Hotel Feedback System

BY

Low Jiang Nan

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF INFORMATION SYSTEMS (HONOURS) BUSINESS INFORMATION SYSTEMS

Faculty of Information and Communication Technology

(Kampar Campus)

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I also would like to thank to my family and parents who support me silently behind the scenes. Their love, support and encouragement allow me to focus in this project.

ABSTRACT

This project is a hotel feedback system application in Malaysia it is for academic purpose , focusing on Natural Language Processing (NLP) to enhance customer satisfaction and customer experience.

The current system has several issues, such as requiring customers to spend a long time providing feedback, inefficient data analysis of feedback, and hindering hotel management from understanding customer emotions effectively. The purpose of this project is to develop a hotel feedback system that simplifies the feedback process for customers while enabling hotel management to easily assess their real experiences and sentiments. To address these problems, the system implements speech-to-text functionality, a categorization feature, and sentiment analysis.

The method used in this project is prototyping, which allows for quick refinement of requirements and system development. The expected outcome is a system that enables users to provide feedback quickly, processes feedback data efficiently, and helps hotel management better understand customer sentiments. Additional planned features include voice recognition, feedback categorization, and sentiment analysis to interpret customer emotions.

This feedback system application will undergo testing, and based on user feedback, necessary improvements—such as adding missing features or fixing functional errors—will be implemented by the developer.

Area of study: Natural Language Processing (NLP)
Keywords: Hotel feedback, Customer satisfaction, Customer experience, Speech-to-text, Sentiment analysis

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LIST OF SYMBOLS

β	beta

LIST OF ABBREVIATIONS

NLP	NATURAL LANGUAGE PROCESSING
AI	ARTIFICIAL INTELIGENCE
ML	MACHINE LEARNING
STT	SPEECH-TO-TEXT

Chapter 1

Introduction

Text is one of the media that everyone comes into contact with every day. Text have many usage such as write a report, message with friends or family and etc. The most importance use of text is to transmit information. In the hotel industry, text also important to let hotel management to know what the guest feeling is.

From 2000 onwards, as the tourism industry develops, so does the hotel industry. Based on CEIC DATA, the number of hotels in Malaysia in March 2000 is 1,578,000 unit and 3,520,000 in September 2023 [1]. The number increased from March 2000 to September 2023 is 1,942,000 hotels. Large amount of hotel causes great competitiveness. In hotel industry, service, experience given to customer is the most important element.

As customer's feeling of hotel's service, is so important, customer's feeling should be collected for hotel to find where their strength and weakness, the collected information is called hotel guest feedback. Hotel guest feedback is a crucial element in the hospitality industry as it enables hotel to understand hotel guests' experiences [2], monitor staff performance [3], help improve service [4]. Happy guest more likely to become loyal guest but unhappy guest may become detractors [5].

The most common way used to collect guest feedback is feedback system. Hotel feedback system is a system that let the hotel's guest provide feedback on their stay, ideas and suggestions for improvements. In this increasingly competitive hotel industry, feedback system has become an important tool for hotels to monitor themselves, improve themselves, and surpass their competitors.

Time ago, hotel feedback data is collected through comments made by users to hotel front desk staff. With the advancement of technology, the method of collecting comments has changed to using words. Now it is possible to fill in comments online instead of writing them down on the spot.

1.1 Problem Statement and Motivation

Although there are so many hotels, the reality is that not many are rated as excellent or above by travellers. There are many reasons for this situation, and one of the reasons definitely include that the feedback system does not reflect customer opinions, reviews and suggestions well or even no feedback system at all.

Nowadays, most of the hotel feedback system able user to fill up the feedback form online written in text form. In fact, from before to now majority feedback also is written in text form, however there are many times and situations is hard for guest to express their emotions by write down their feelings. There are sometimes that guest more prefer to speak out their feeling since sometimes it is easier to express emotions by talking about it rather than write or type it out.

Furthermore, the other problem from the feedback system is that Customer needed long to do feedback, data from feedback system very messy hard for hotel service department to process, Feedback system lack of interactive with customer after customer filled up the feedback form.

1.Customer needed long time to do feedback.

Majority of feedback system ask customer to fill in feedback form in text form. However, with the changes of the times, society has changed from the previous slow pace to a fast-paced life now. Changes in the pace of society have led to the fact that few people in modern society are willing to spend long-time giving feedback to hotels.

2.Data from feedback system very messy hard for hotel service department to process.

There are many feedback systems given space for user to enter user's information, content of feedback. These information helps hotel to have a preliminary understanding of the user and feedback however, only these content although information needed to collect is enough but these information hard for hotel customer service department to sort data. Hotel customer service department need to take a lot of time to process the data and send it to others departments.

3.Hotel management hard to understand customer's feeling.

Feedback system in word hard to direct show customer's feeling. For hotel service department, they may receive thousands or hundreds of feedback per day. Due to so much feedback may accept by hotel service department, it is hard for them to watch and reflect customer's feedback to various departments in short period of time. This cause hotel management need long time to read and know customer's feeling and advise from customer's feedback because they did not know which feedback should read first.

1.2 Objectives

1. To develop a hotel feedback system that able for the customer use voice recognition to give feedback.

Voice recognition is the ability of a machine or program to receive and interpret dictation or to understand and perform spoken commands [6]. Voice recognition can help customer to feedback hotel easier and faster. Voice recognition can fill in feedback form by speaking and not need to type in text. This let customer can feedback while doing other things at the same time. The customer just need to press a button and talk the comment, feeling, suggestion and etc to fill the feedback form and this make the customer fill in feedback more efficiently.

2. To develop a hotel feedback system that will be easy to sort data by categorizing different category.

Hotels comprise multiple units, such as the front desk department, room maintenance department, and food and beverage department and etc. Feedback materials need group into different categories based on the type of feedback by the customer service department and forwarded to each department [7]. Feedback with category help to speed up customer service department to identify feedback should be send to which department.

3. To develop a hotel feedback system that can analyse and display customer's emotion from feedback given by customer.

When a customer give feedback, usually they are expressing their feeling of their experience at the hotel, it might be good experience or might be bad experience, user give feedback is to reflect their feelings. In this case, sentiment analysis is suitable achieve this goal, sentiment analysis is a tool for understand emotion that powered by advanced artificial intelligence (AI) [8]. Due to sentiment analysis can analyse word insert by customer in feedback. with this sentiment analysis, customer can know that did their advise or comment express right and hotel management can quickly read those negative feedback for quick improvement.

1.3 Project Scope and Direction

The goal of this project is to create a hotel feedback system application that simplifies the process for users to provide feedback and streamlines data handling for the hotel's customer service department, enabling efficient communication with other departments. The mobile application will be built on the Android platform and will include the following features and functionalities:

I) The hotel feedback system can collect user information.

II) The application can gather feedback data for the hotel.

III) Users can provide feedback using voice recognition.

IV) The system can categorize user feedback into various categories.

V) The application can analyze customer feedback and display their emotions.

1.4 Contributions

To sustain and grow the tourism industry, hotels play a crucial role. High-quality hotels enhance a destination's reputation, which in turn attracts more visitors. To maintain and improve service standards, hotels must actively gather and analyze customer feedback. An effective feedback collection system is essential for understanding guest experiences, identifying areas for improvement, and ensuring customer satisfaction.

A well-designed hotel feedback system helps hotels quickly identify their strengths and weaknesses. By addressing these areas promptly, hotels can improve their performance faster, leading to higher customer satisfaction. Satisfied guests attract more visitors, boosting tourism and, in turn, strengthening the national economy.

1.5 Report Organization

In chapter 1, I will introduce problem statement, objective, project scope, contribution. In chapter 2, I will review some current existing hotel feedback system. After reviewed these hotels, I will analysis the strength and weakness of these hotel feedback system. In chapter 3, I will introduce methodology, system equation, use case of this project. In chapter 4, I will show how the system flow of sentiment analysis and two applications developed. In chapter 5, I will show about setting and configuration, testing project screenshot. In chapter 6, I will show survey result, testing and setup result, issue and challenge, timeline, objective evaluation. In chapter 7, I will discuss conclusion and recommendation.

Chapter 2

Literature Review

2.1 Eastern & Oriental Hotel

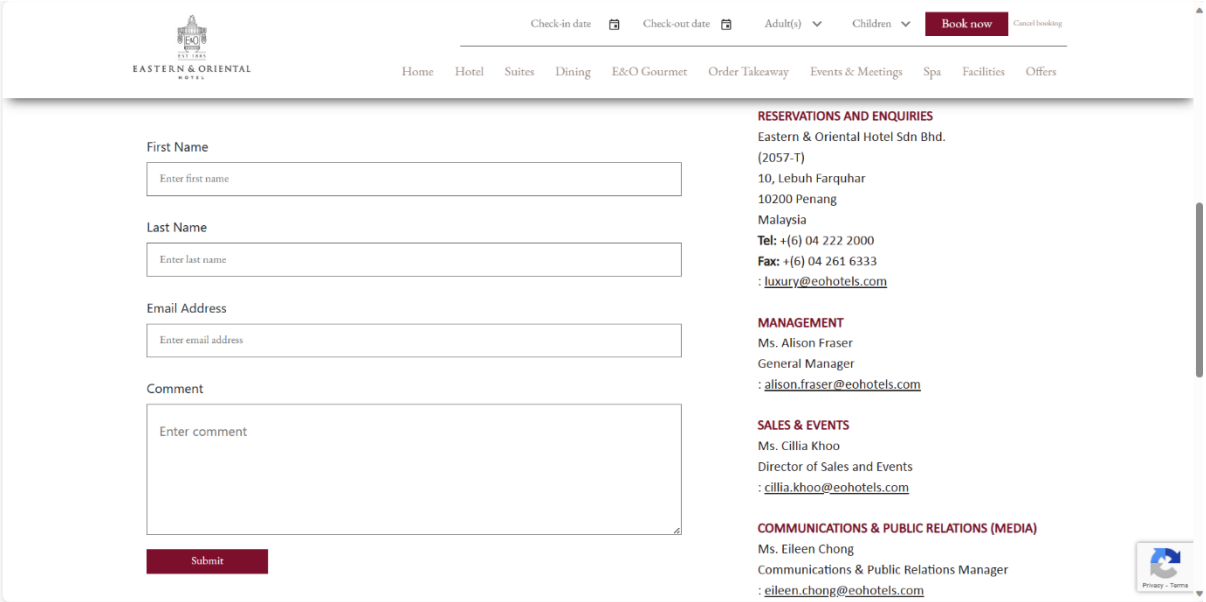

Figure 2.1.1 Eastern & Oriental Hotel feedback system

Eastern & Oriental Hotel is a five-star hotel situated in George Town.

Strength

1. Customer feedback can be collected.

   Eastern & Oriental Hotel provide a space for customer to talk/complain about their experience of staying at Eastern & Oriental Hotel.

2. Customer information can be collected.

   Eastern & Oriental Hotel asked customer to fill up personal information. This will help Eastern & Oriental Hotel can find back the customer to give reply.

Weakness

1. Voice recognition function not provided.

   Eastern & Oriental Hotel only provide text input for feedback system. This might let those senior citizens less interested to fill feedback system since if they need to fill in themselves need long time and troublesome to find someone help to fill.

2. Data did not have category.

   Eastern & Oriental Hotel did not let customer to type in category of the feedback content that customer fill in this will let them need to spend a lot of time to sort data.

3. System does not analyse and display emotion of customer.

   Eastern & Oriental Hotel's feedback system does not analyse and display emotion of customer. This will let customer don't know did emotion express rightly to the hotel.

2.2 MTREE Hotel

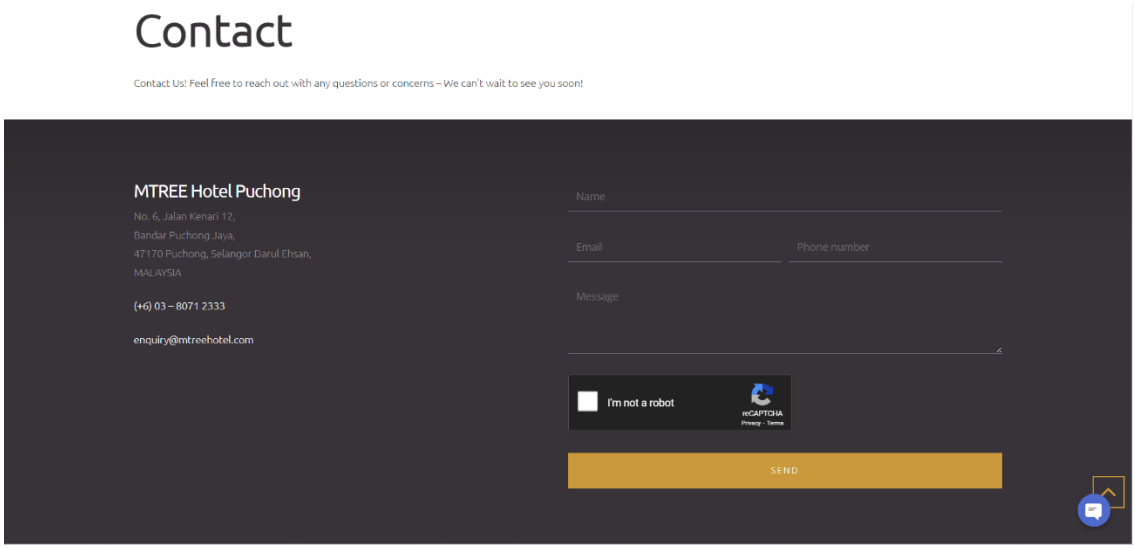

Figure 2.2.1 MTREE Hotel feedback system

MTREE Hotel is a three-star hotel situated in Puchong.

Strength

1. Can collect customer feedback.

   MTREE Hotel provide a space for customer to talk/complain about their experience of staying at Eastern & Oriental Hotel.

2. Can collect customer information.

   MTREE Hotel asked customer to fill up personal information. This will help MTREE Hotel can find back the customer to give reply.

Weakness

1. Voice recognition function not provided.

   MTREE Hotel only provide text input for feedback system. This might let those senior citizens less interested to fill feedback system since if they need to fill in themselves need long time and troublesome to find someone help to fill.

2. Data did not have category.

   MTREE Hotel did not let customer to type in category of the feedback content that customer fill in this will let them need to spend a lot of time to sort data.

3. System does not analyse and display emotion of customer.

   MTREE Hotel's feedback system does not analyse and display emotion of customer. This will let customer don't know did emotion express rightly to the hotel.

