cannot be accessed from a single location. Businesses will be able connect all their channels through Alice.

The growth of a business leads to the problem of providing quality customer support, due to the growth of the customer base. Customer queries are often poorly dealt with, resulting in a disappointing experience. Businesses lose a potential paying customer, and often left with a bad reputation. Alice uses conversational AI to automate common customer queries to provide instant replies, that are friendly and informative.

Alice Labs is a startup company that delivers software as a service, for businesses. Alice provides a customer support platform for businesses, that are looking for an intuitive way to communicate with their customers. The goal of Alice, is to make customer support convenient, affordable for businesses, and a pleasant experience for both parties.

**Keywords**— customer, support, care, SaaS, service, platform, automation, e-commerce, API, integration, social, media, messaging, channel, omni-channel, chatbot, instant, connect, facebook, whatsapp, viber, instagram

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# Chapter 1

## Introduction

### 1.1 Overview/Background of the Work

The rapid growth of the E-commerce market has spurred the need for an intuitive way to manage customer queries. Although more and more companies are adopting to the online marketplace, they are faced with the challenges that bring with it as well. Customer support has always been a cornerstone for any business looking to improve their quality of service. The growth of an organization brings about the challenge of managing a larger audience base, that could potentially be a paying customer.

Alice provides a platform that bridges the gap between the customers and the organization, by making conversation seamless for both parties. The platform allows the integration of multiple online channels to be connected from a single location, enriching the connection to their audience base through Alice. Among other services, Alice provides the integration of chatbots to automate conversations, to frequently asked questions, making replies instantaneous. The chatbot is not restricted to conversations, it can handle multiple types of user requests.

Affiliations:

1. Misfit Technologies.
2. iFarmer.

### 1.2 Objectives

The objective of my internship at Alice is to work closely with the development team. Understand how the team operates to manage different components and projects. I will be working on the different projects the company is currently working on. These projects include other organizations that want to integrate services of Alice with their online platforms. I am required to test and code for the APIs that links the Alice platform, with the clients server. The goal is to help our clients integrate Alice seamlessly with their platform, making sure we meet their requirements. Any issues that may arise in the future after integration, will also be assessed by the project team.

Currently I have been working closely with the project team on Glow And Lovely Careers(GALC), working on API integration with the services of Alice and the GAL servers.

## 1.3 **Scopes**

Features that will be available to Glow and Lovely Careers (GALC), after integration with Alice:

1. Alice chatbot integration with facebook messenger.
2. Automation of common sequential conversations.
3. Language support for both Bangla and English.
4. User will be able to create a GALC account through the chatbot.
5. User can choose to create an account through email or phone number.
6. User will be able to reset GALC account's password through messenger.
7. User will be able to see the GALC templates (if user is logged in)on messenger, and can be redirected to that page.
8. GALC will be able to use the Alice platform to communicate with their audience.
9. GALC will be able to inspect their audience activities of facebook through the Alice platform.
10. GALC will be able to use Alice's builder to create their own conversational flow for facebook messenger.

# Chapter 2

## Literature Review

### 2.1 Relationship with Undergraduate Studies

The undergraduate program at Independent University of Bangladesh (IUB) has moved me closer to my ambition, of being a computer science engineer. The courses helped me understand the fundamental concepts of computer science. Working with the faculties and classmates on projects has given me an idea of what its like to work on a team, with a given deadline.

#### 2.1.1 Courses Directly Related to Work

1. **CSE203, Data Structure:** Fundamentals of different types of data, how they are structured and manipulated.
2. **CSE213, Object Oriented Programming:** The concepts of OOP has been vital to my work at Alice. It taught me how to read, write and use modular programs to structure the codebase.
3. **CSE211, Algorithms:** Concepts of complexity and how to write efficient algorithms, which helps to understand and write clean code.
4. **CSE303, Database Management:** Concepts and implementation of database schemas and CRUD operations. Working on projects at Alice, requires constant access and manipulation of data.
5. **CSE309, Web Application and Internet:** Concepts of how the internet works, practicing HTML, CSS, Javascript, Node.js. Learning about REST API, how to use Git commands and Github has helped with my work at Alice. Since Alice is a Client-Server architectural system, this course particularly has been very helpful.

## 2.2 Related Works

### 2.2.1 Background

Alice is closely related Misfit Technologies. In fact, Alice has originated from Misfit, and later became a separate organization. The Founder of Alice, Shuvo Rahman, is a part of Misfit Technology, and had seen the potential for Alice to grow as a separate entity. Misfit also works on projects for other organization, and some of them uses Alice's chatbot.

Alice is also closely linked to iFarmer, an online crowd-farming and financial service platform, connecting farmers to investors. iFarmer uses Alice to communicate with potential investors, offering investments they might be interested in, among other things.

### 2.2.2 Use of Chatbots

Chatbots are not a new concept that has emerged. It has been used to provide services to businesses by other organizations, such as Alice. The market for chatbots in North America and Europe are fairly saturated. Many companies provide businesses their services, as a result, the countries in these continents are not looking elsewhere.

In Asia, there is more of a demand for a company such as Alice. More specifically, in South East Asia, businesses are more open to Alice's services. Developing a service such as Alice in this part of the world is more cost effective, compared to more developed parts of the world. There is also no lack of talented individuals, that are keen to work on a project like Alice.

# Chapter 3

## Project Management & Financing

### 3.1 Work Breakdown Structure

The WBS is a structure that allows the team to visualize all the important steps needed to executed. Each individual sections are broken down into smaller sub-sections, giving an estimation of the responsibilities, scope of the project, points of communication and risks involved. This is the WBS for our team working on the GALC project. The diagram breaks down important steps, starting from managing the project, integrating the services of Alice, and finally deploying the product.



Figure 3.1: Work Breakdown Structure

## 3.2 Process/Activity wise Time Distribution

Time Allocation for each of the major sections of the GALC project. The life cycle of the project is 3 months, and work has been distributed accordingly. Majority of the time has been allocated to coding the APIs for the project.

| Task               | Days | Percentage |
|--------------------|------|------------|
| Project Management | 5    | 5          |
| System Analysis    | 5    | 5          |
| Design             | 13   | 15         |
| Coding             | 45   | 50         |
| Testing            | 13   | 15         |
| Deployment         | 9    | 10         |
| Total              | 90   | 100        |

Table 3.1: Activity Diagram

## 3.3 Gantt Chart

The following Gant Chart has been followed for the GALC project. The chart was created according to the developers, and estimated time required for individual task completion.

The organization also uses a software called Jira to keep track of workflow.

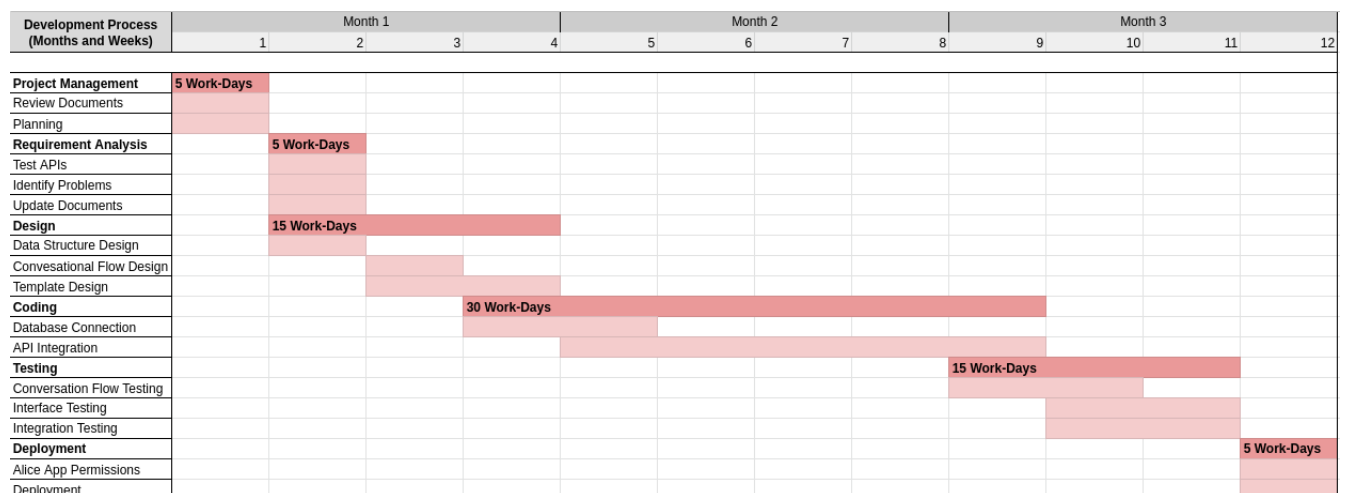


Figure 3.2: Gantt Chart

## 3.4 Estimated Costing

The financial information of Alice is highly confidential. Most employees do not require to know the transactions that take place with clients. Since Alice is a growing startup company, it is receiving funds from investors.