2.3 Grand Kampar Hotel

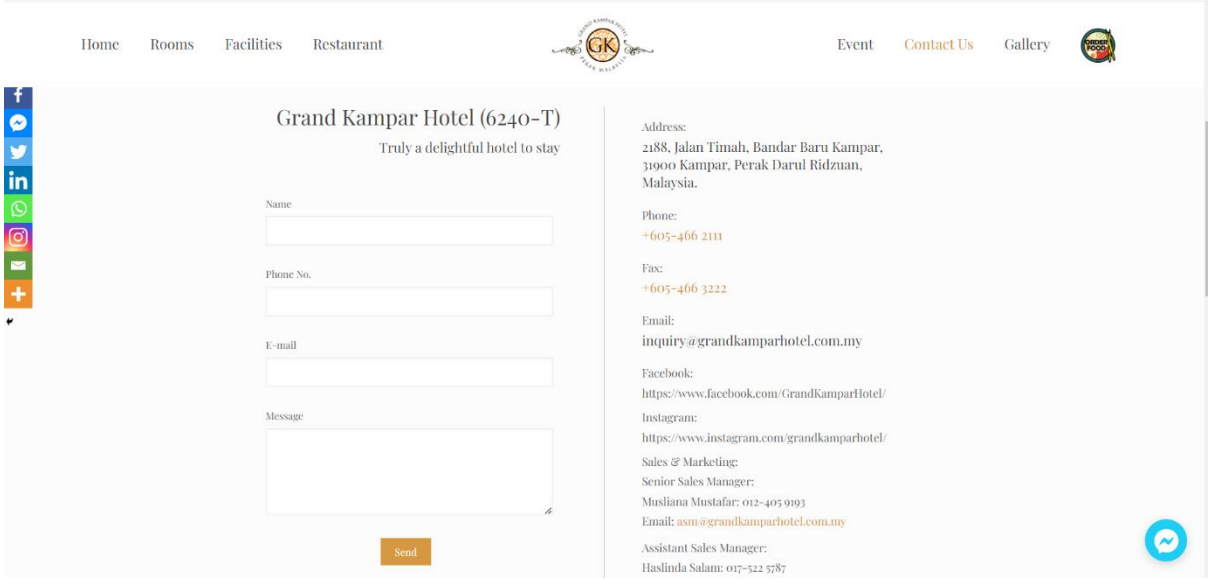

Figure 2.3.1 Grand Kampar Hotel feedback system

Grand Kampar Hotel is a three-star hotel situated in Kampar.

Strength

1. Customer feedback can be collected.

   Grand Kampar Hotel provide a space for customer to talk/complain about their experience of staying at Grand Kampar Hotel.

2. Customer information can be collected.

   Grand Kampar Hotel asked customer to fill up personal information. This will help Grand Kampar Hotel can find back the customer to give reply.

Weakness

1. Voice recognition function not provided.

   Grand Kampar Hotel only provide text input for feedback system. This might let those senior citizens less interested to fill feedback system since if they need to fill in themselves need long time and troublesome to find someone help to fill.

2. Data did not have category.

   Grand Kampar Hotel did not let customer to type in category of the feedback content that customer fill in this will let them need to spend a lot of time to sort data.

3. System does not analyse and display emotion of customer.

   Grand Kampar Hotel's feedback system does not analyse and display emotion of customer. This will let customer don't know did emotion express rightly to the hotel.

2.4 Summary Limitation

The conclusion of literature review limitation is:

Voice recognition function not provided.

Most of the existing feedback system did not provide voice recognition, this let those senior citizens hard to give feedback and it cause feedback amount decrease and hotel hard to know the problem that they had.

Data did not have category.

The feedback form did not have category of the feedback content will let hotel hard to process data and find their problem. This situation will cost lots of time for process data to other departments.

System does not analyse and display emotion of customer.

After customer enter feedback, system did not analyse, and display emotion of customer might cause customer did not accurately express his/her feeling to the hotel and hotel cannot solve problem accurately.

2.5 Comparison Table

	Eastern & Oriental Hotel	MTREE Hotel	Grand Kampar Hotel	Proposed Project
Collect feedback	✓	✓	✓	✓
Collect customer information	✓	✓	✓	✓
Voice recognition	×	×	×	✓
Data category	×	×	×	✓
Analyse and display emotion of customer	×	×	×	✓

Table 2.5 Comparison of similar system

Chapter 3

System Methodology

3.1 Methodology

The hotel feedback system's sentiment analysis involves several phases which are pre-development, data preparation, model training, and prediction.

First feedback can be collected by speech or text, if using speech, the speech will be converted into text. Next, continue with data cleaning-remove special characters, convert text to lowercase, filter out common words.

After that, use lexicon method to link words to emotion, classify sentences as positive, slightly positive, neutral, negative, and slightly negative, it also can present in score between -1 and 1. This helps determine sentiment intensity.

The hotel feedback system was developed using the prototype model, which offers flexibility in design and improves collaboration between developers and users. This approach allows for iterative refinements, ensuring the system better meets user needs and expectations.

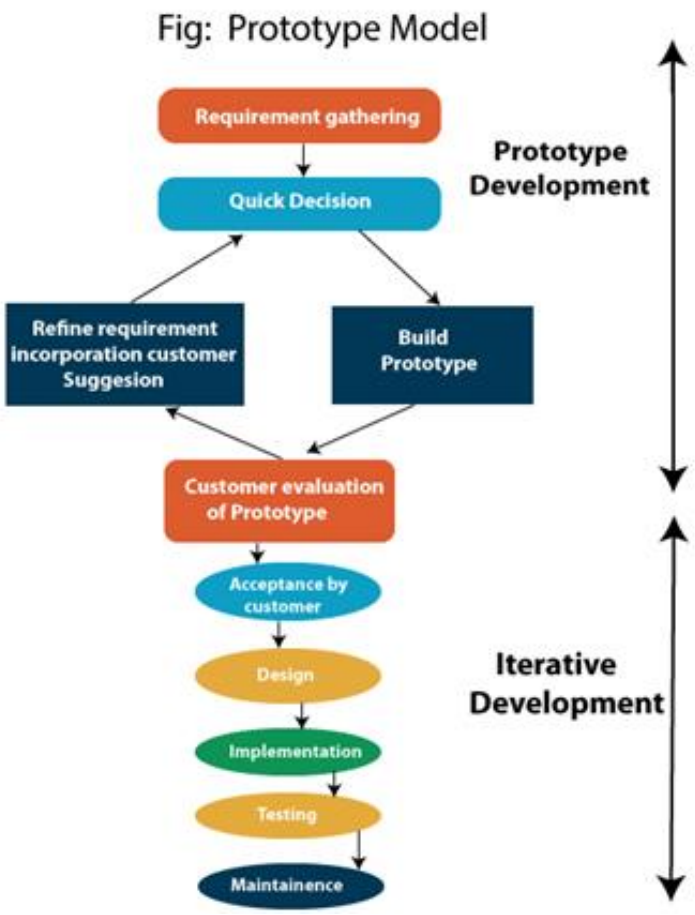

Figure 3.1 Prototype Model

The prototype model follows six key phases:

Step 1: Requirement Gathering

This initial phase involves system planning, collect user requirements and analyze existing systems with similar functionalities. Surveys help define the project's scope and objectives.

Step 2: Quick Design

From the assembled requirements, a draft design is produced. This rapid blueprint outlines core functionalities and system architecture, serving as a foundation for the prototype. The focus is on speed and flexibility rather than perfection.

Step 3: Build Prototype

A working prototype is developed using the quick design. This version includes essential features (though not fully polished) to demonstrate functionality.

Step 4: Customer Evaluation

The prototype is presented to clients/users for testing. Their feedback identifies usability issues, missing features, or design flaws. This step ensures the system aligns with real-world needs before further development.

Step 5: Prototype Refinement

Based on user input, the prototype undergoes iterative improvements. If major changes are needed, the process loops back to earlier steps. This cycle continues until the prototype meets all key requirements.

Step 6: Engineer Final Product

Once the prototype is approved, the full system is developed with refined code. Rigorous testing ensures stability before deployment. Post-launch, maintenance (updates, bug fixes, and optimizations) keeps the system efficient.

3.2 System Equation

$$c = \text{normalize}\left(\sum_{i=1}^{n} \text{valence}(w_i) \cdot \text{modifiers}\right)$$

This sentiment analysis formula used to classify hotel feedback into five distinct sentiment categories: Positive, Slightly Positive, Neutral, Negative, and Slightly Negative. The system leverages the VADER (Valence Aware Dictionary and sEntiment Reasoner) model, enhanced with a custom lexicon containing domain-specific terms in multiple languages (English, Chinese, Malay) to improve accuracy.

The sentiment analysis process begins by augmenting VADER's default lexicon with predefined sentiment scores for key words. Strongly negative terms ("dirty", "差", "kotor") are assigned a score of -3.0, while moderately negative words ("slow", "偏旧", "lama") receive -1.5. Neutral terms ("average", "一般", "biasa") score 0, moderately positive words ("helpful", "整洁", "bersih") score +1.5, and strongly positive terms ("excellent", "完美", "hebat") score +3.0. This ensures the model accurately captures sentiment nuances in hotel reviews.

The compound sentiment score (c) is computed by summing the valence scores of each word, adjusted for modifiers such as punctuation, capitalization, and conjunctions (e.g., "but" shifts sentiment). The result is normalized to a range between -1 (most negative) and +1 (most positive).

3.3 Use Case Diagram

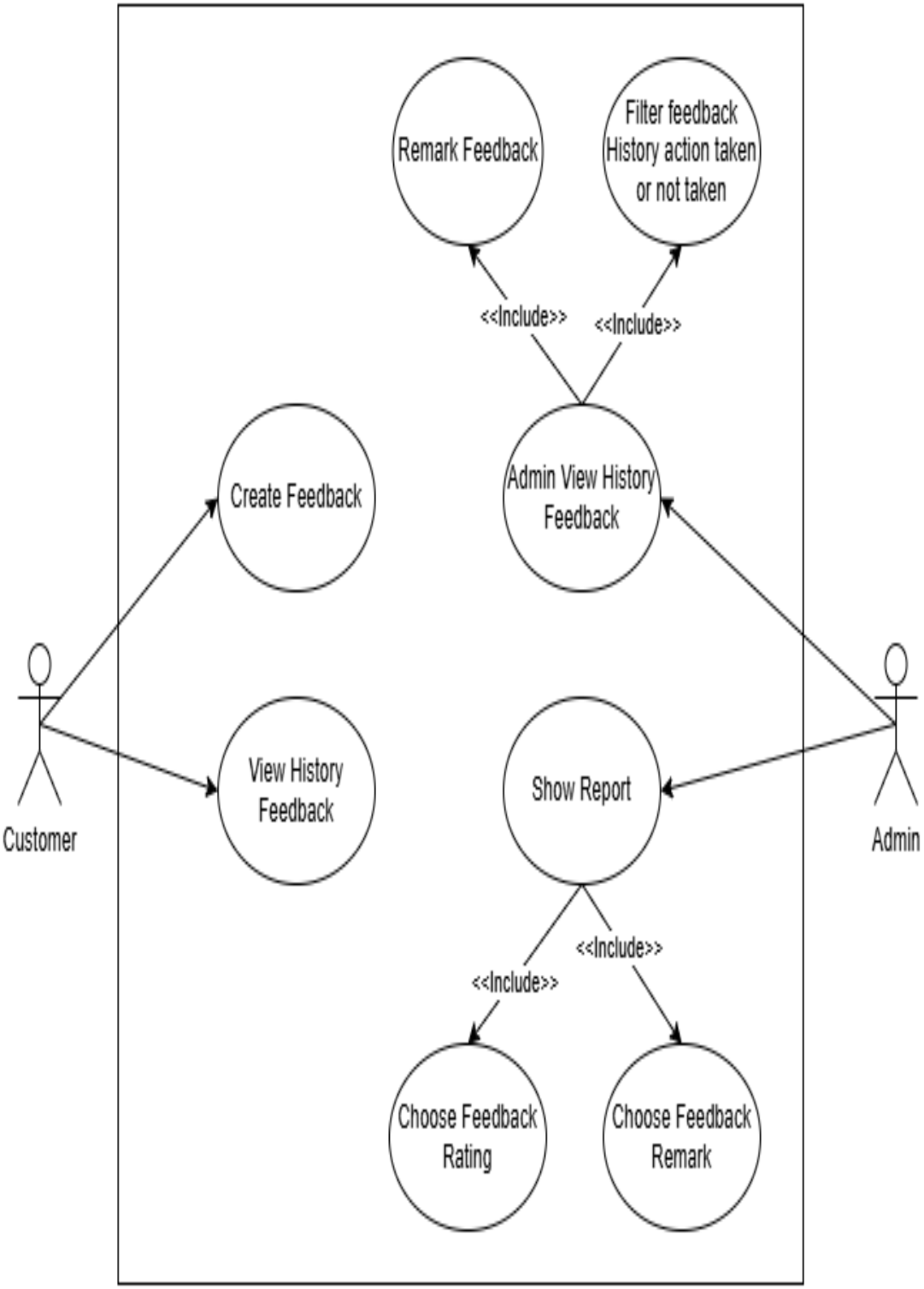

Figure 3.3 Use Case Diagram

Use Case ID	1
Use Case	Create Feedback
Goal	User able to submit comment
Actor	User, System
Trigger	User wishes to submit comment
Main Flow	1. Press feedback button in hotel feedback application 2. User input or use voice recognition (speech-to-text) by clicking the record button to enter information needed 3. System will based on feedback entered by user analyze user emotion. 4. Click submit button 5. All data will be stored in Firebase
Sub Flow	-
Alternate Flow	-

Table 3.3.1 Use Case Description: Create Feedback

Use Case ID	2
Use Case	View History Feedback
Goal	User able to see history comment
Actor	User, System
Trigger	User wishes to see all previous comment made by other user
Main Flow	1. Select history button of hotel feedback application 2. System connect database and display all previous comment
Sub Flow	-
Alternate Flow	-

Table 3.3.2 Use Case Description: View History Feedback

Use Case ID	3
Use Case	Admin View History Feedback
Goal	Admin able see history comment
Actor	Admin, System
Trigger	The administrator wants to see all past comment submitted by other users
Main Flow	1. Select feedback button in admin application 2. System connect database and display all previous comment
Sub Flow	-
Alternate Flow	-

Table 3.3.3 Use Case Description: Admin View History Feedback

Use Case ID	4
Use Case	Remark Feedback
Goal	Admin be able to update remark
Actor	Admin, System
Trigger	The admin would like to add a remark regarding the comment
Main Flow	1. Select feedback button in admin application 2. Press the selected comment that admin want to remark 3. Enter information for remark 4. Click submit button 5. All data will be stored in Firebase
Sub Flow	-
Alternate Flow	-

Table 3.3.4 Use Case Description: Remark Feedback

Use Case ID	5
Use Case	Show Report
Goal	Admin able to see report
Actor	Admin, System
Trigger	The administrator would like to review a summary of all past comment
Main Flow	1. Select report button of admin application 2. Select rating and remark of feedback 3. System will display previous feedback based on rating and remark selected
Sub Flow	-
Alternate Flow	-

Table 3.3.5 Use Case Description: Show Report

Chapter 4 System Design

4.1 System flow of Sentiment Analysis

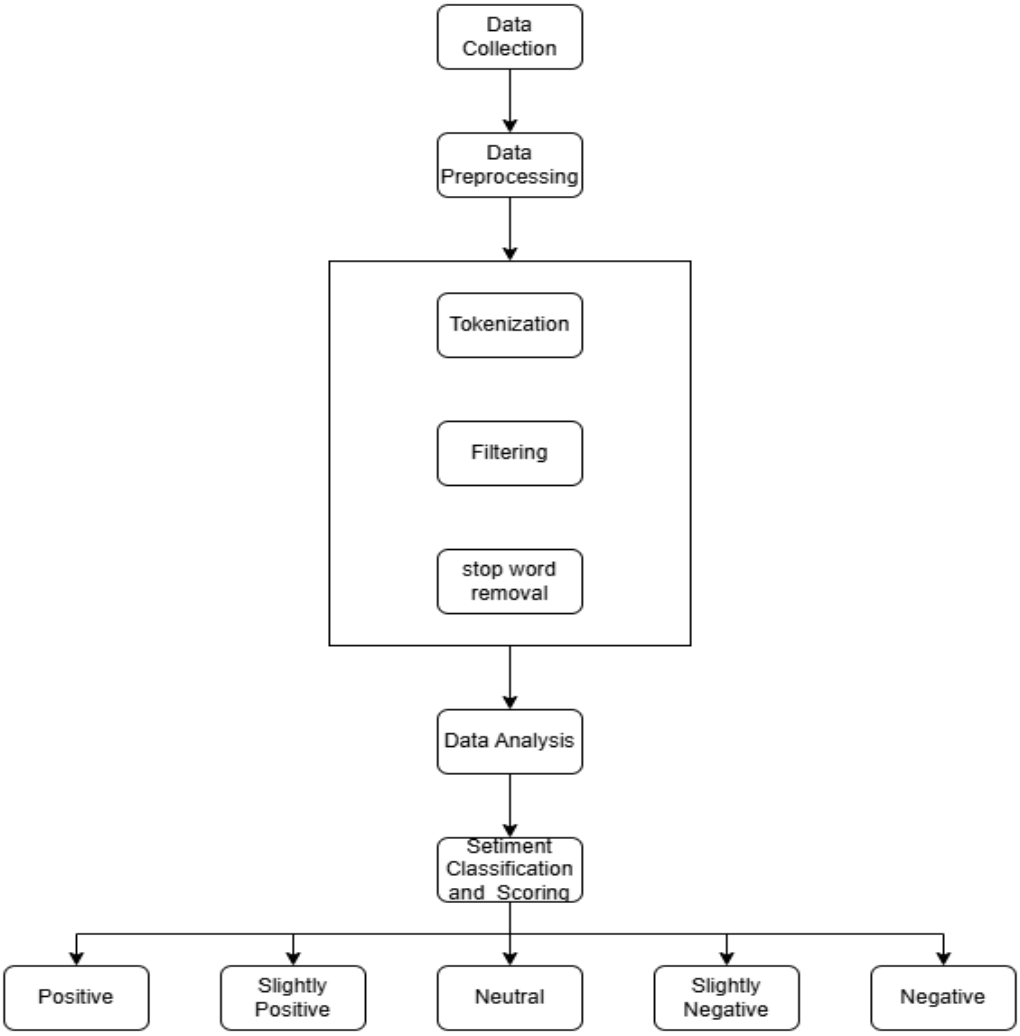

Figure 4.1 System Design Diagram of Sentiment Analysis

Data collection

This process is to collect feedback from customers. The collected data will undergo sentiment analysis to improve hotel performance.