The financial costs for Alice include:

1. Monthly wages of the staff.
2. Monthly cost of the live server and websites.
3. Cost of resources for individual projects.
4. Marketing cost.

Alice provides 3 different packages for clients, excluding a 14 day free trial.

| Service Type | Monthly Fee (USD) | Monthly Active Users |
|--------------|-------------------|----------------------|
| Startup      | \$50              | 500                  |
| Business     | \$300             | 5000                 |
| Enterprise   | Custom Package    | Unlimited            |

Table 3.2: Alice Pricing

# Chapter 4

## Methodology

### 4.0.1 API Integration

Social media platforms allow for API integration to automate messages. Platforms such as facebook, instagram, whatsapp and viber are all supported channels of Alice. Furthurmore, Alice provides services to websites, for clients looking to integrate Alice directly to their domain.

### 4.0.2 Bot Builder

The bot builder service of Alice, allows for the creation of sequences. Sequences are dedicated conversational flows for a specific use case. Each sequence can have multiple "Blocks". Blocks are individual actions for the chatbot to execute. The major block types include:

1. **Input Block:** It is used to take an input from the user. It can ask for a specific format of input, with an error counter.
2. **Text Block:** Reply to the user using regular text.
3. **Gallery Block:** It is used to render pictures in the chatbot. It also allows for buttons for the user to be redirected to a URL or a different sequence.
4. **Delay Block:** It is a pop up in the chatbot that allows the user to understand, that a reply is being generated. It is the same pop up that is shown when a user is typing a reply on the other end.
5. **Button Block:** Buttons are used to redirect the user to a different sequence.
6. **Redirect Block:** This block is also used to redirect the user to a different sequence, but it supports conditional statements. The user can be redirected, if the preset attributes match.

Replies that are not recognized by the chatbot, triggers the default sequence. The default sequence then triggers a special block, called the ticket block. This block assigns the conversation a ticket, which saves the conversation in the inbox of Alice App. Through the app, a human can then interact with the user directly, for the conversations the chatbot is unable to understand.



# Chapter 5

## Body of the Project

### 5.1 Work Description

Alice is a company that is focused on providing software as a service (SaaS). Companies that are looking for an intuitive way to communicate with their customer through the digital media platforms, can benefit from using the services of Alice.

The tech team is separated in two, one team working on the product, and the other on projects. The product team is dedicated to maintain and enhance the Alice product, bringing in new features and updating the old one's. While the project team is dedicated to handle the different clients that want the services of Alice. The clients often have their own vision on how they want to integrate Alice with their platform.

Currently I am working with the project team, developing and integrating APIs for clients, such as Glow and Lovely Careers (GALC). The codebase for the APIs use FastAPI, which is a web framework based on Python. Alongside coding the APIs, my work includes testing the APIs provided by the client, creating conversational flows and integrating the APIs with the chatbots.

Alice Labs PTE. LTD. is a startup company that is looking to expand globally. Alice has already managed to work with foreign organizations such as Uber, Maybelline, Unilever, Coca-Cola and many more. The product is being used daily to improve customer experience, increase sales and reduce cost for customer support.

## 5.2 System Analysis

### 5.2.1 Six Element Analysis

| Process                            | System Roles |                        |                           |   |  |  |
|------------------------------------|--------------|------------------------|---------------------------|---|--|--|
|                                    | Human        | Non-Computing Hardware | Computing Hardware        | Software  | Database   | Communication  |
| <b>Create Conversational Flows</b> | Admin        | Pen and Paper          | 1. Computer<br>2. Printer | 1. MS Word<br>2. Web Browser<br>3. Alice App<br>4. Facebook   | 1. Personal Hard Drive<br>2. Alice Datalab               | 1. Google Meet<br>2. Slack<br>3. Whatsapp              |
| <b>Assign Tickets</b>              | Admin        | N/A                    | 1. Computer               | 1. Web Browser<br>2. Alice App<br>3. Facebook   | 1. Alice Database  | 1. Google Meet<br>2. Slack<br>3. Whatsapp              |
| <b>Audience Report</b>             | Admin        | N/A                    | 1. Computer               | 1. Web Browser<br>2. Alice App<br>3. Facebook   | 1. Alice Database  | 1. Google Meet<br>2. Slack<br>3. Whatsapp              |
| <b>API Integration</b>             | Admin        | N/A                    | 1. Computer               | 1. Web Browser<br>2. Alice App<br>3. Facebook<br>4. Integrated Development Environment<br>4. GitHub<br>5. Postman | 1. Personal Hard Drive<br>2. Alice Database<br>3. Github | 1. Google Meet<br>2. Slack<br>3. Whatsapp<br>4. Github |
| <b>GALC Registration</b>           | User         | N/A                    | 1. Computer               | 1. MS Word<br>2. Web Browser<br>3. Alice App<br>4. Facebook   | 1. GALC Database<br>2. Alice Database                    | 1. Facebook Messenger                                  |
| <b>View Templates</b>              | User         | N/A                    | 1. Computer               | 1. MS Word<br>2. Web Browser<br>3. Alice App<br>4. Facebook   | 1. Alice Database  | 1. Facebook Messenger                                  |

Figure 5.1: Six Element

### 5.2.2 Feasibility Analysis

The feasibility of the work at Alice mostly depend on the requirements of the clients. The requirements that require API integration with the client's server, has some restrictions most of the time. Clients do not want to share their information of their customers, present in their database. This means Alice is mostly able to send requests to the client's server to check if the data matches with the data present in their database, and get a response accordingly.

From the product side, Alice App also has some restrictions. Alice supports multiple channels to be connected for the clients to manage from one location. The conversations appear in the inbox of Alice App, for a human to respond if necessary. Omni channel support brings the need for a user to be recognized, in the case of, when a user switches to a different channel. This creates a barrier, as the user is required to provide multiple inputs all over again, for Alice to recognize that its the same user.

### 5.2.3 Problem Solution Analysis

Clients do not allow Alice to access to their database for security reasons. Alice can send requests to the clients server, and get a response accordingly. Thus the users interacting with the chatbot, needs to provide their credentials, and those credentials are sent in request body, to the clients server to be checked. Depending on the response, Alice saves it to a dedicated attribute (for example: if a user provides the correct login credentials, Alice saves it to a variable `successfulLogin=True`).

Merging conversations of a single user, interacting through different channels of a client is a challenge. Since there is no common attribute, the user needs to provide a identifier, that is common for all channels. For example, a mobile number can be used to identify the same user, provided that the mobile number is verified. This allows the user to pick up the conversation where they left of, without needing to start the conversation all over again. Clients are also able to identify the user, communicating in through different channels, as Alice can merge these conversation in its inbox.

### 5.2.4 Effect and Constraints Analysis

Working during a global pandemic brings in several challenges that the team is needing to deal with. The major challenge has been communication with the team members. The communication and availability of team members at the workplace is more effective, than working remotely from home.

One of Alice's client, Glow and Lovely Careers (GALC), required us to complete the tasks within certain deadlines. Working remotely has made it harder for developers to work effectively and meet these deadlines. The constraints require the chatbot to be live within 3 months, which has proven to be a challenging task. GALC has made several revisions on the requirements from the chatbot that the team had to incorporate. Although these revisions were accounted for when planning and scheduling, the challenges of working remotely from home has made it harder for developers to work together.