Data pre-processing

In this phase, feedback collected from customers undergoes tokenization, which break the text into clear, logical segments. This is followed by filtering and stop word removal. This step involves filtering out stop word which is widely spoken words in the language that add little meaning (e.g., "the," "and"). In addition, special characters (such as commas and periods) are removed, and each letter is transformed to lowercase. to ensure consistency and improve processing. After preprocessing, the model prioritizes key words that best capture the data's meaning, enhancing representation accuracy.

Data Analysis

After preprocessing, the system analyzes the data to extract deeper insights from the text. It also evaluates sentence length as part of a more robust sentiment analysis framework.

Sentiment classification and scoring

Following data analysis, the system performs sentiment classification, where the model systematically evaluates sentiment intensity, classifying it into five categories: positive, slightly positive, neutral, slightly negative, and negative. After sentiment classification, the next step generates a composite sentiment score. This score definitively classifies the data's overall sentiment.

4.2 System flow of User Mobile Application

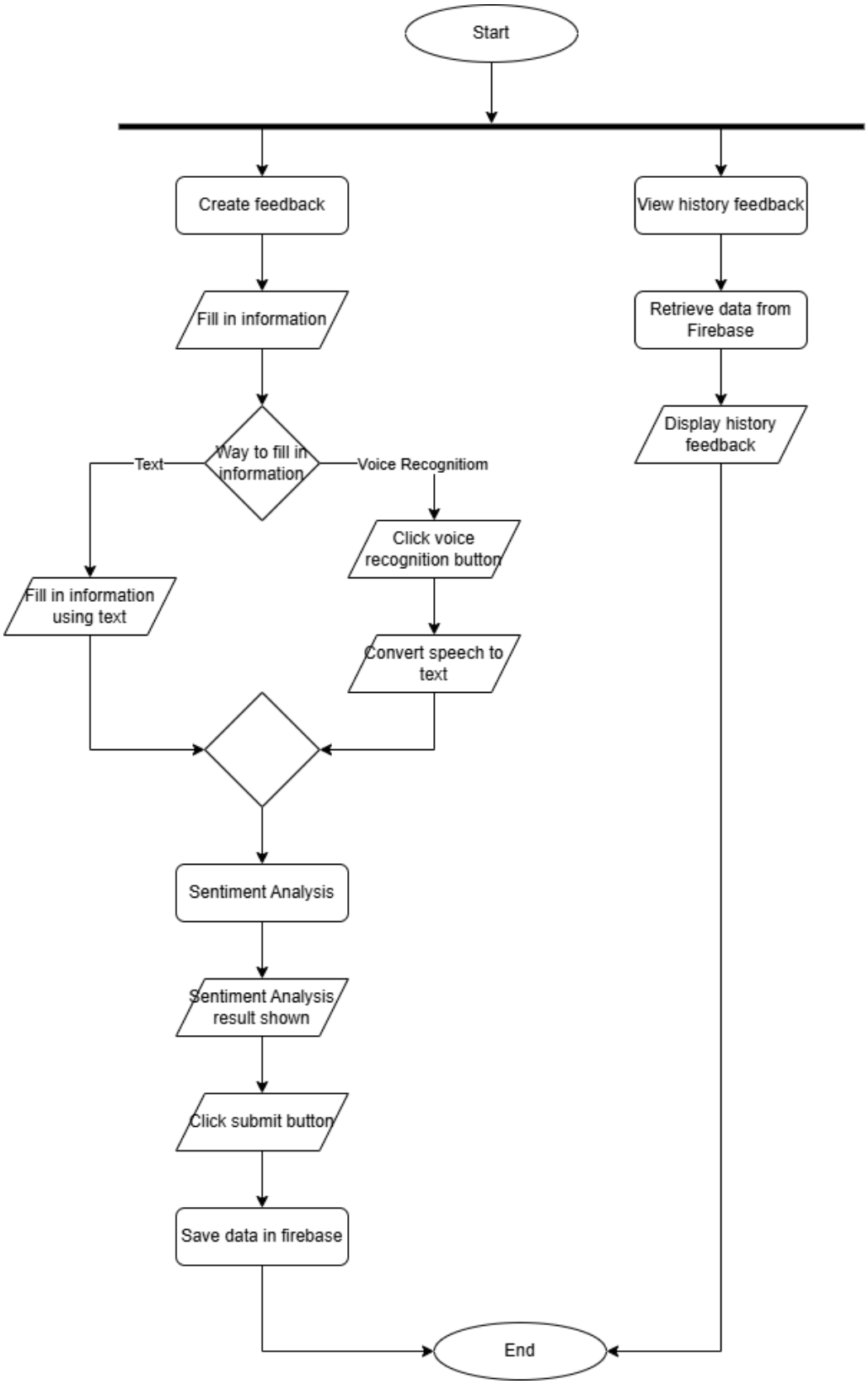

Figure 4.2 System Design Diagram of User Mobile Application

Figure 4.2 shows user journey when using user mobile application. The application demands an internet connection for use. Upon launching the app with an active connection, users are directed to the feedback page where they can fill in information to make a feedback. Feedback can be provided through two methods: text input or voice recognition. If user select using text, user direct insert information needed can make a feedback, if user select voice recognition method to insert feedback, system will convert speech to text to insert the feedback. Once the feedback content is inserted, the system performs sentiment analysis, categorizing the input as positive, slightly positive, neutral, slightly negative, or negative. After verifying the information for accuracy, users can submit their feedback by clicking the submit button, which then saves the data to Firebase.

Additionally, the mobile application let users to view their feedback history by selecting the history button. The history page displays previous feedback information including name of the user, category, sentiment analysis result, date.

4.3 System flow of Admin Mobile Application

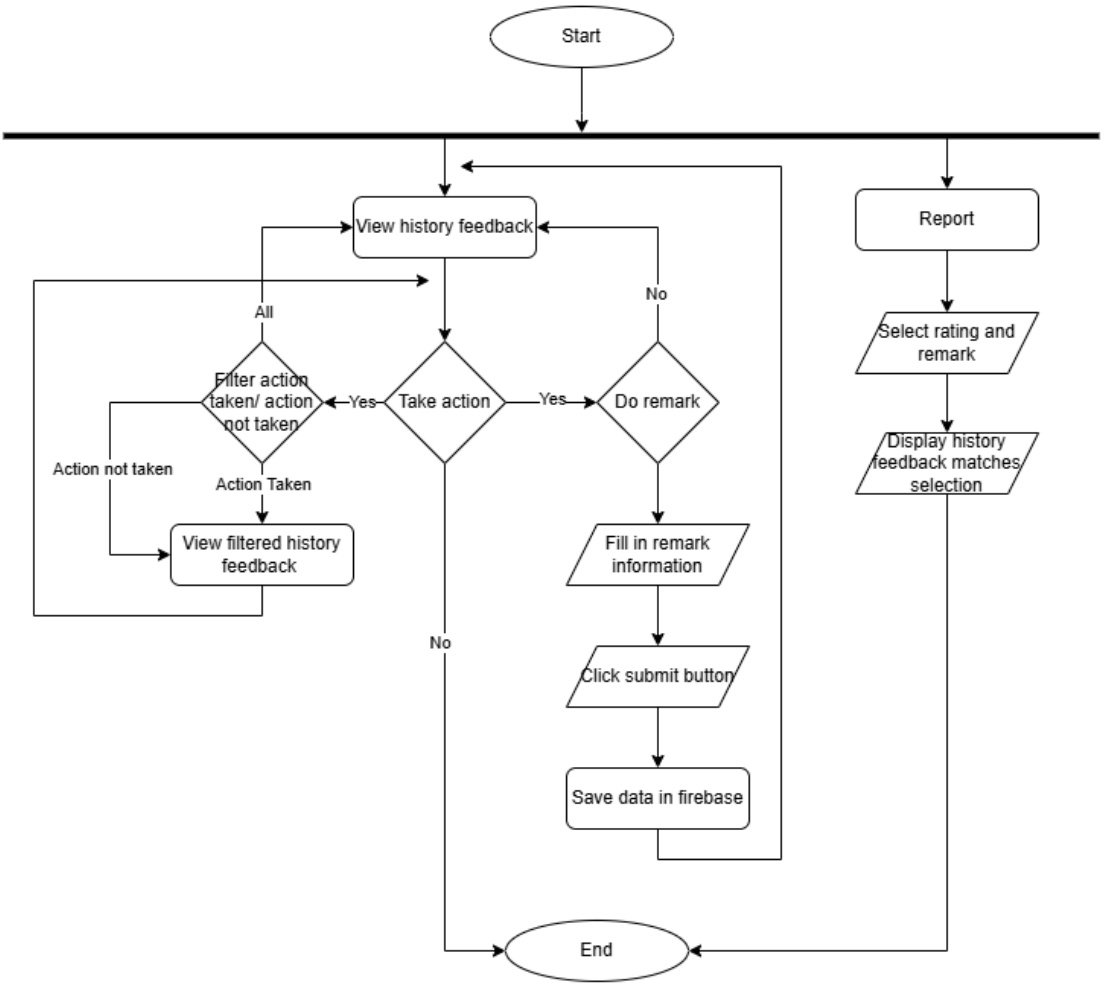

Figure 4.3 System flow of Admin Mobile Application

Figure 4.3 illustrates the admin mobile application workflow. When accessing the application, admins are first directed to a page displaying all customer feedback. At this stage, admins can choose between two actions: filtering feedback or adding remarks.

For filtering, admins can categorize feedback as: action taken, action not taken, or view all feedback. After applying initial filters, admins may either refine their filters further or proceed to add remarks. To submit a remark, the admin simply needs to enter the remark information and click the submit button, which then saves the data to Firebase.

Additionally, the application provides a historical feedback view in report format. This report presents feedback in a more organized manner, allowing admins to filter by: remark status (action taken/not taken) and Sentiment rating (positive, slightly positive, neutral, slightly negative, or negative). Each report entry includes the customer's name, feedback content, sentiment rating, action status, and submission date for comprehensive reference.

Chapter 5 Implementation and Testing

5.1 Hardware Setup

This project requires two hardware components for development and testing: a laptop and an Android gadget. The laptop is applied in application creation and connecting to Firebase, which serves as the data storage platform. The Android mobile phone is used to test and run applications.

Description	**Specification**
Model	ASUS TUF Gaming F15 (FX506HCB)
Processor	Intel Core i5 (11th Gen) 11400H / 2.7 GHz
Operating System	Windows 11
Graphic	NVIDIA GeForce RTX 3050 / Intel UHD Graphics
Ram	8GB X 2
Storage	512 GB SSD M.2 PCIe 3.0 – NVM Express (NVMe)

Table 5.1 Specification of Laptop

Description	**Specification**
Operating System	Android 13
Display Resolution	1080 x 2400
Ram	8GB
Storage	256GB

Table 5.1.2 Specification of Mobile Phone

5.2 Software Setup

Description	**Specification**
Operating System	Windows 10
Ram	Minimum 8 GB
CPU	(Intel VT-x or AMD-V, enabled in BIOS). CPU microarchitecture after 2017
Disk space	Minimum 8 GB
Screen Resolution	Minimum 1280 x 800

Table 5.2.1 Requirement for android studio

The sentiment analysis in this project is implemented using Python 3.8, leveraging its natural language processing libraries.

5.3 Setting and Configuration

After completing the application development, the developer clicks 'Run' button in Android Studio to launch the app. For testing, I used my personal smartphone. To deploy the application on the device, I enabled Developer Mode and activated USB debugging.

The integration between Python and Android Studio was achieved using the Chaquopy tool. For data storage, the Firebase Realtime Database was implemented to store customer feedback, including Customer name, Phone number, Email address, Feedback category, Feedback content, Sentiment analysis result.

5.4 System Operation (with Screenshot)

There are two applications in this hotel feedback system which are user application and admin application. User application is an application for customers to provide feedback and admin application is for admin use.

5.4.1 User application

Once the user launches the app, they will access the feedback page.