## 5.3 System Design

### 5.3.1 Rich Picture

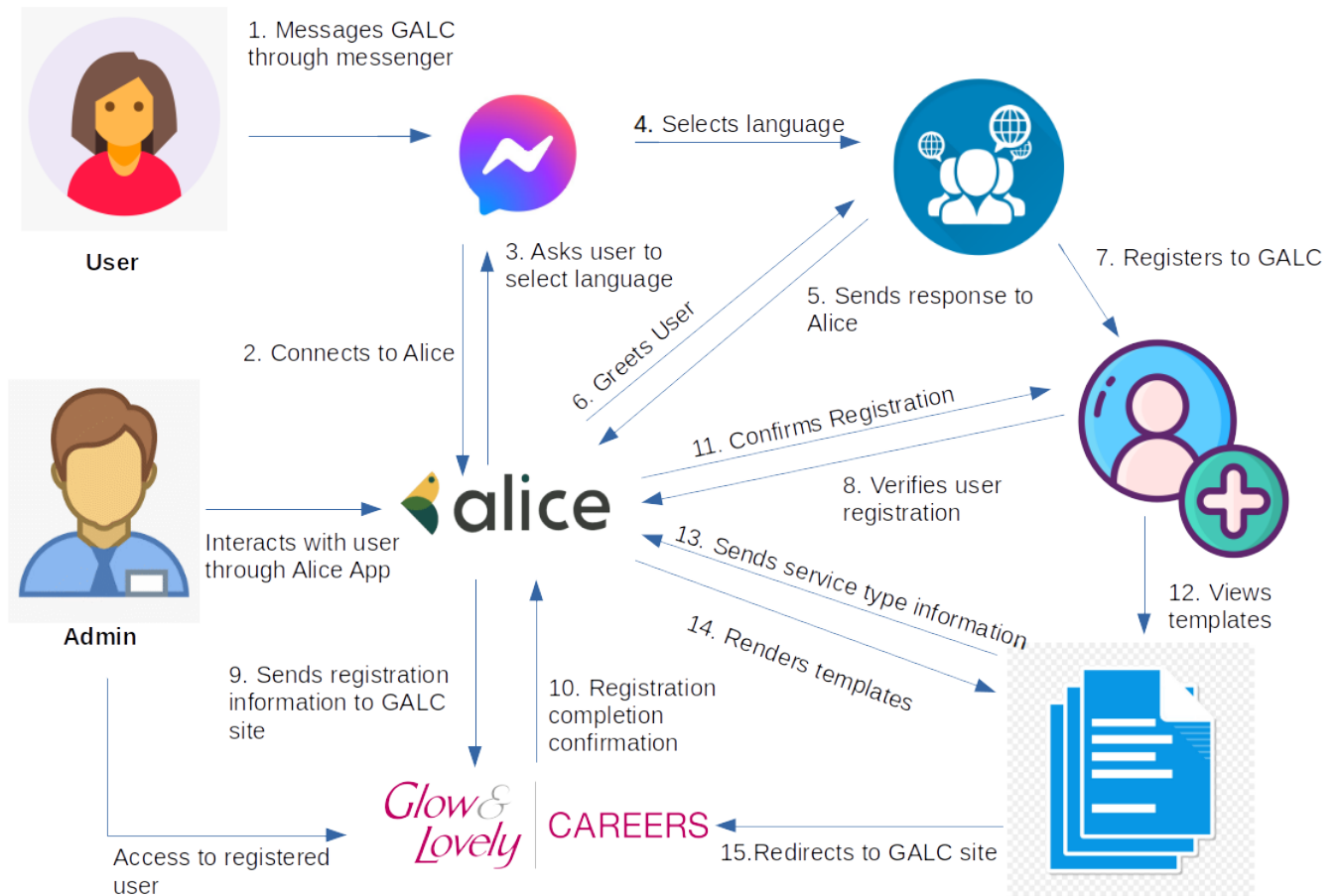


Figure 5.2: Rich Picture

### 5.3.2 UML Diagrams

#### Activity Diagram

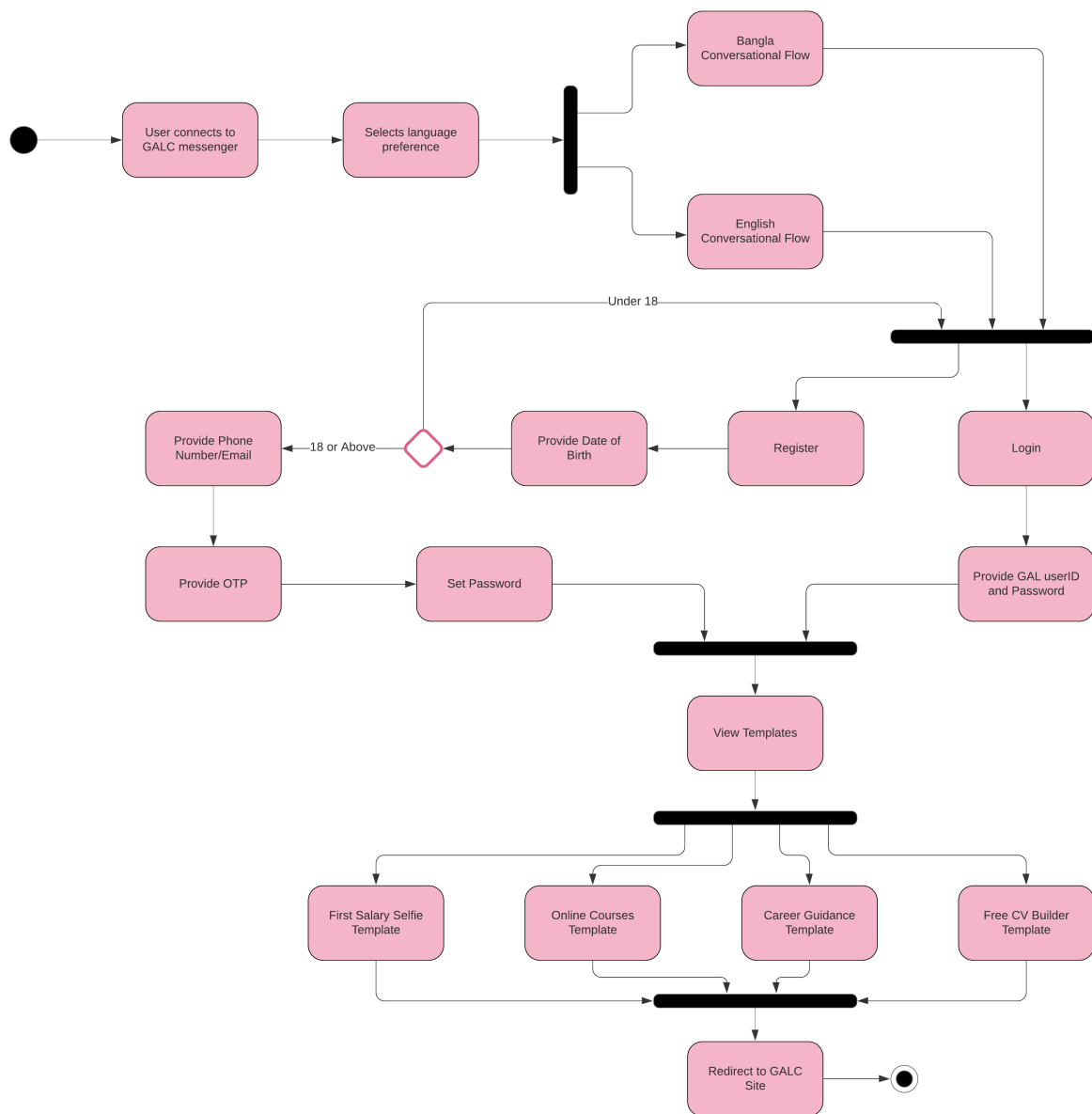


Figure 5.3: GALC User

## Activity Diagram

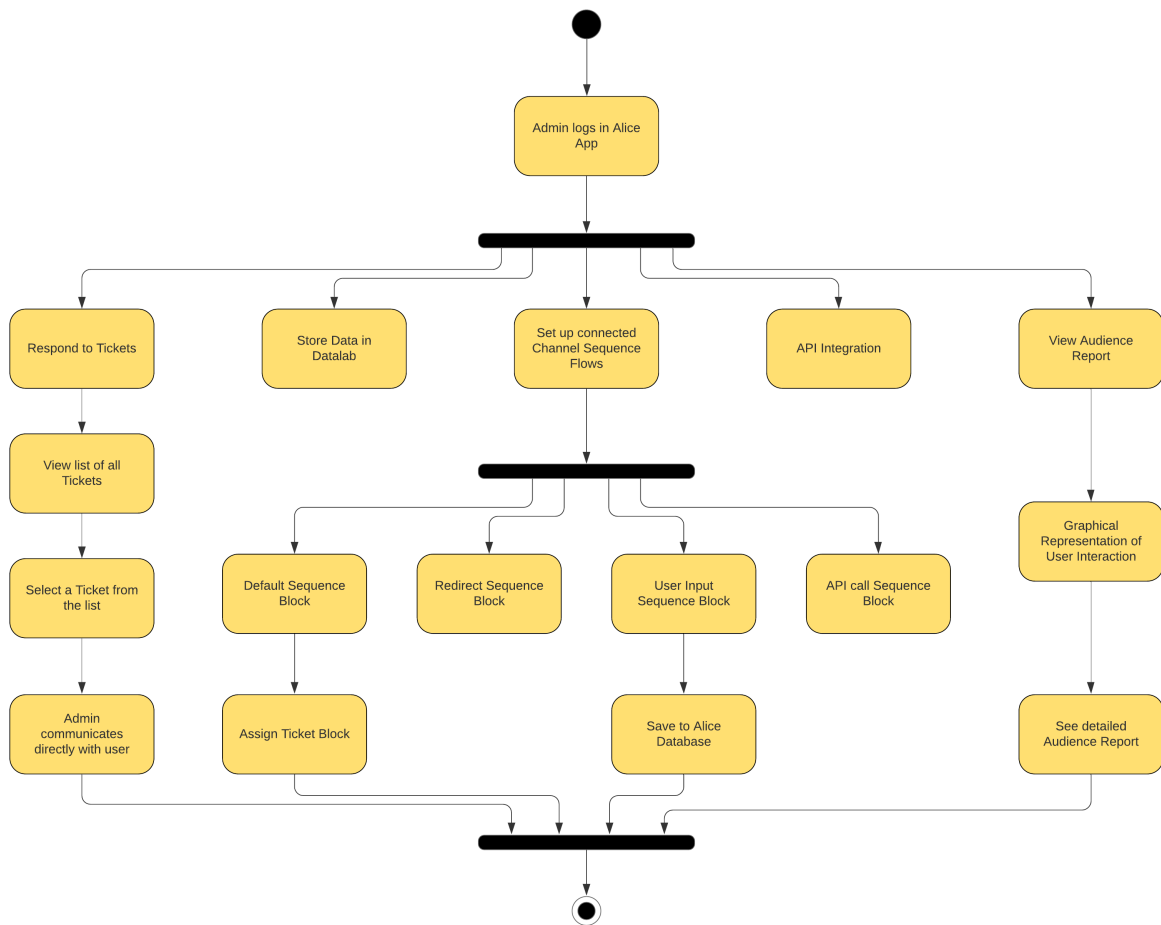


Figure 5.4: GALC Admin

## Flow Chart

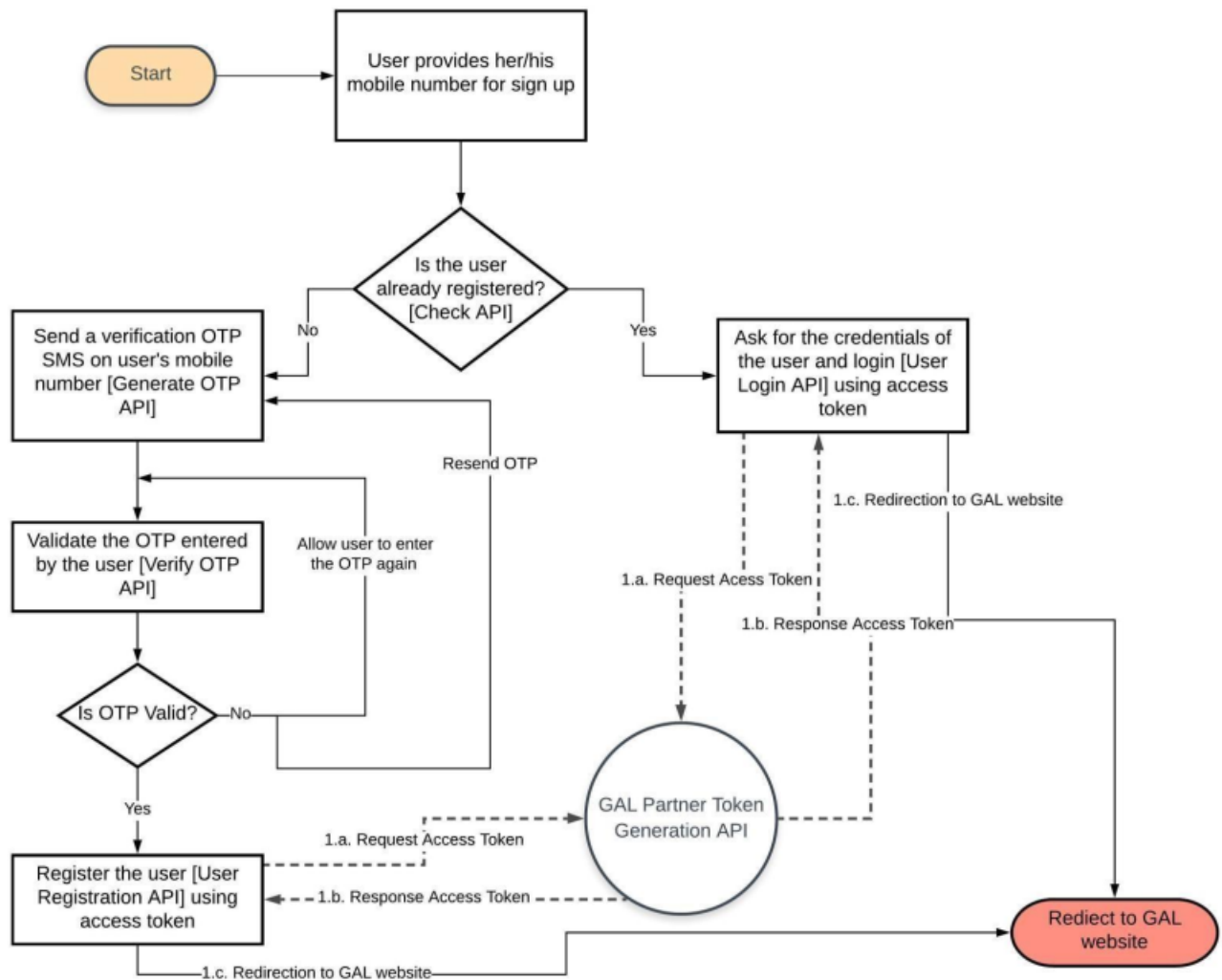


Figure 5.5: GALC User Registration and Login

## Flow Chart

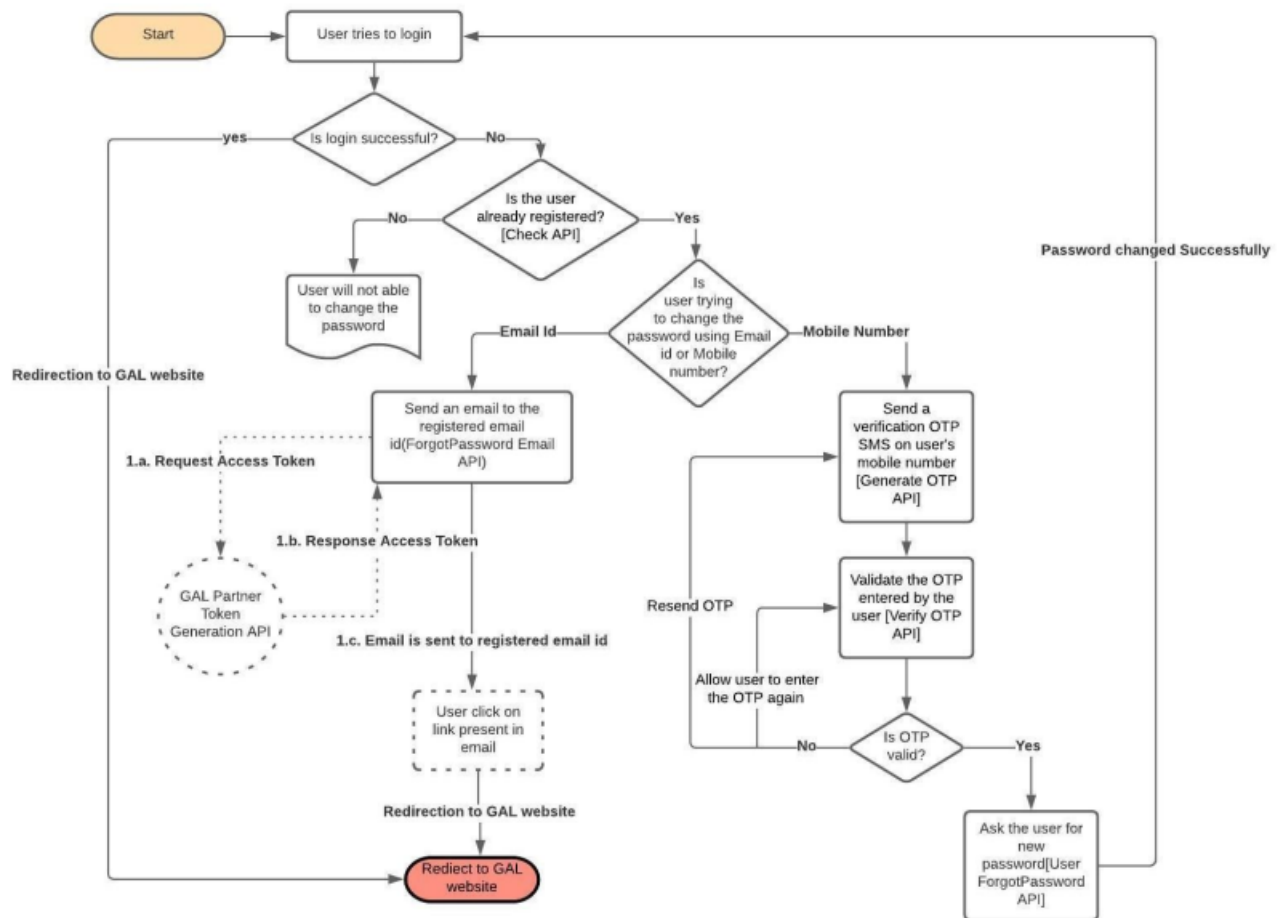


Figure 5.6: GALC Reset Password



### 5.3.3 Functional and Non-Functional Requirements

|  |   |  |
|--|---|--|
| <b>Function: Register User to GALC Site.</b>   |   |  |
| <b>Input:</b> Gender, Date of Birth, Mobile Number/Email, Password.  | <b>Process:</b> Follow the registration flow in GALC messenger. | <b>Output:</b> User is registered to GALC to site with the credentials provided. |
| <b>Precondition:</b> User must be 18 or above. User must provide the OTP provided during the registration process.         |   |  |
| <b>Postcondition:</b> User registration information needs to be saved to Alice App, for other use cases in GALC messenger. |   |  |

Table 5.1: GALC Registration

|   |  |   |
|---|--|---|
| <b>Function: User Login.</b>  |  |   |
| <b>Input:</b> Mobile Number/Email, Password.  | <b>Process:</b> Follow the login flow in GALC messenger. | <b>Output:</b> User is logged in to GALC messenger with the credentials provided. |
| <b>Precondition:</b> User must be registered to GALC Site.                              |  |   |
| <b>Postcondition:</b> Assign a token that logs out the user from GALC messenger 24 hrs. |  |   |

Table 5.2: GALC Login

|   |   |  |
|---|---|--|
| <b>Function: Reset Password.</b>  |   |  |
| <b>Input:</b> Mobile Number/Email.  | <b>Process:</b> Follow the forget password flow in GALC messenger and provide the OTP provided. | <b>Output:</b> User is able to change GALC account password. |
| <b>Precondition:</b> User must be registered to GALC Site. User needs to provide the OTP sent to the mobile number/Email. |   |  |
| <b>Postcondition:</b> The new password is sent to GALC Server.  |   |  |

Table 5.3: GALC Reset Password

|  |  |   |
|--|--|---|
| <b>Function: Redirect Templates.</b>   |  |   |
| <b>Input: Service Type.</b>  | <b>Process: Select a service type or log in to GALC Messenger.</b> | <b>Output: User is able view the rendered template of the desired service type.</b> |
| <b>Precondition: User must be registered to GALC Site. User must be logged in to GALC messenger.</b> |  |   |
| <b>Postcondition: Allow the user to be redirected to GALC Site with a button.</b>                    |  |   |

Table 5.4: GALC Redirect Template

|  |   |   |
|--|---|---|
| <b>Function: Support for Bangla and English Flow.</b>                                    |   |   |
| <b>Input: Language Type (en, bn).</b>  | <b>Process: Select a language type in GALC Messenger.</b> | <b>Output: User is taken to the dedicated sequence flow of conversation of the chosen language.</b> |
| <b>Precondition: N/A.</b>  |   |   |
| <b>Postcondition: Language type needs to be saved to Alice App for future reference.</b> |   |   |

Table 5.5: GALC Language Support

### Non-Functional Requirements

1. **Fast Replies:** The purpose of automation of conversation is for a user to have instant replies. Although conversational flows are preset, API calls can take longer to respond. Enabling asynchronous API calls are essential for the code to run efficiently in the background. Replies that may take longer than usual, needs to be integrated with Alice's Delay Block, which is a pop up in facebook when a message is being typed. This allows the user to understand that a response is coming.
2. **Friendly Replies:** Thoughtful replies are essential for a user to have a pleasant experience with the chatbot. The replies should be friendly as well informative. Clear messages allow the user to understand where the conversation is going, and what reply the chatbot is expecting.
3. **Avoid Conversational Loops:** While creating conversational flows through the Alice App, sequences need to be carefully thought out and put into place. A conversation with the chatbot can take many different paths to the desired outcome. This leads to the risk of conversations being stuck in a loop. This would be an unpleasant experience for the user.
4. **Meaningful Error Messages:** Many scenarios require the user to provide an input. The inputs may require the user to follow a certain format (for example: Date of Birth DD/MM/YYYY). Users not replying in the correct format, can be guided with a meaningful error message, stating what was wrong with the input, and what is being expected.