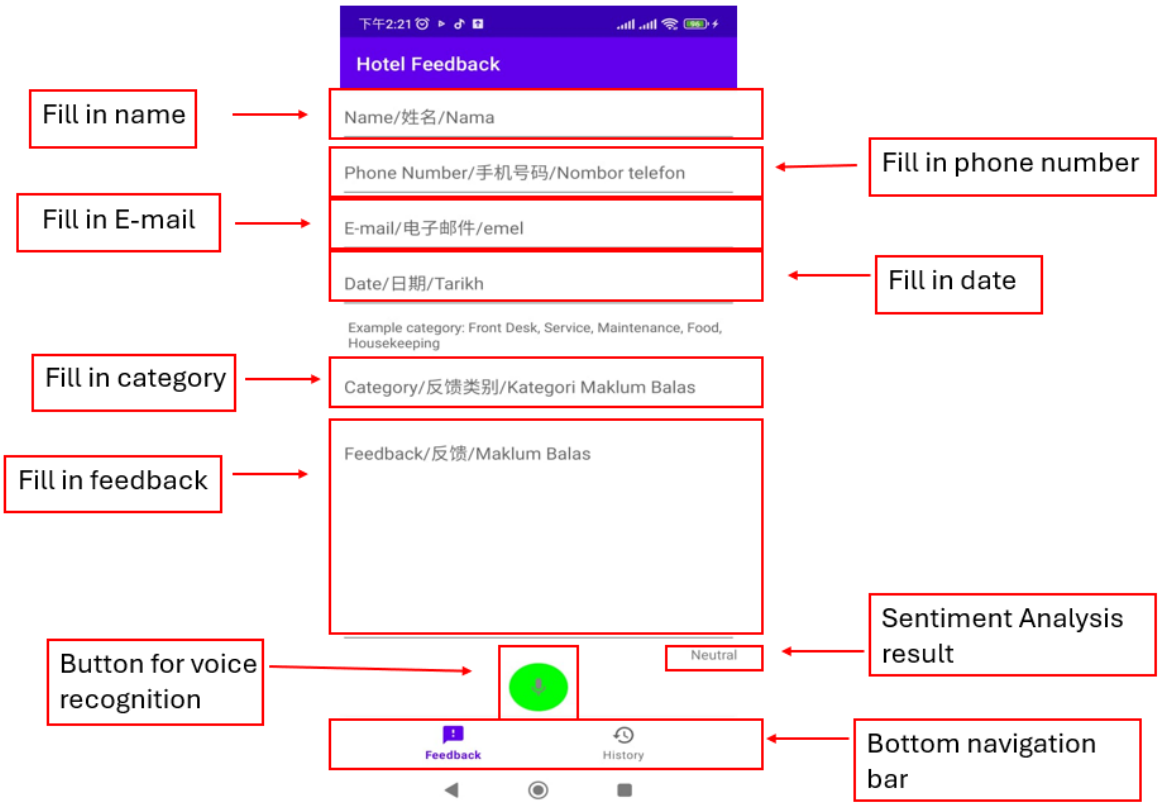

Figure 5.4.1.1.1 Create feedback

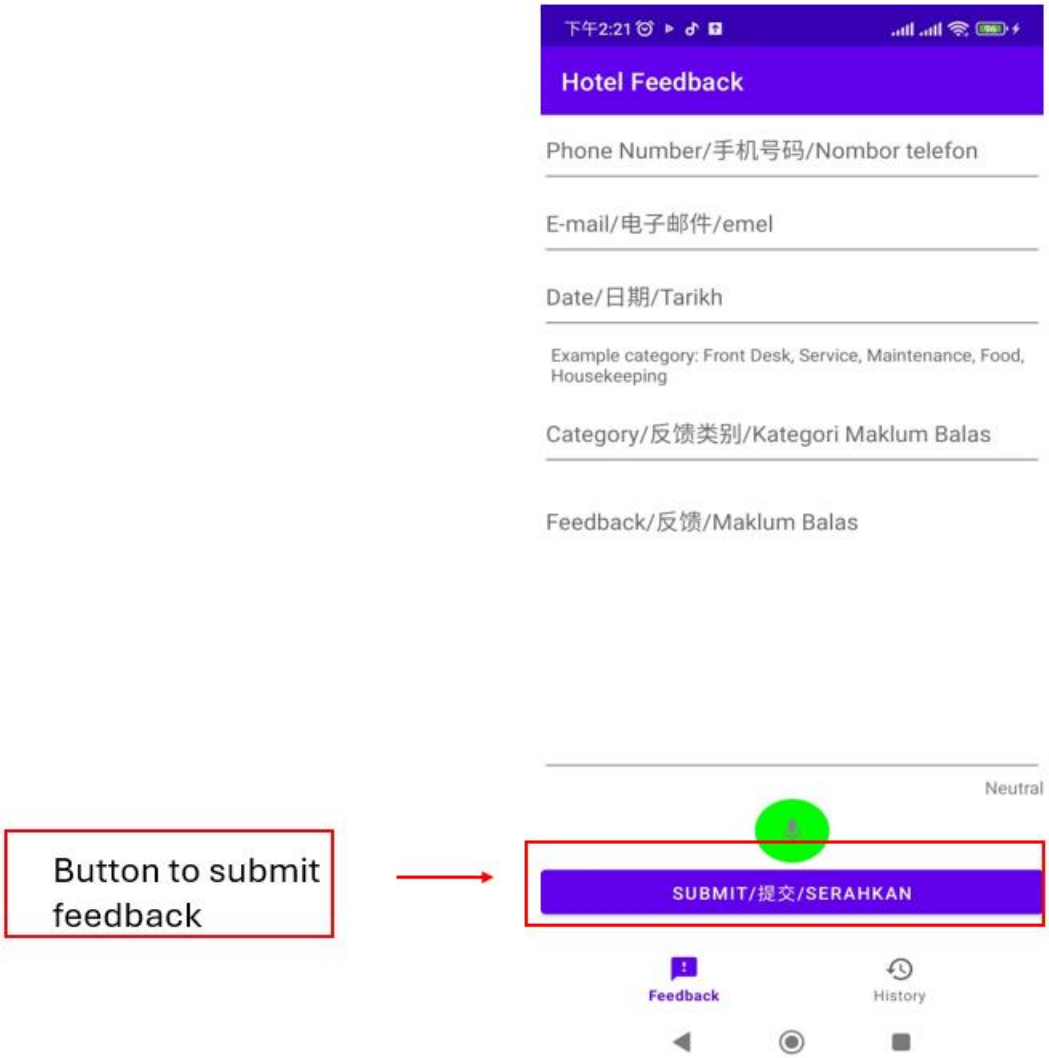

Figure 5.4.1.1.2 Create feedback

This is a feedback page that allows users to enter and submit feedback information. The required fields include: name, phone number, date, category, and feedback content. There is a section showing example categories for user reference. The page displays sentiment analysis results, which initially show as 'neutral' and update based on the customer's feedback sentiment.

A green microphone button enables voice recognition functionality. Below this button is the submit button, which sends all entered feedback information.

The bottom navigation contains two options: the current feedback page and a history page that displays past feedback submissions.

Figure 5.4.1.2 Feedback page validation

When a user submits the form without providing all necessary details, a notification pop-up will show saying 'Please fill in all the information,' reminding them to enter all required details before submission.

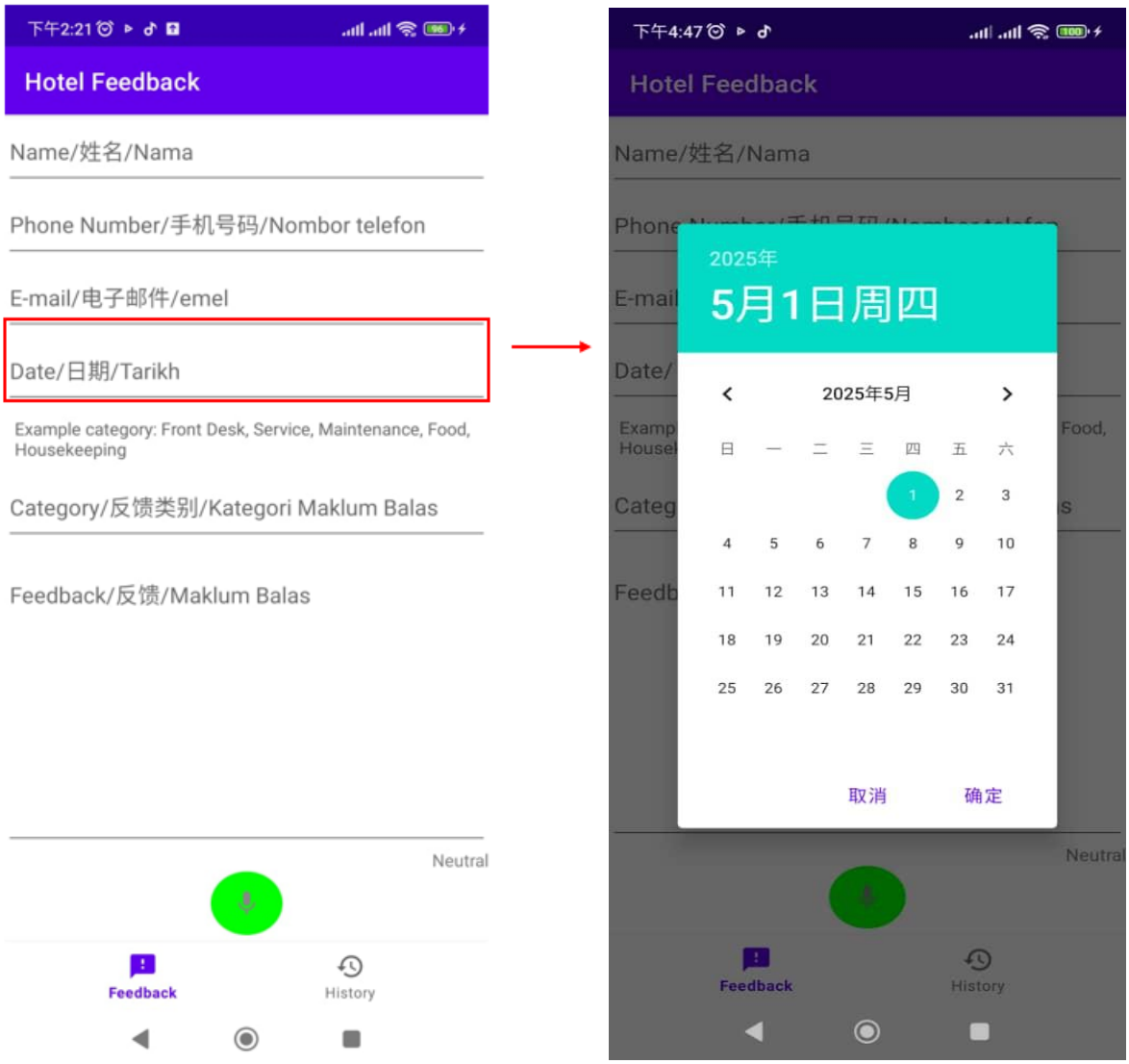

Figure 5.4.1.3 Date

When users click the date input field**,** a calendar appears as a pop-up for date selection. The chosen date auto-fills the text box using the system's default date structure.

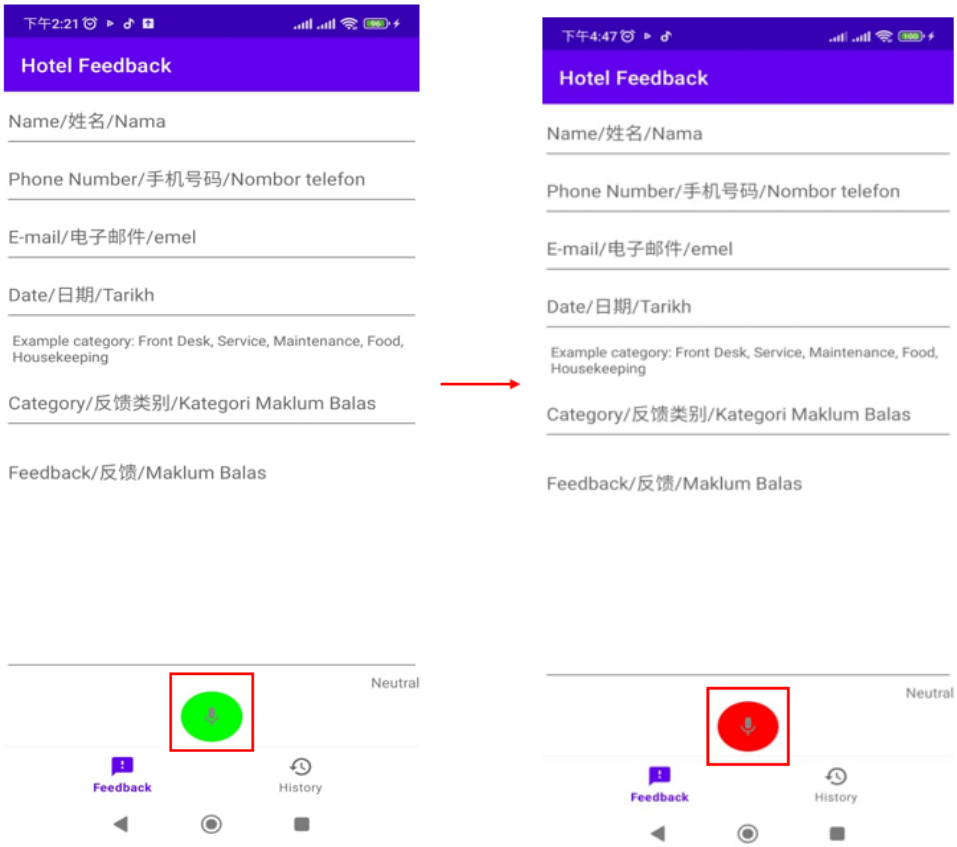

Figure 5.4.1.4 Voice recognition

When user presses the green microphone button, it changes from green to red, indicating the voice recognition function is active. While active, user can speak their feedback content. After finishing, pressing the button again stops recording. The spoken words are then converted to text.

Figure 5.4.1.5 Sentiment analysis

After the user submits their feedback, the system displays a sentiment rating. There are five possible categories: Positive, Slightly Positive, Neutral, Slightly Negative, and Negative.

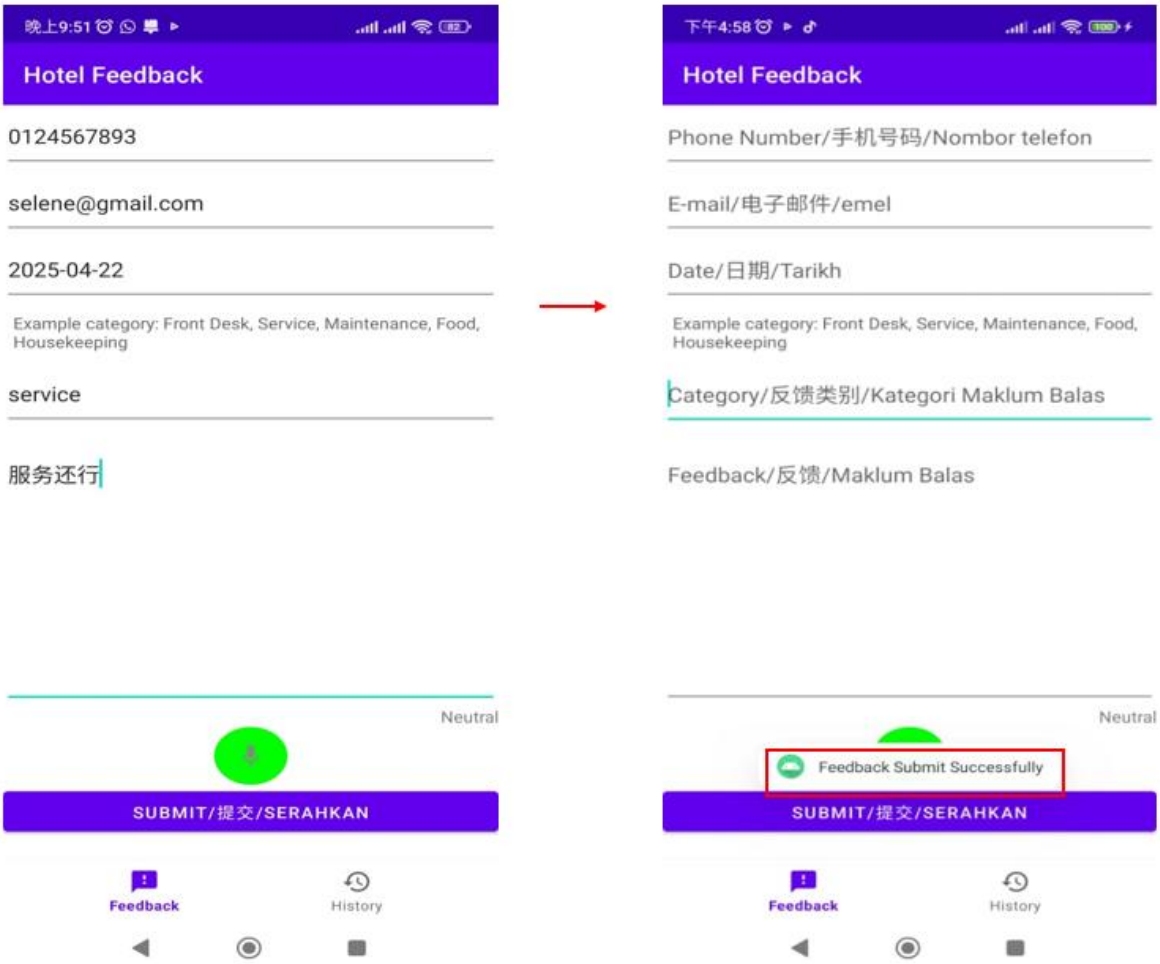

Figure 5.4.1.6 Submit feedback

After the user enters all information and clicks submit, a 'Feedback Submitted Successfully' pop-up message appears, confirming the feedback has been saved to Firebase.

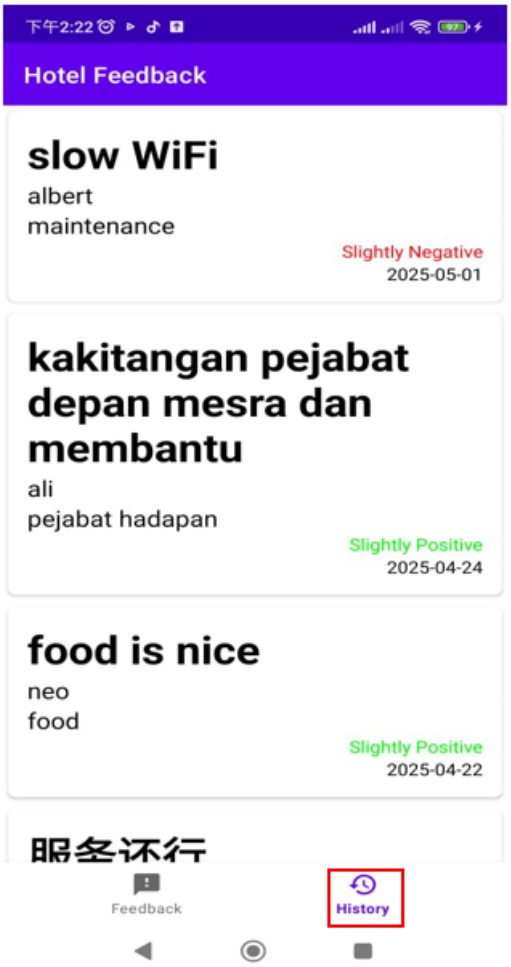

Figure 5.4.1.7 View history feedback

When customers select the history button in the bottom navigation, the system displays the feedback history page. This page shows all previously submitted feedback from other customers.

5.4.2 Admin application

When admin run the admin application will enter to feedback page

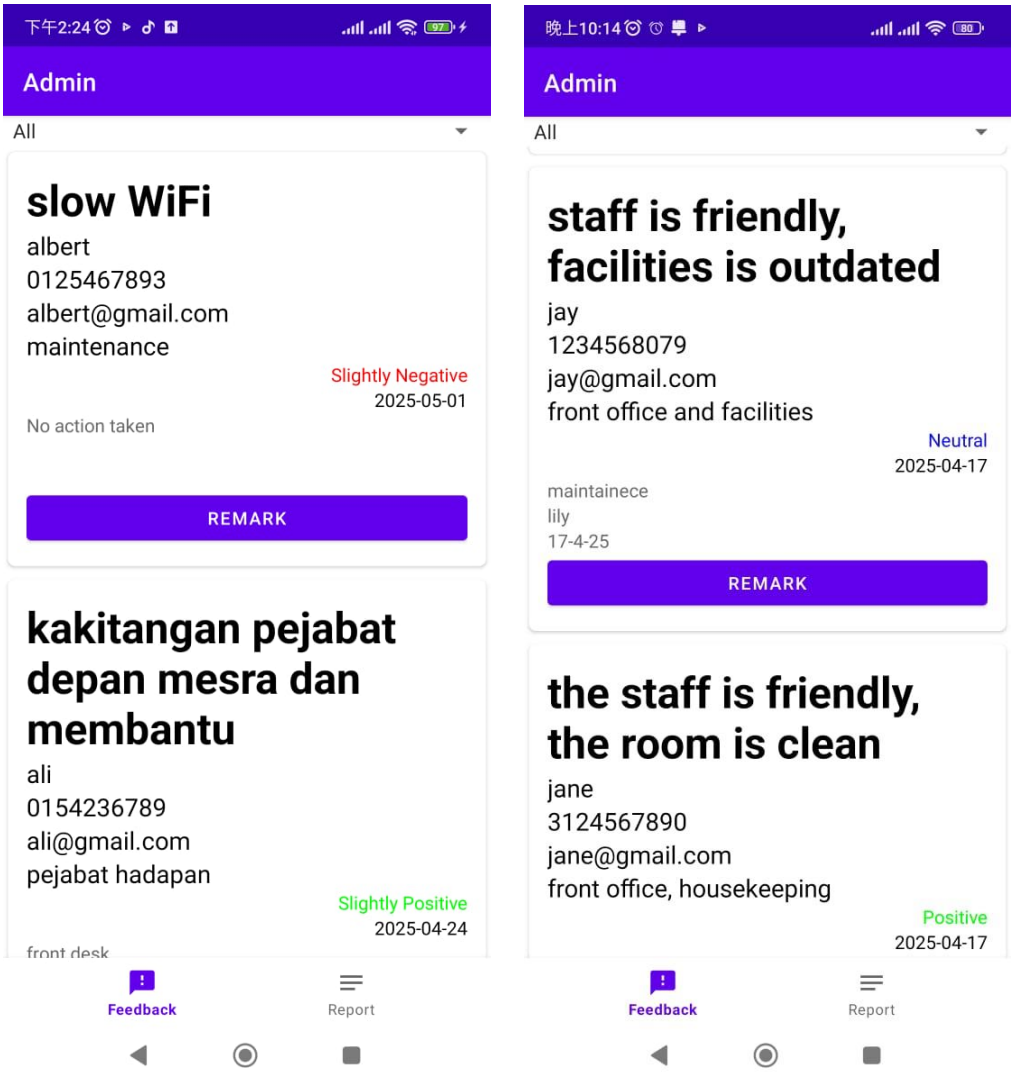

Figure 5.4.2.1 View feedback page

This page displays all historical feedback submitted by customers. Each feedback entry includes: the feedback content, customer name, phone number, email, category, sentiment analysis result, and submission date. Additionally, each entry features a remark button for admin actions. When action is taken on feedback, the entry will show the responsible department, admin name, and action date below the submission date. If no action has been taken, 'No action taken' will be displayed instead.

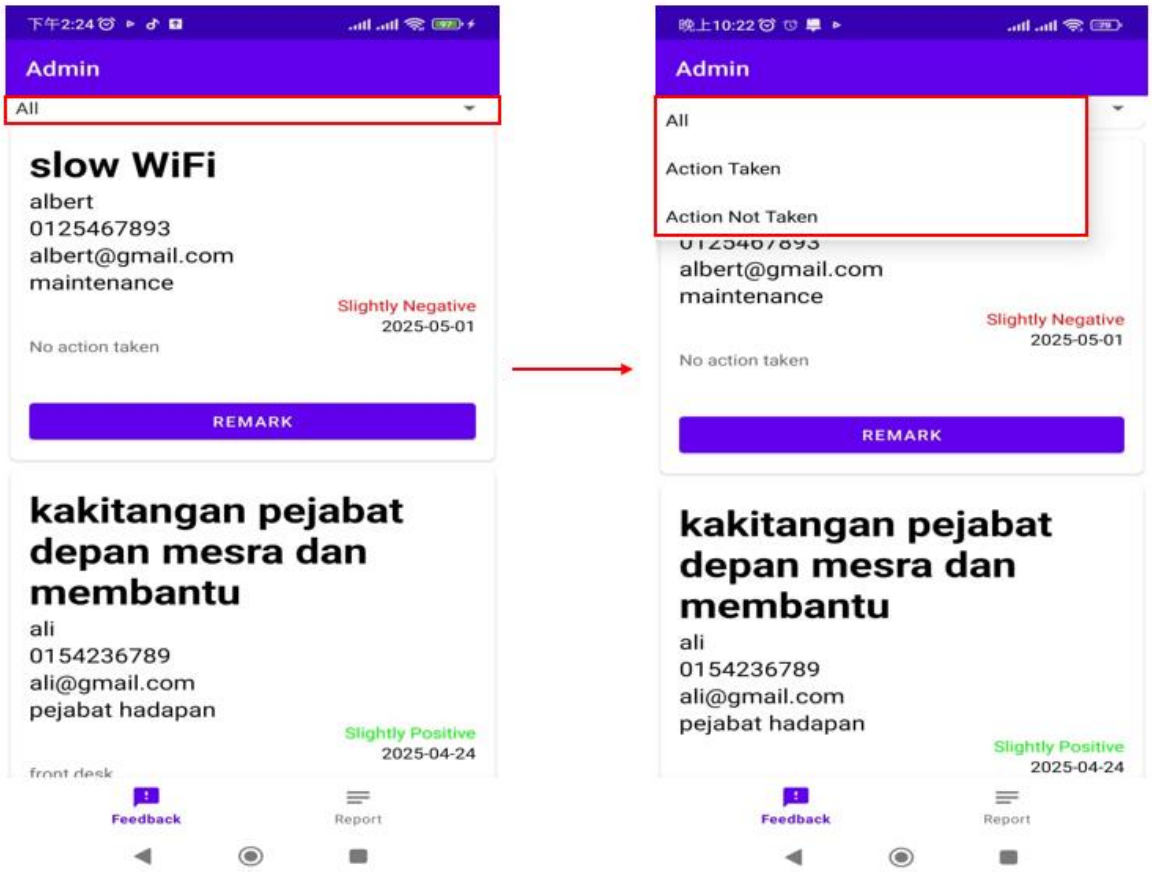

Figure 5.4.2.2 Action taken drop down box

Upon entering the feedback section, there is a combo box. When an admin clicks it, three filter options appear: 'All', 'Action Taken', and 'Action Not Taken'. This dropdown allows admins to sort feedback by action status.

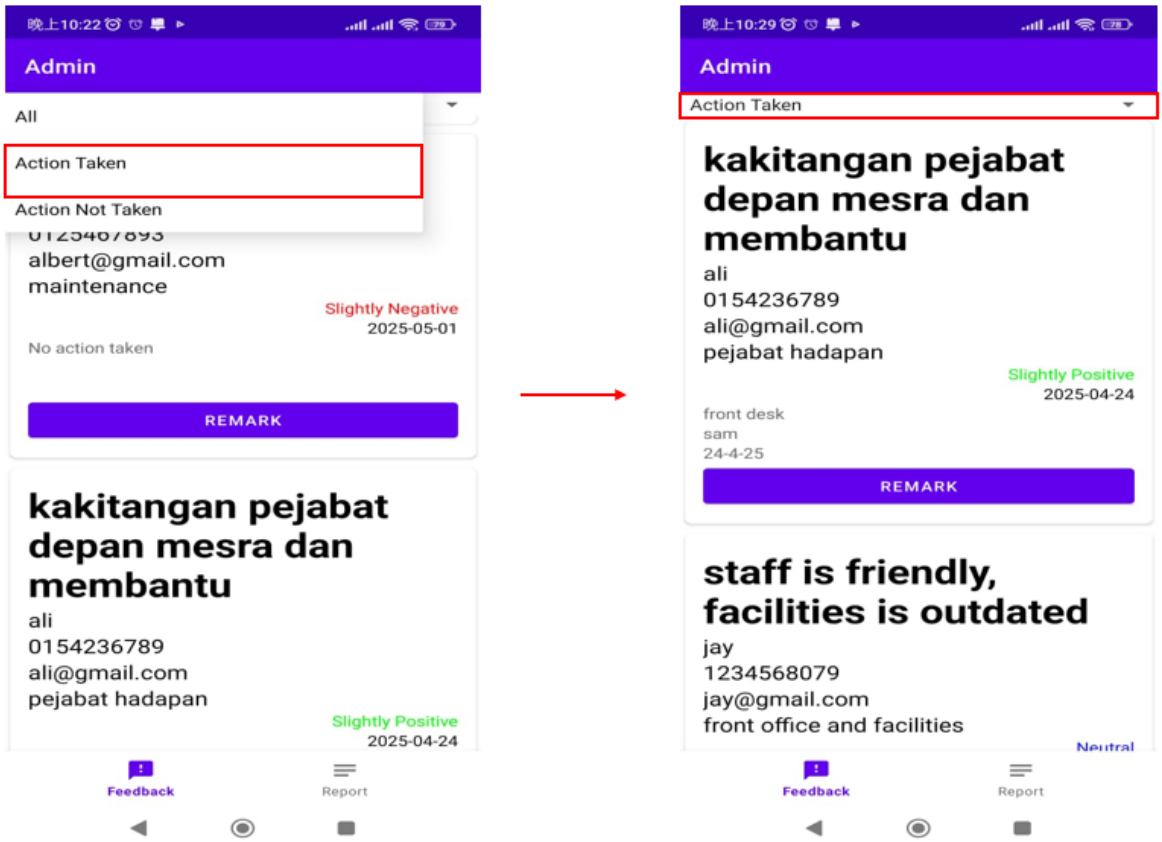

Figure 5.4.2.3 View Action taken feedback

Whenever users select 'Action Taken', the system displays all feedback entries where action has been taken.

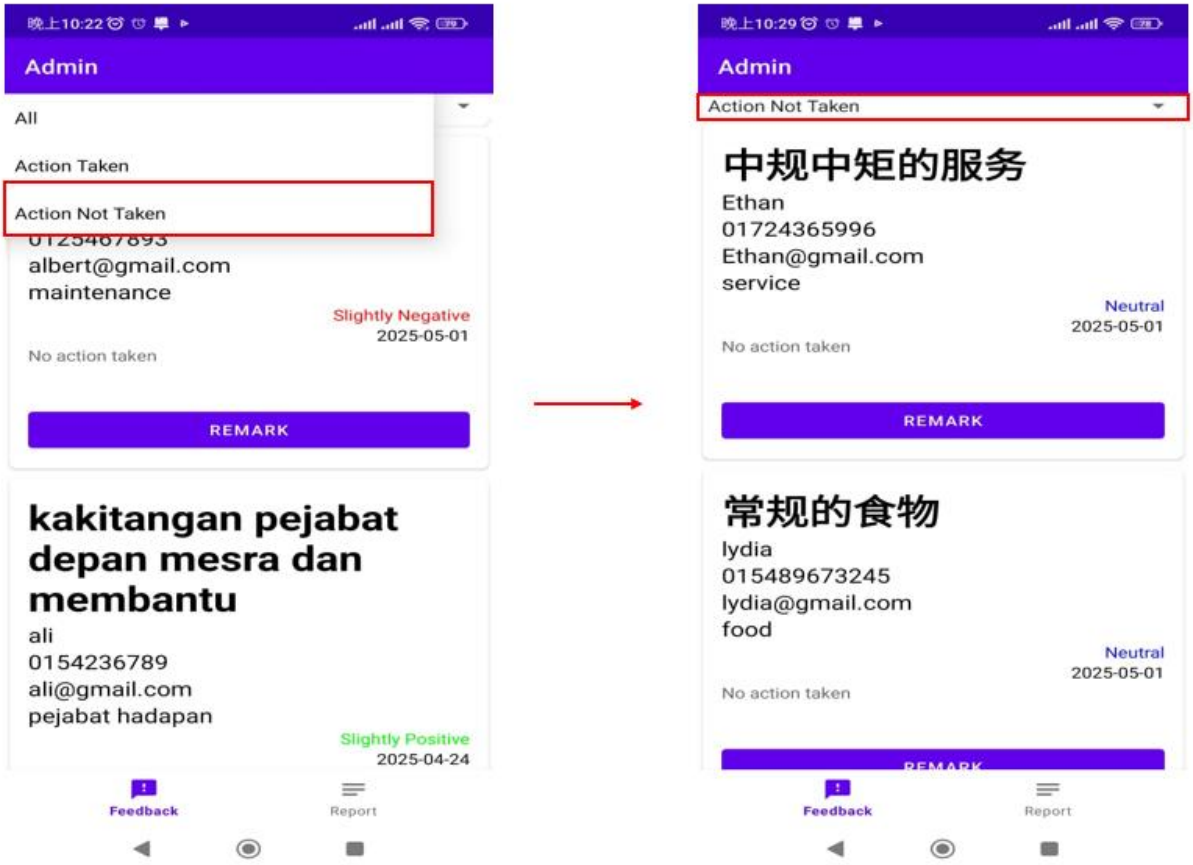

Figure 5.4.2.4 View Action not taken feedback

When users select 'Action Not Taken', all feedback where action has not been taken will be displayed.