## 5.4 Product Features

### 5.4.1 Input

#### Dashboard

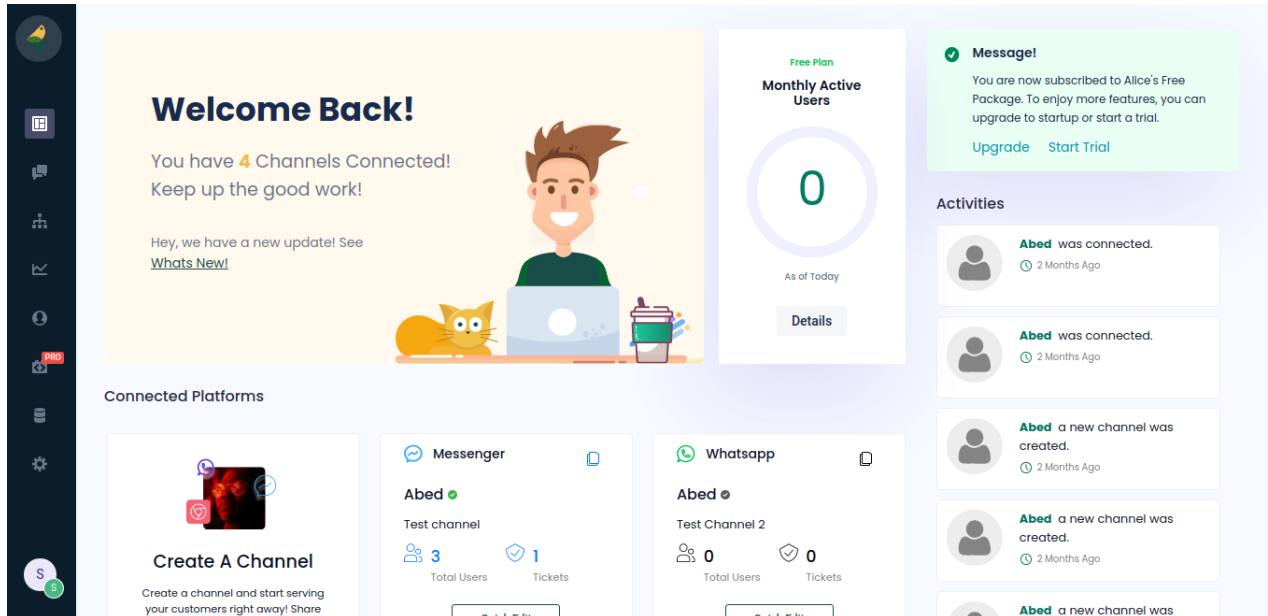


Figure 5.7: Alice Dashboard

#### Bot Builder

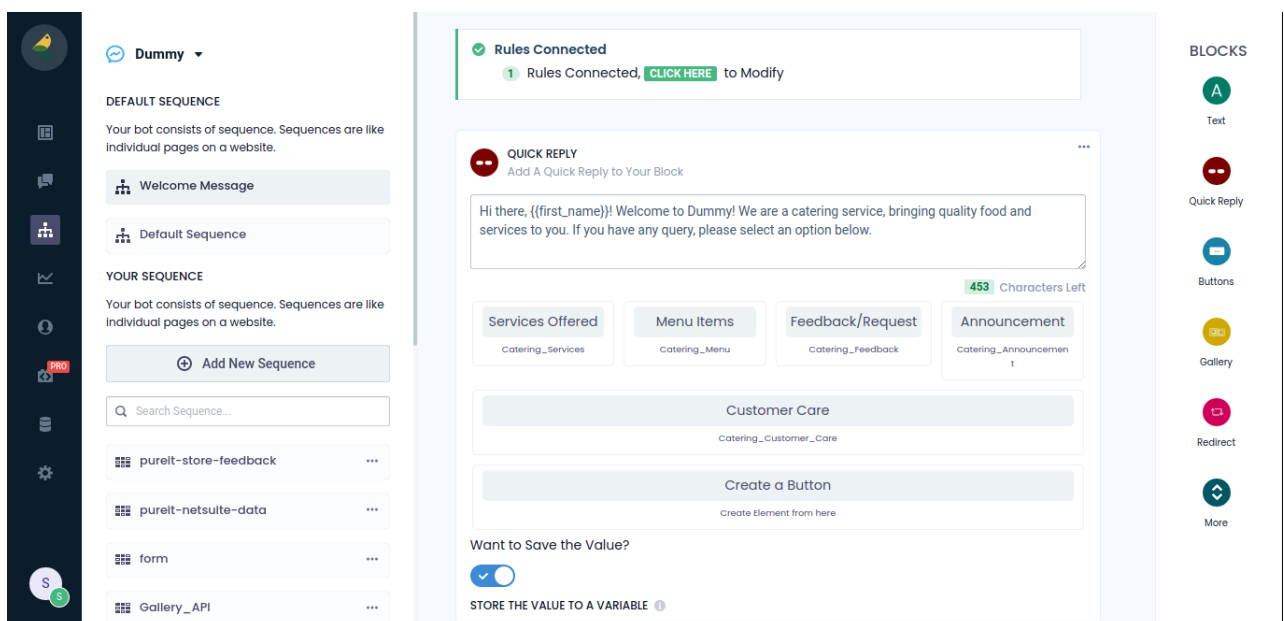


Figure 5.8: Alice Bot Builder

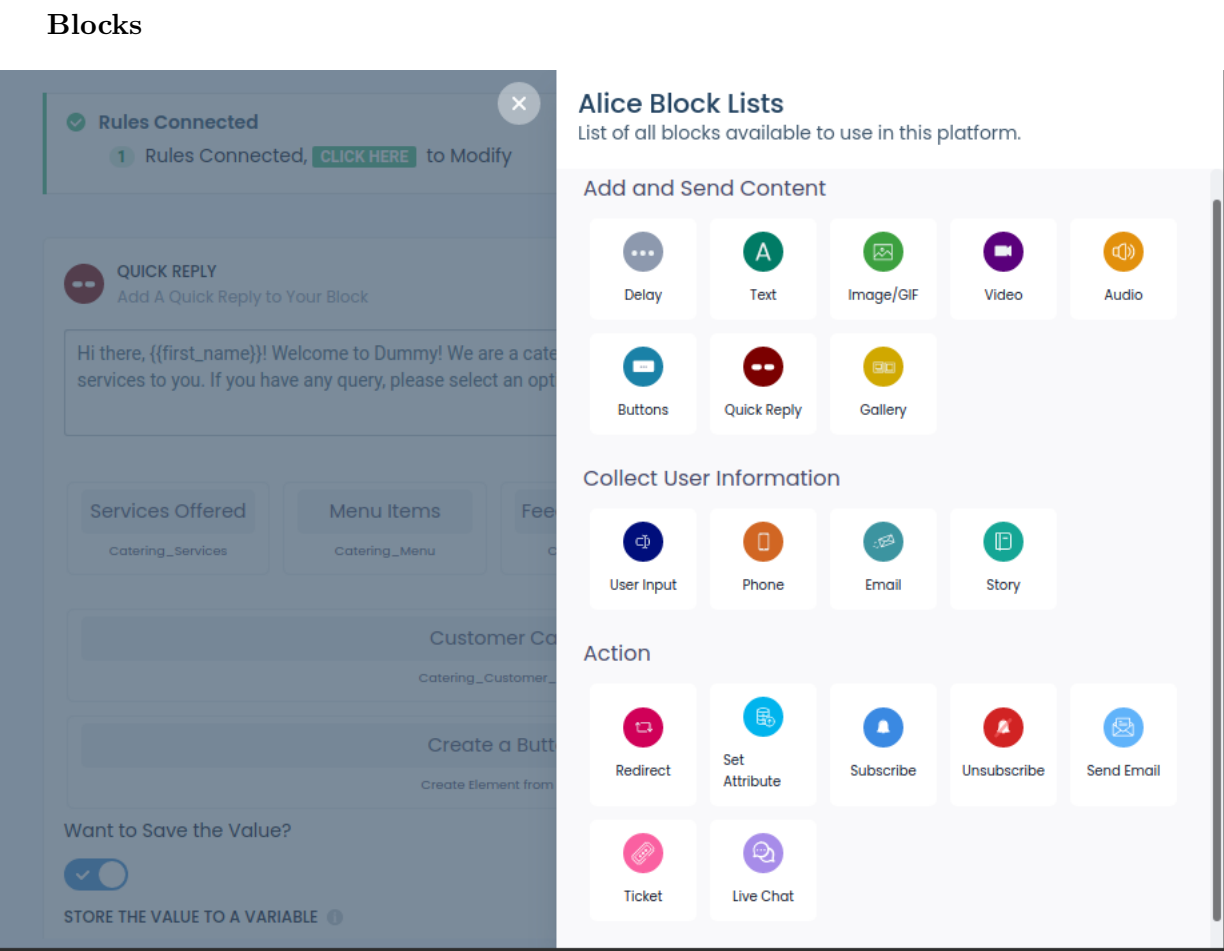


Figure 5.9: Alice Blocks

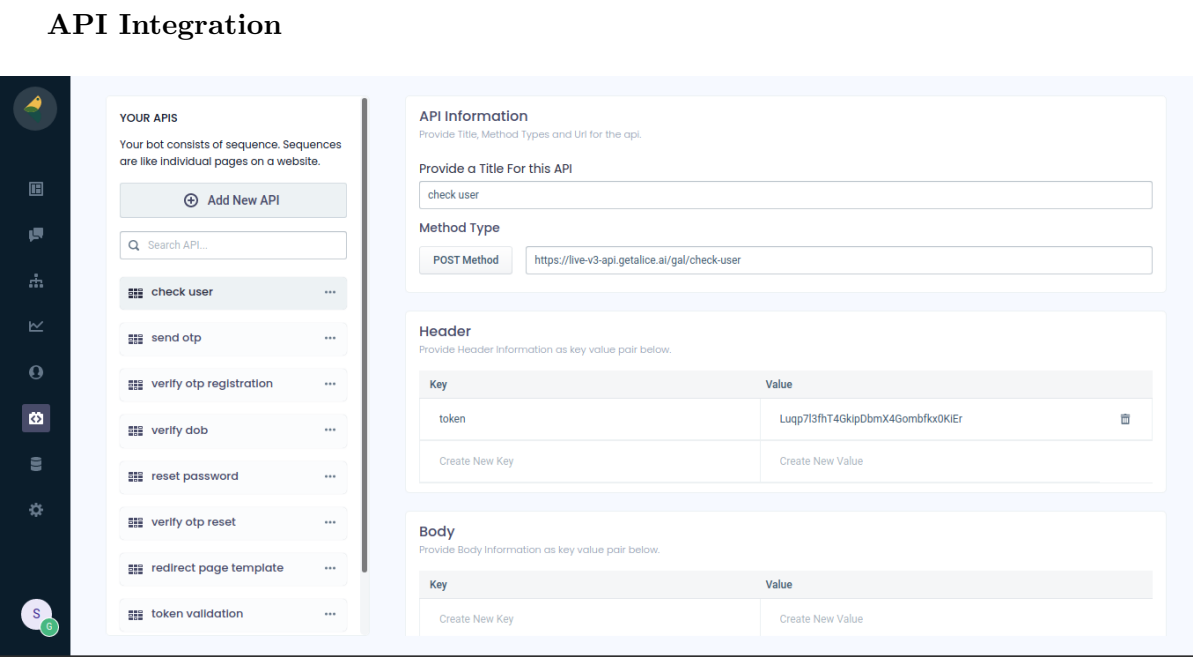


Figure 5.10: Alice API Integration

## 5.4.2 Output

### Alice Inbox

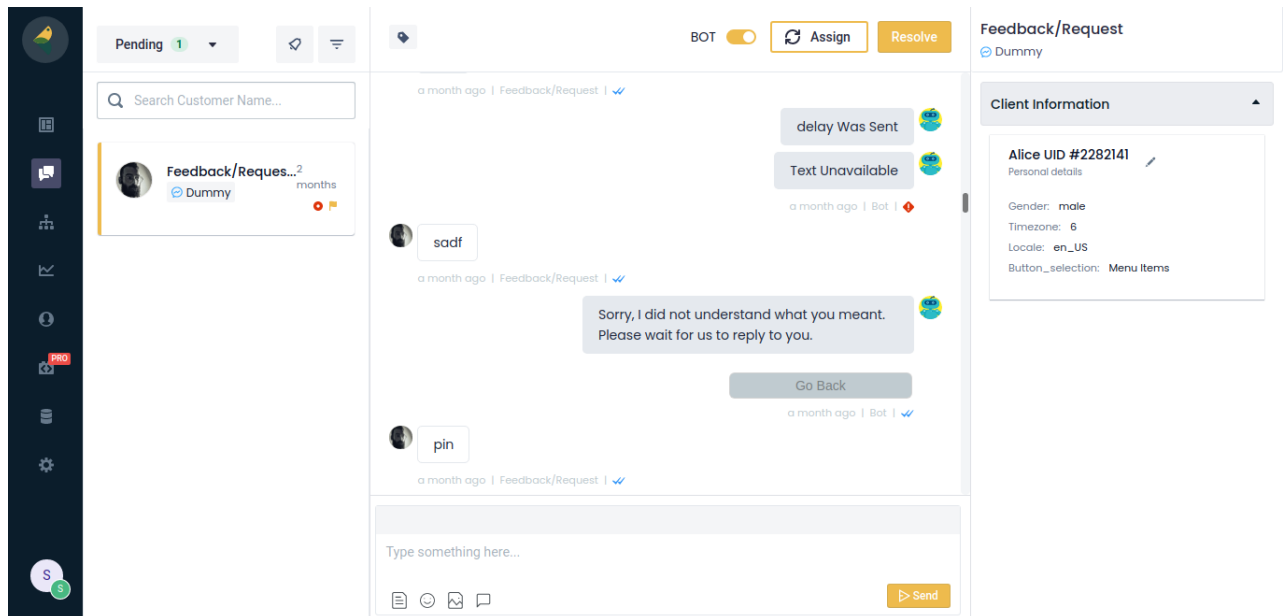


Figure 5.11: Alice Inbox

### Audience Report

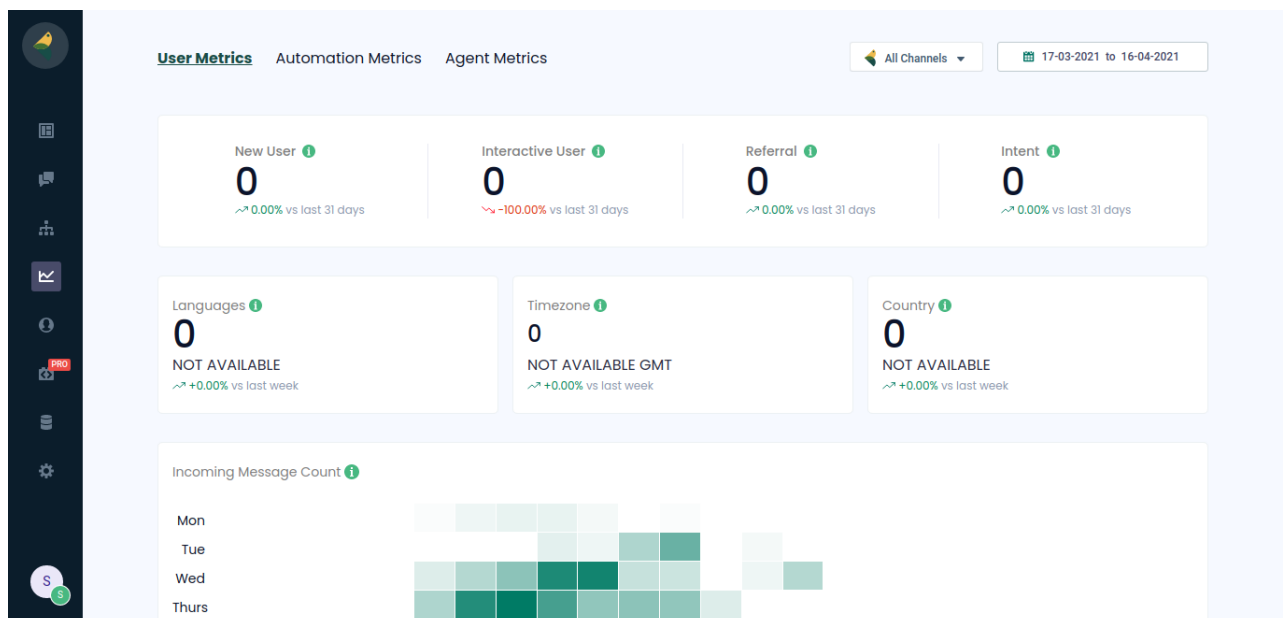
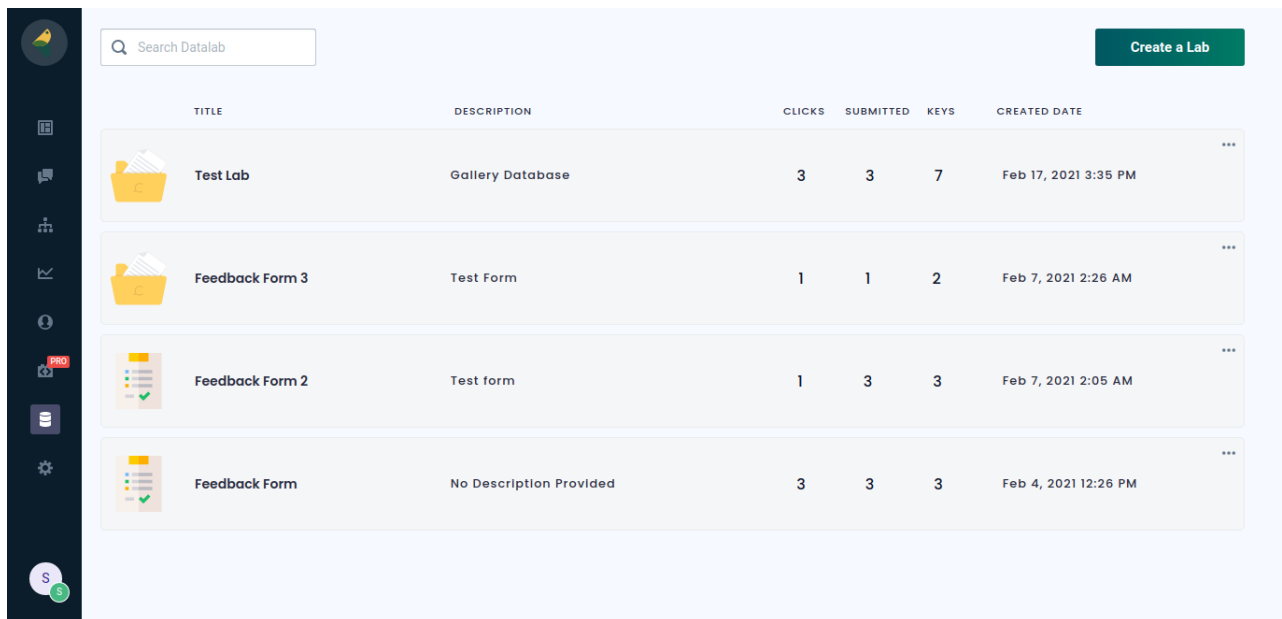


Figure 5.12: Alice Audience Report

## Alice Datalab



The screenshot shows the Alice Datalab interface. On the left is a dark sidebar with various icons. The main area has a light blue header with a search bar labeled 'Search Datalab' and a green 'Create a Lab' button. Below the header is a table with the following columns: TITLE, DESCRIPTION, CLICKS, SUBMITTED, KEYS, and CREATED DATE. The table contains four rows of data, each with a folder icon on the left and a three-dot menu on the right.

| TITLE           | DESCRIPTION             | CLICKS | SUBMITTED | KEYS | CREATED DATE         |
|-----------------|-------------------------|--------|-----------|------|----------------------|
| Test Lab        | Gallery Database        | 3      | 3         | 7    | Feb 17, 2021 3:35 PM |
| Feedback Form 3 | Test Form               | 1      | 1         | 2    | Feb 7, 2021 2:26 AM  |
| Feedback Form 2 | Test form               | 1      | 3         | 3    | Feb 7, 2021 2:05 AM  |
| Feedback Form   | No Description Provided | 3      | 3         | 3    | Feb 4, 2021 12:26 PM |