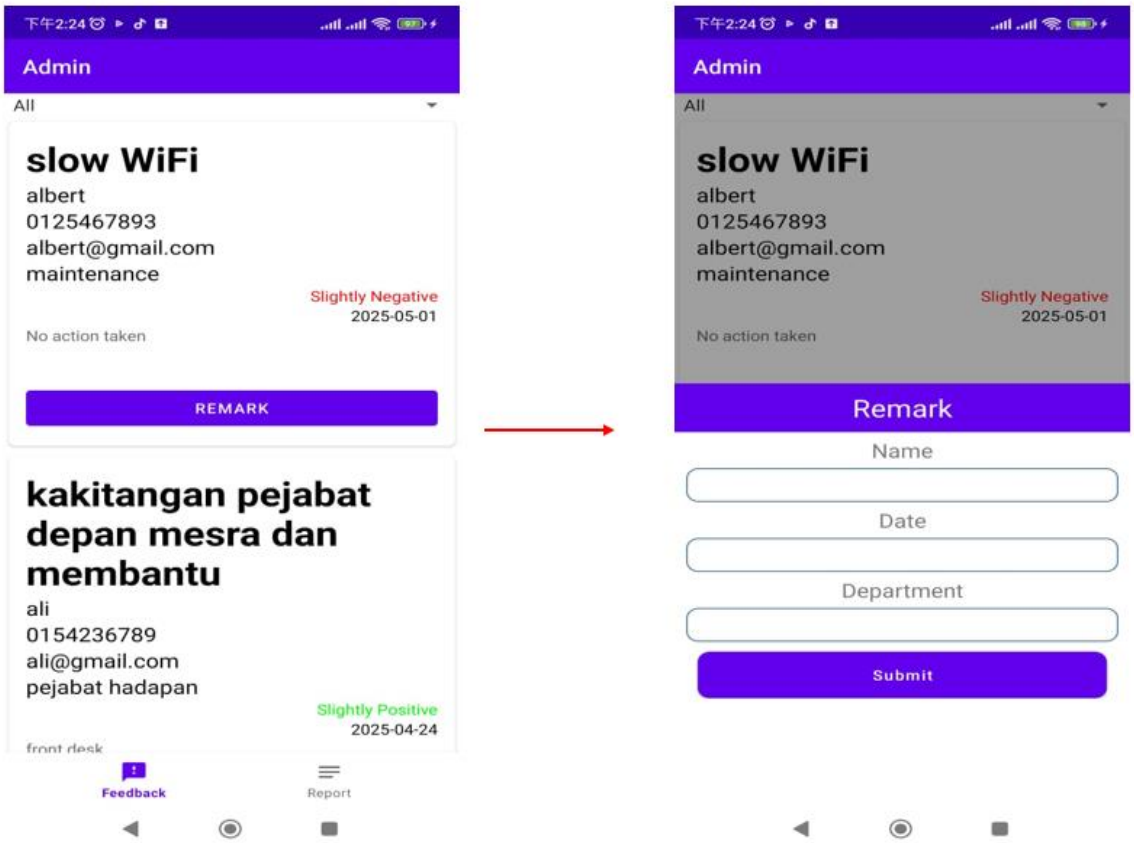

Figure 5.4.2.5 Create remark

Whenever an admin clicks the remark button, the system opens a remark window. This window displays a form requiring the admin to enter: their name, the remark date, and the relevant department.

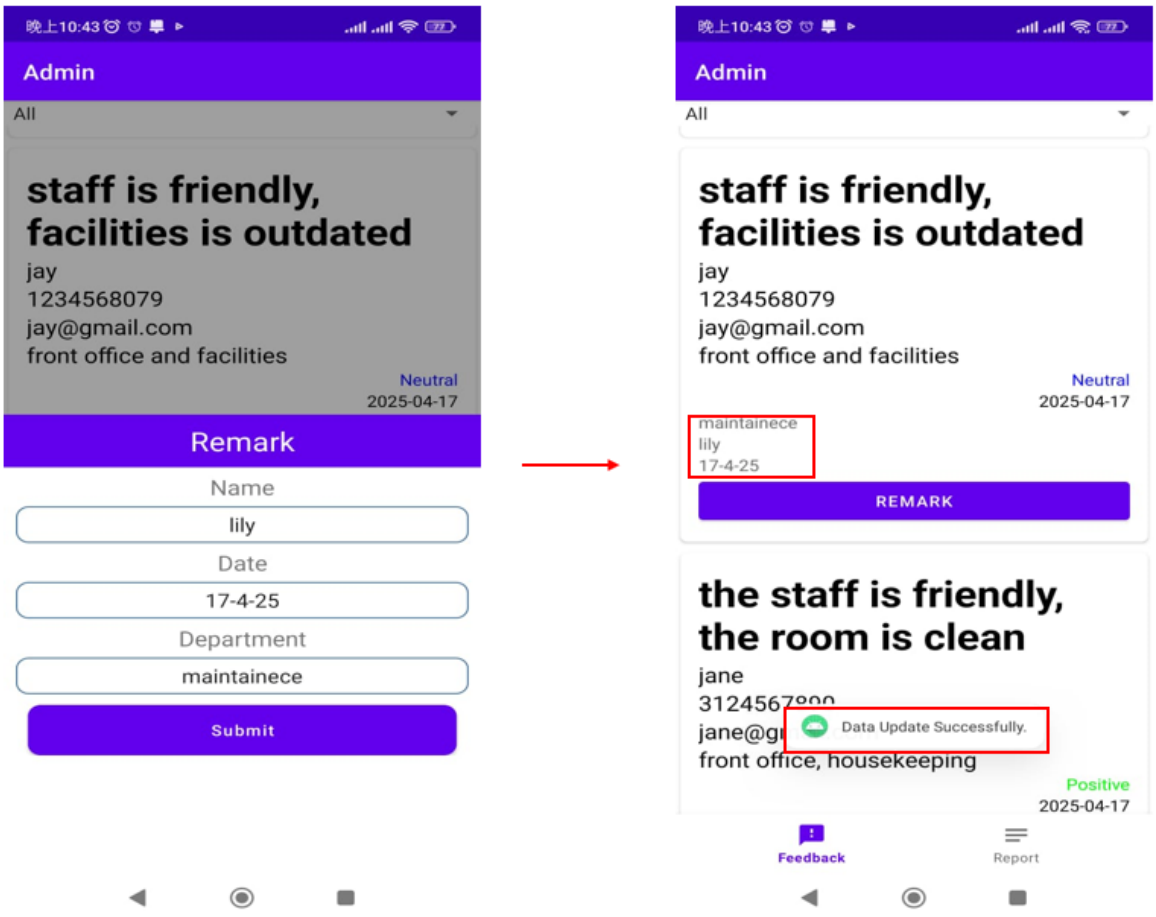

Figure 5.4.2.6 Save remark

After entering all required information, the admin can click submit. The system will then display a 'Data Updated Successfully' confirmation message. The remark data will be saved to Firebase and displayed in the feedback record.

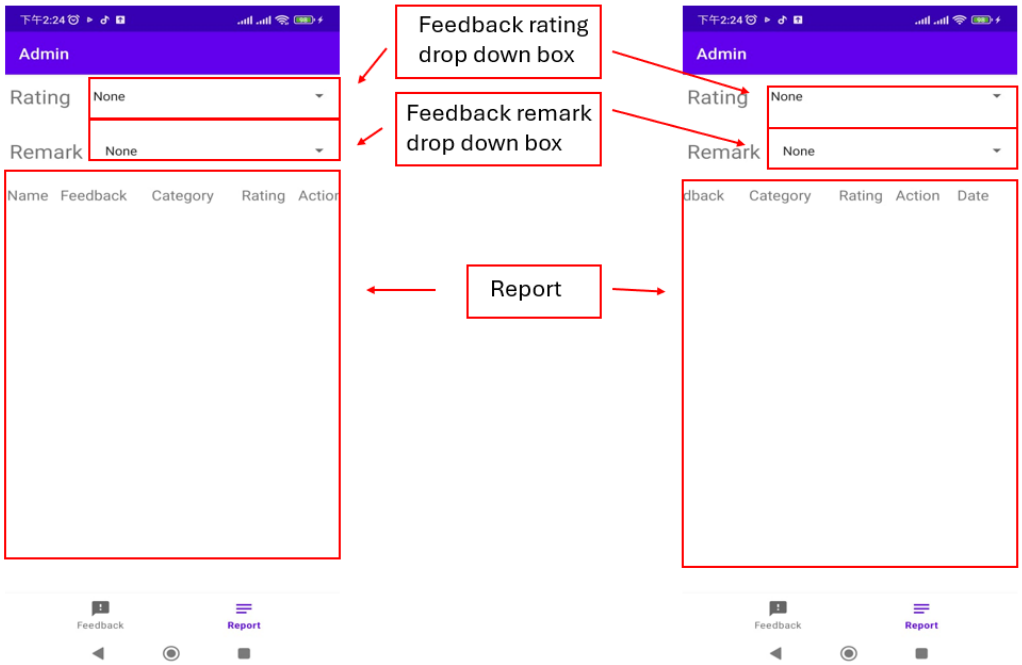

Figure 5.4.2.7 Report Page

When admin clicks the report icon in the bottom menu, system will display the report page. Report page contains rating dropdown box for admin to select feedback rating, remark dropdown box for admin to choose feedback remark, and a report view showing customer name, feedback content, category, feedback rating, feedback action, and action date.

Figure 5.4.2.8 Feedback rating drop down box

Whenever an admin selects the rating dropdown box, several choices appear for choosing: 'All', 'Positive', 'Slightly Positive', 'Neutral', 'Slightly Negative', and 'Negative'. If no selection is made, the default value remains 'None'.

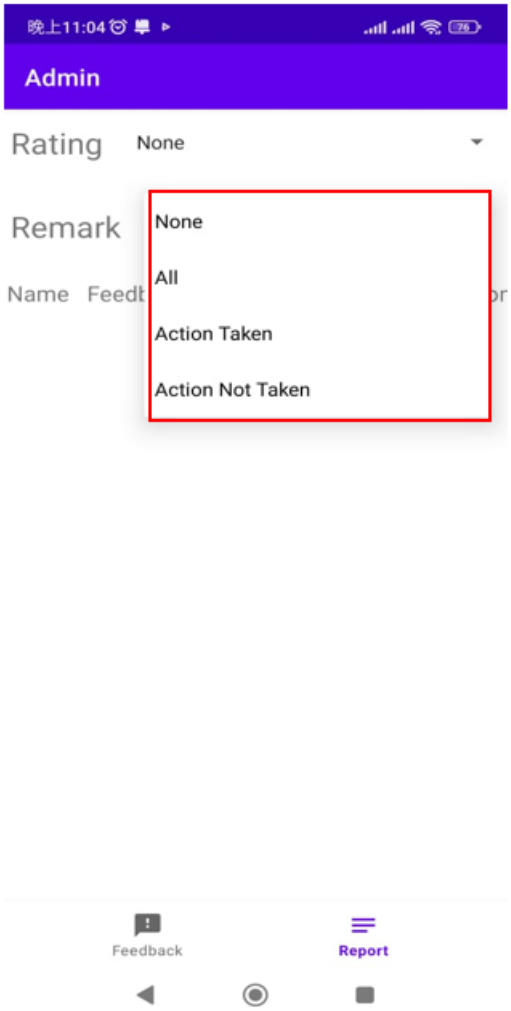

Figure 5.4.2.9 Feedback remark drop down box

Whenever an admin selects the remark dropdown box, several choices appear for choosing: 'All', 'Action Taken', and 'Action Not Taken'. If no selection is made, the default value remains 'None'.

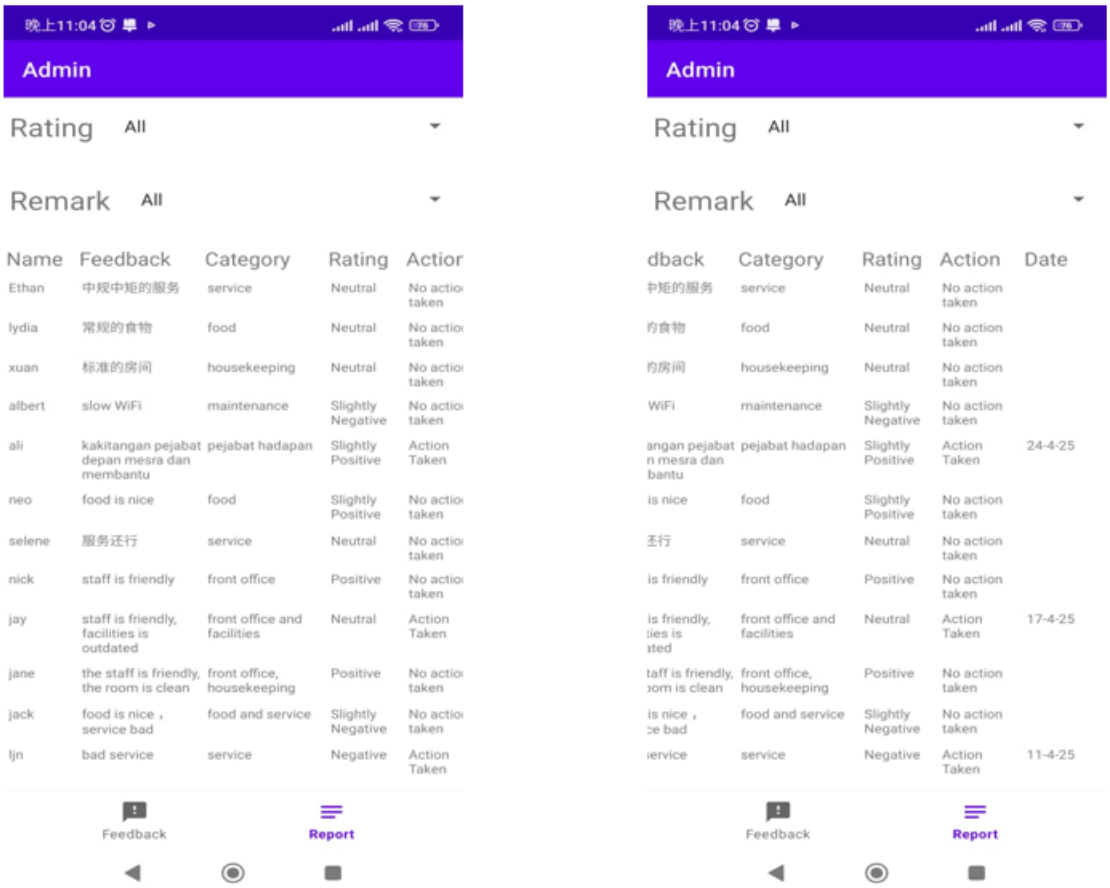

Figure 5.4.2.10 Feedback report

If the admin selects 'All' in both the rating and remark dropdown boxes, the system will display all feedback records. Each displayed entry will include: the customer's name, feedback content, category, feedback rating, action status, and action date.

Chapter 6 System Evaluation and Discussion

6.1 System Evaluation Survey Results

There were 15 respondents provided this feedback. The survey was divided into three parts: part one collected personal information and participants' hotel feedback experiences, part two centered on hotel customer feedback application, and part three focused on hotel admin application.

6.1.1 Section A - Personal Information and Hotel Feedback Experience

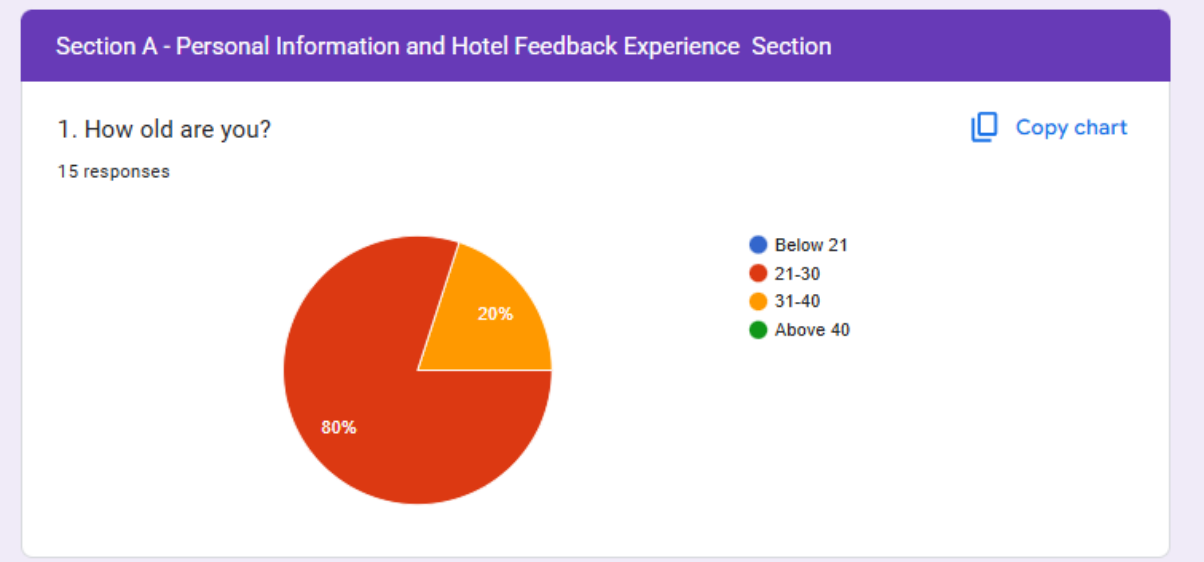

Figure 6.1.1.1 Respondents age

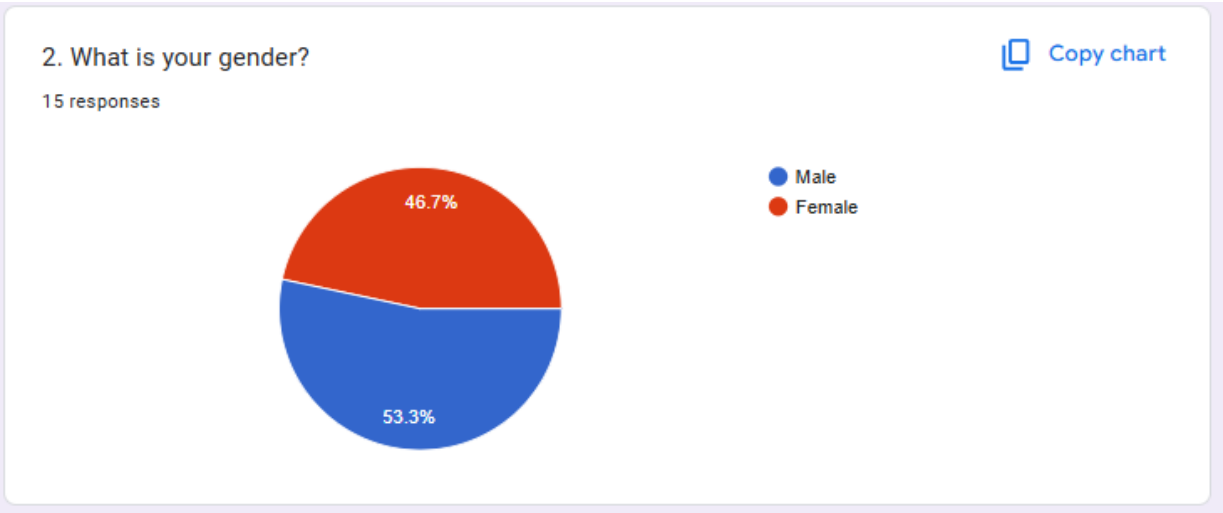

Figure 6.1.1.2 Respondents Gender

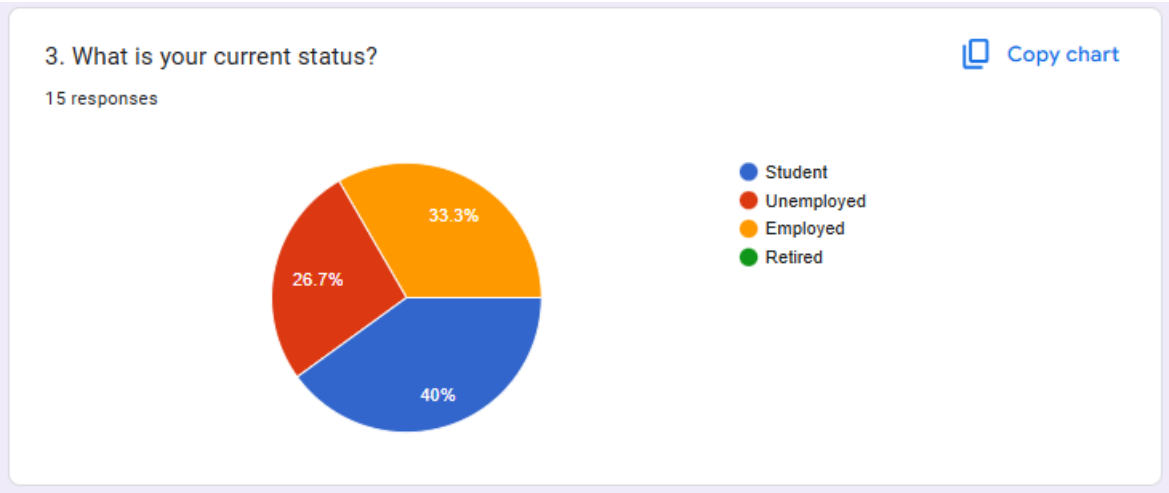

Figure 6.1.1.3 Respondents status

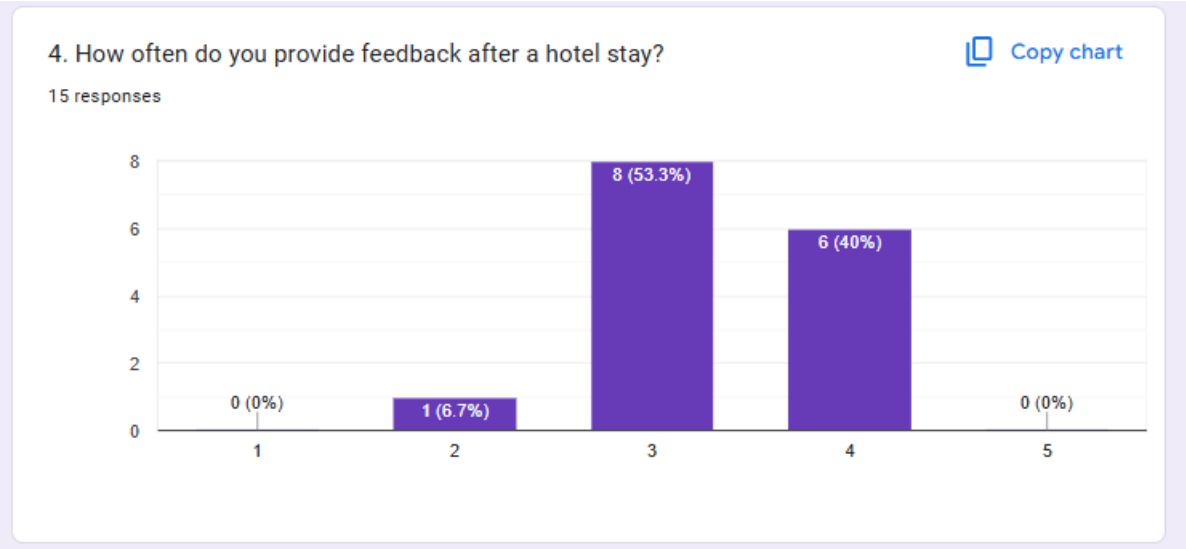

Figure 6.1.1.4 How often respondents provide hotel feedback

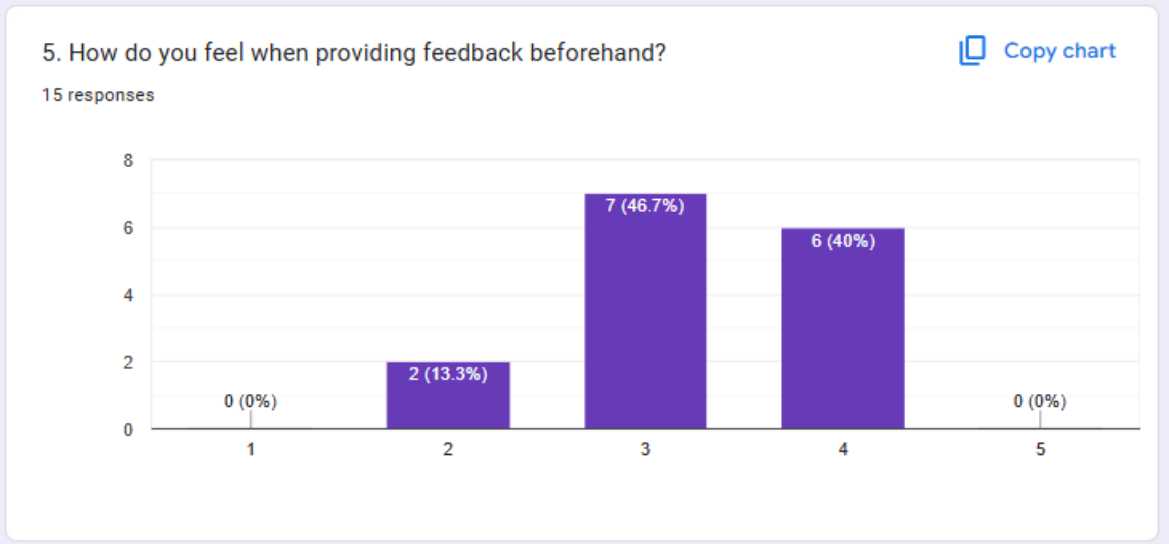

Figure 6.1.1.5 Feeling on providing hotel feedback

From survey results, we know that the majority of respondents are 21-30 years old, comprising 80% of the total. For gender of respondents, male accounts for 53.3%, more than female at 46.7%. The majority status of respondents is student, representing 40% in total. The majority of respondents fall into category 3 for providing feedback, accounting for 53.3% in total. Most respondents rated 3 for their feelings about providing hotel feedback.