Figure 5.13: Alice Data Lab

### 5.4.3 Architecture

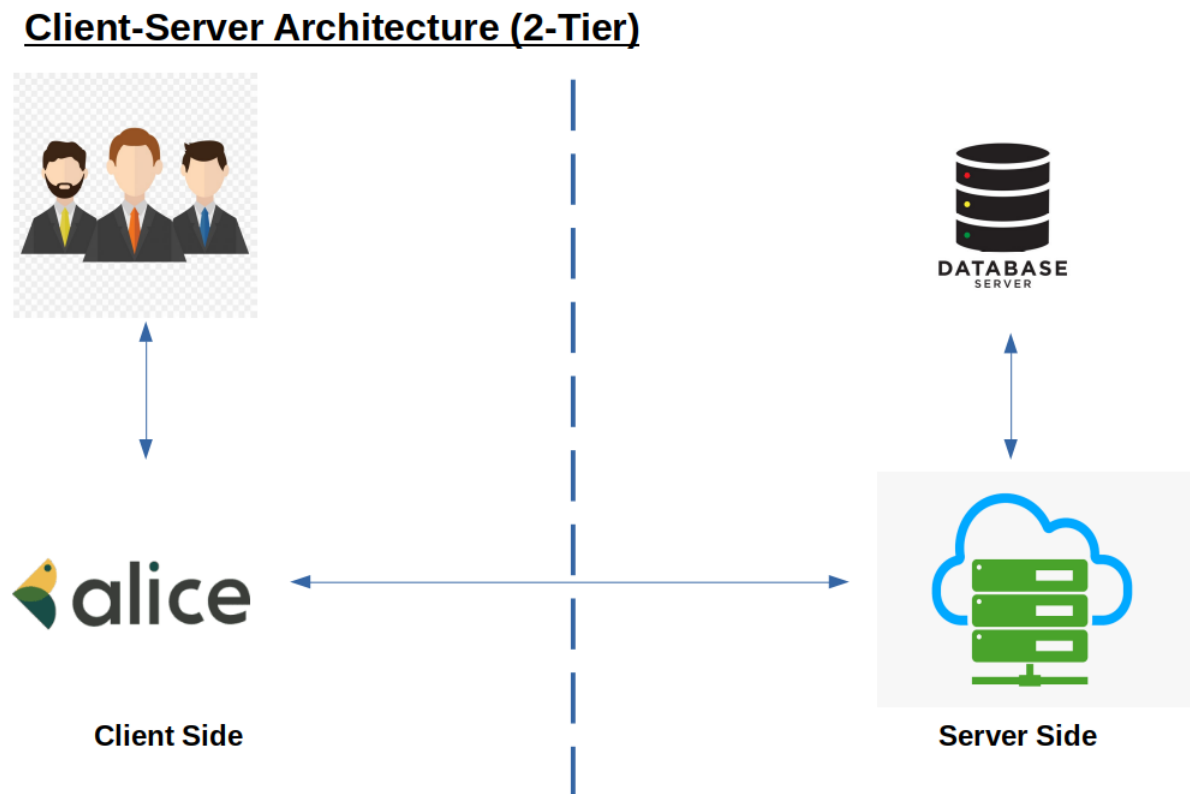


Figure 5.14: Alice Architecture



## Chapter 6

# Results & Analysis

The project that I was mostly working on was with Glow And Lovely Careers (GALC). GALC required Alice to connect to their facebook page, and incorporate Alice's chatbot with facebook messenger. Using Alice's bot builder, we set up conversational flows for users to interact with, both in English and Bangla. This resulted in a quick and intuitive way for users to interact with GALC messenger.

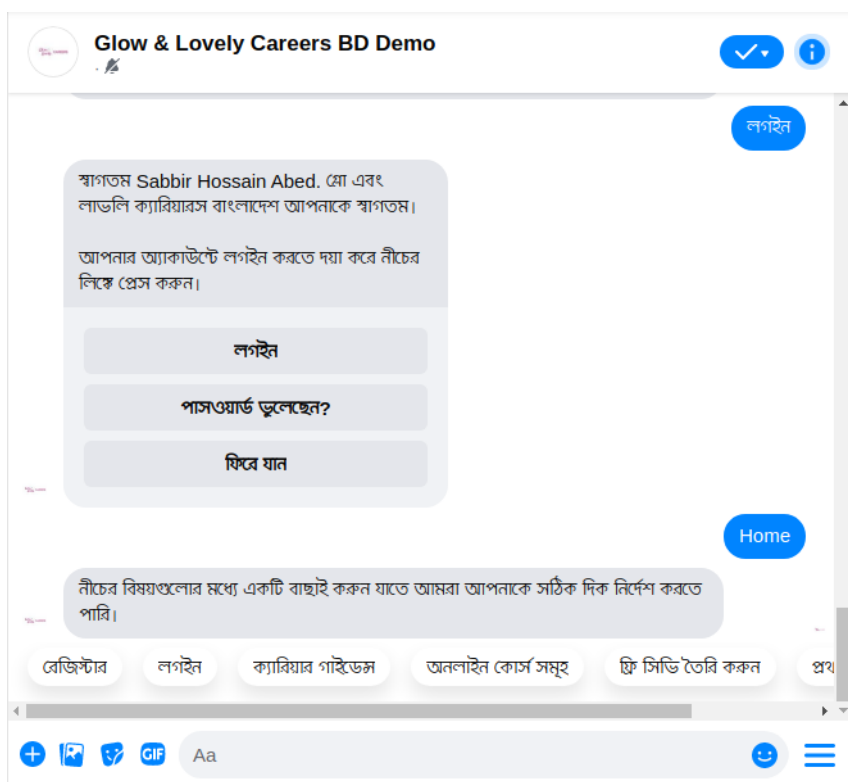


Figure 6.1: GALC Messenger

GALC wanted a quick and easy way for users to register to their website through GALC messenger. This required us to integrate API calls the chatbot with the GALC server, so that we can take user inputs and send it to their server through the request body. The chatbot guides the user through the registration process, making it as seamless as possible.

Alongside registration, users from GALC messenger will be able to login directly through the chatbot, and enquire about the different services GALC provides. Depending on the type of query, Alice's chatbot is able to render information about the different pages from GALC Site.

Users are also able to reset their GALC password directly through GALC messenger, after an otp validation, done through multiple API calls. The user is guided through out the whole process, with meaningful messages, making the experience pleasant for the user.

The default sequence in the bot is set with a ticket block, which is triggered when the chatbot is unable to understand the user. The conversations that trigger the ticket block, saves the conversation to the inbox. This makes it easier for GALC members to take over, and respond directly, for the conversations the chatbot is unable to respond accordingly. It is an intuitive way to manage customer support, as all the conversations assigned a ticket, can be found in one single location.

Currently, the chatbot for GALC is not live yet. The functional requirements are all met. Some of the non-functional requirements are currently being assessed, as the project is still in its testing phase. Alice and GALC are planning to go live with the chatbot within the next week.

# Chapter 7

## Project as Engineering Problem Analysis

### 7.1 Sustainability of the Project/Work

Alice is company provides software as a service (SaaS). The team at Alice has been working hard to meet the requirements Glow And Lovely Careers. After GALC messenger goes live, the team will attend to any maintenance work that is required. GALC will be subscribed to the plan agreed upon by both parties. In the case GALC exceeds the number of users agreed upon, GALC is needed to upgrade their current subscription.

Alice will also be open to any future requirements from GALC that needs to be integrated.

### 7.2 Social and Environmental Effects and Analysis

Alice aims to help businesses through great customer service. Users interacting with the help of Alice's platform, have had great experiences.

With the growth of a company, it becomes very difficult to maintain good customer service. Bad interactions between customer service and their customers can be detrimental, to the reputation of a company.

### 7.3 Addressing Ethics and Ethical Issues

Over the years, chatbots have gotten a bad reputation. Chatbots have been used in the past to collect sensitive user information.

Alice does not collect any sensitive user information. The information collected are only used to improve the user experience, with the consent of the user.

# Chapter 8

## Lesson Learned

### 8.1 Problems Faced During this Period

During the first month of my internship at Alice, there was a lot of challenges that I had to face. I was required to have a good understanding of how the product works. Understanding the requirements from Alice's clients and how the team provide solutions.

As a developer, I had to understand what was expected of me. I had to work closely with clients, to help them integrate Alice. Some tools that were used for development, were common from my academical years at IUB. But a few were new to me, that I had to learn on the go.

The work environment of Alice is very friendly to newcomers. This was my first exposure to a professional workplace, so I had to learn how to communicate with the people their.

### 8.2 Solution of those Problems

My internship at Alice Labs have helped me grow as a developer tremendously. I developed new skills, and sharpened old one's that was practiced during my courses in IUB.

1. I was introduced to the Linux operating system. Switching from Windows to Linux, gave me more control over my hardware, and has made me a better engineer overall.
2. The programming language used at Alice is Python. I worked with two popular web framework, Django and FastAPI.
3. To test the APIs locally on my machine, I was introduced to ngrok. I useful, and easy to use tool for development purposes.
4. Docker was introduced to run the codebase locally on the machine.
5. I used Postman to test APIs. I useful tool to request data from a server, and check responses.
6. Alice uses Github to store and stage its codebase. I learned how to leverage useful Git commands, to contribute my work from my local machine to be implemented on the live codebase.

# Chapter 9

## Future Work & Conclusion

### 9.1 Future Works

The goal of Alice Labs Pte. Ltd is to expand globally. Alice is more than a company that allows the integration of chatbots. The ability of integrating APIs enables Alice to have great flexibility on what is possible through messaging channels. The product is still in its starting phases, with massive potential to grow. Alice aims to take on big projects, such as voice and image recognition, to provide better services to clients in the future.

### 9.2 Conclusion

Alice as a product, is at a very exciting process of development. It is a very ambitious project, recognized by Microsoft's Emerge X Program, as one of the top startup companies in Asia.

My internship here at Alice has helped me grow as a software engineer. It has given me the experience of collaborating with other passionate individuals, who have guided me very well through out the process.

Overall my experience at Alice has been overwhelmingly positive. I would like to thank the team at Alice Labs for the oppurtunity. I am very excited to see the growth of this company, and I wish them all the best.

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