6.1.2 Section B- Hotel Customer Feedback Application

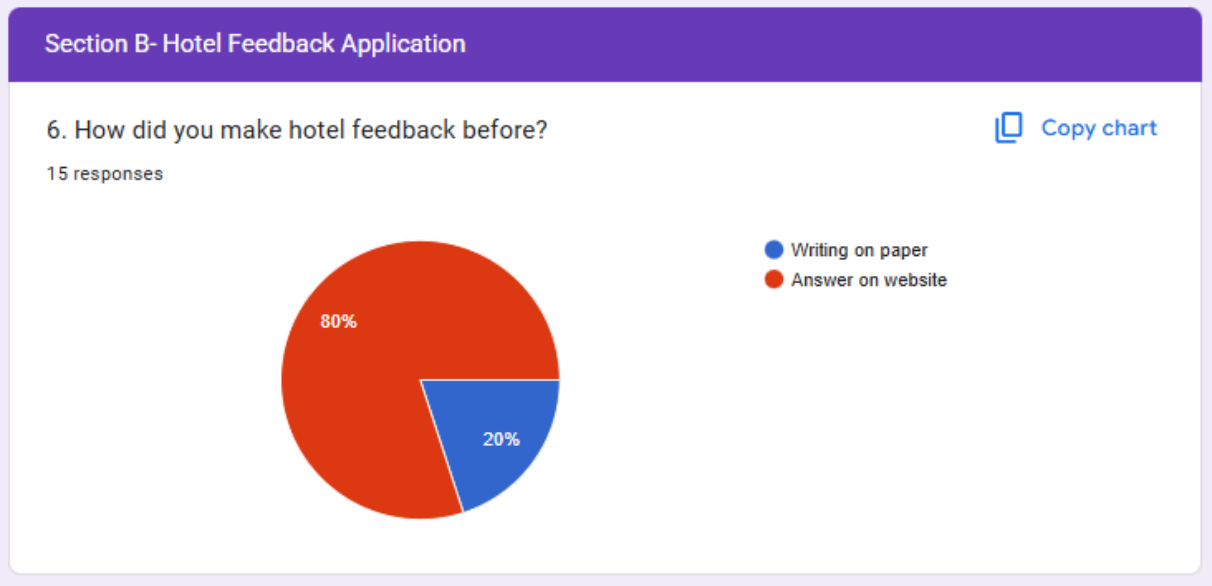

Figure 6.1.2.1 Prior feedback submission method

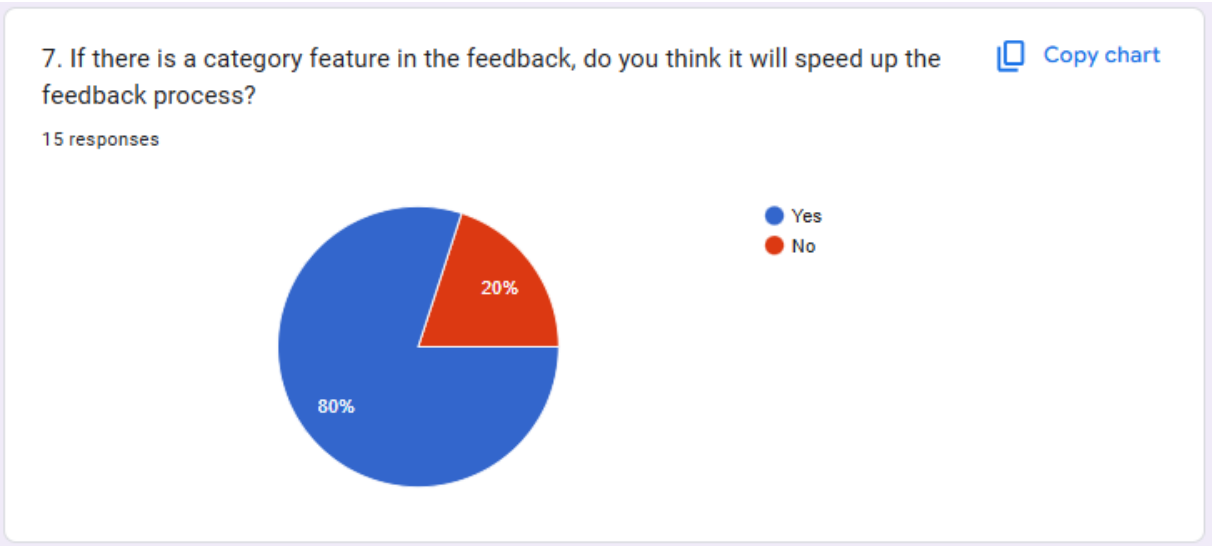

Figure 6.1.2.2 Can category help speed up feedback process

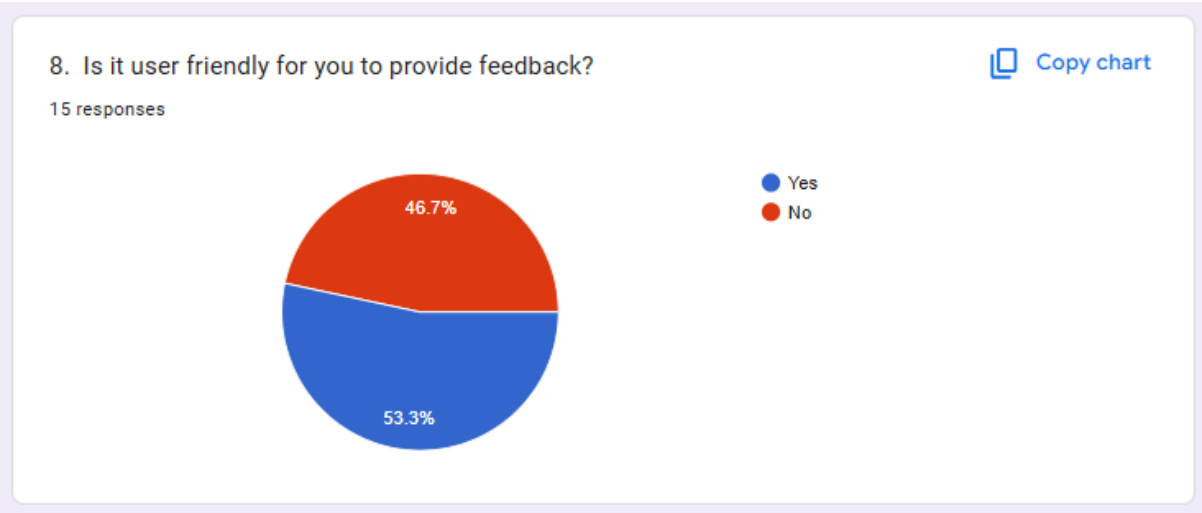

Figure 6.1.2.3 User friendly of application

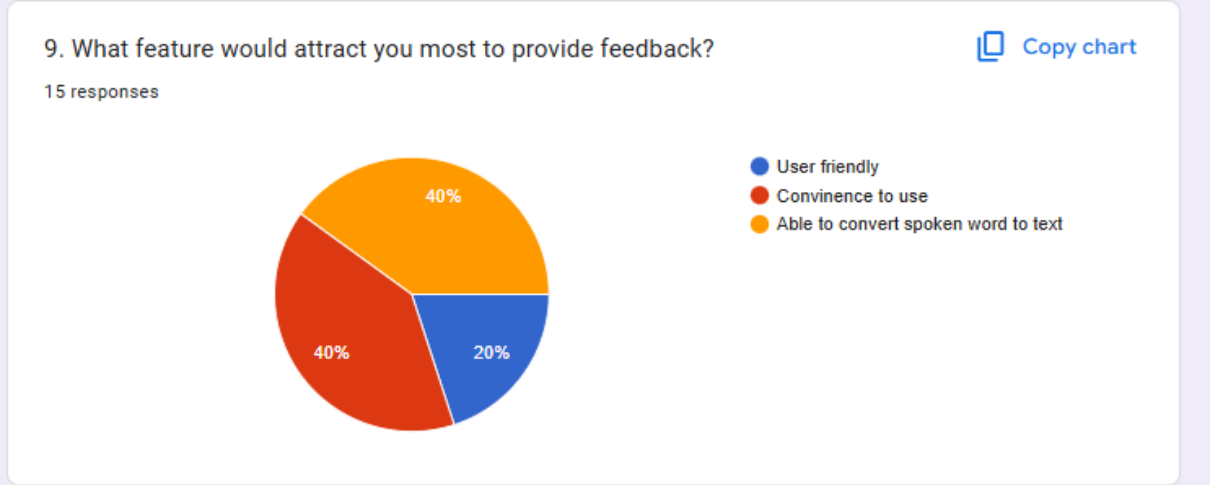

Figure 6.1.2.4 Feature to attract respondent

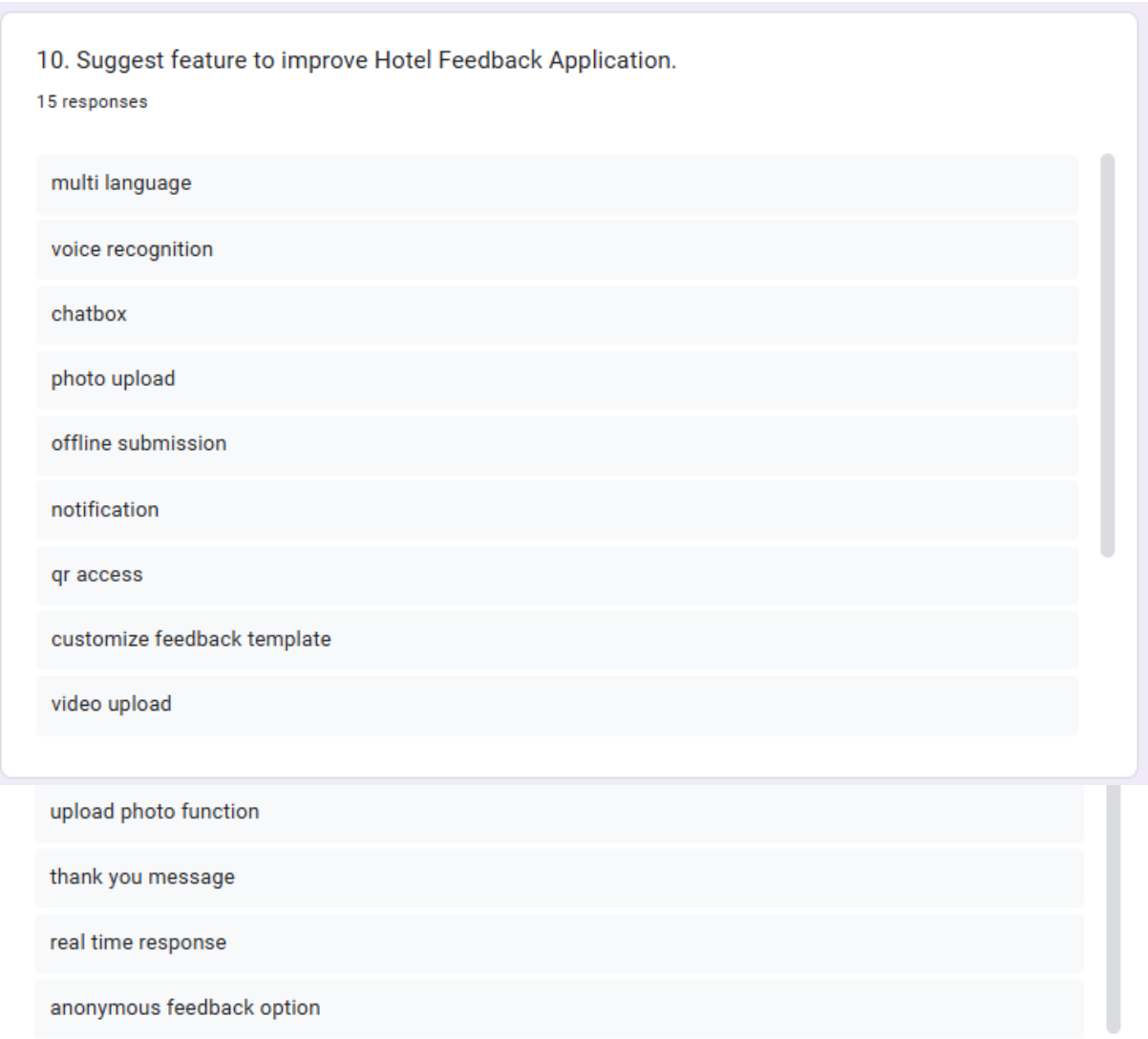

Figure 6.1.2.5 Recommend of respondent

The majority of respondents have made feedback on the website before, accounting for 80% in total. 80% of respondents feel that categories help to speed up the feedback process. 53.3% of respondents find it user-friendly to provide feedback. The features that attract respondents most to provide feedback are convenience to use and ability to convert speech to text, at 40%. From respondents' suggestions, multi-language support might be the most suitable addition for the application.

6.1.3 Section C - Hotel Admin Application

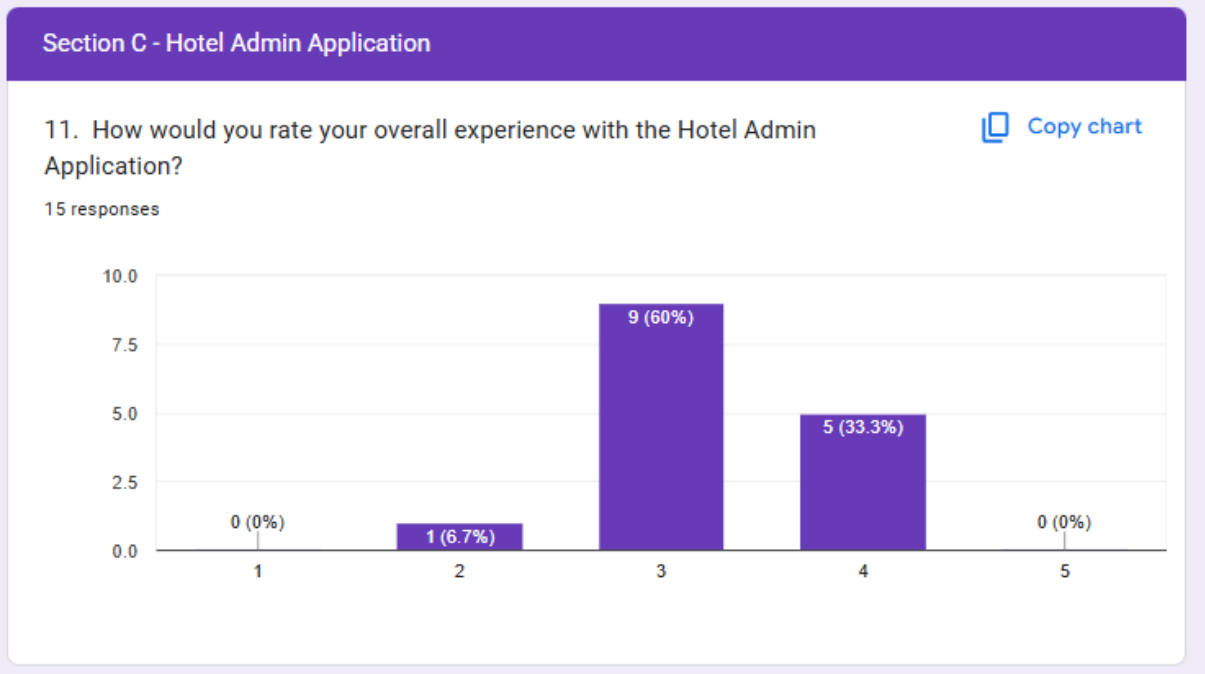

Figure 6.1.3.1 Overall experience on Hotel Admin Application

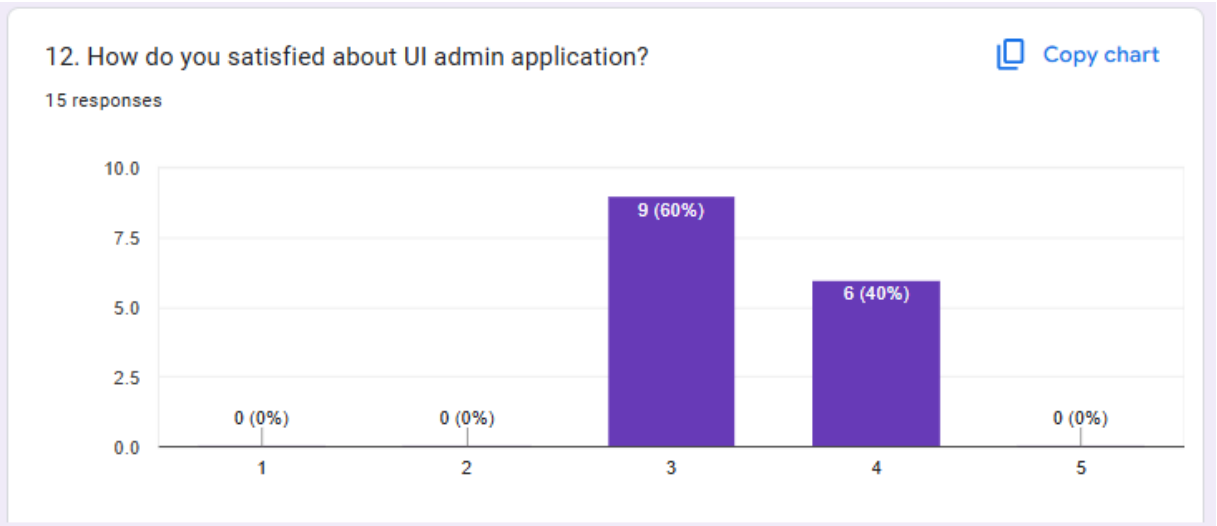

Figure 6.1.3.2 Satisfaction of the admin UI

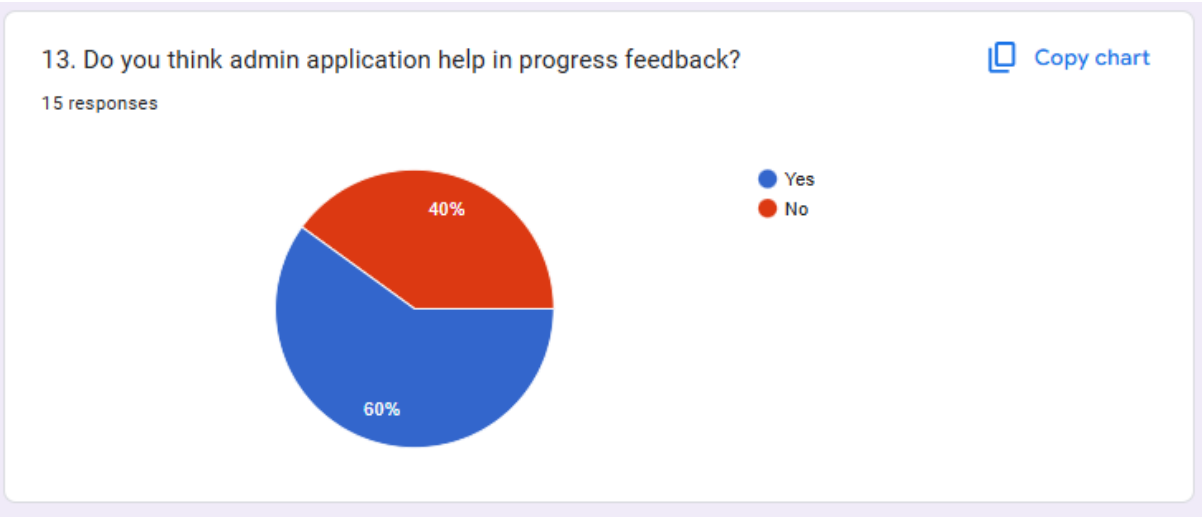

Figure 6.1.3.3 Opinion of respondents

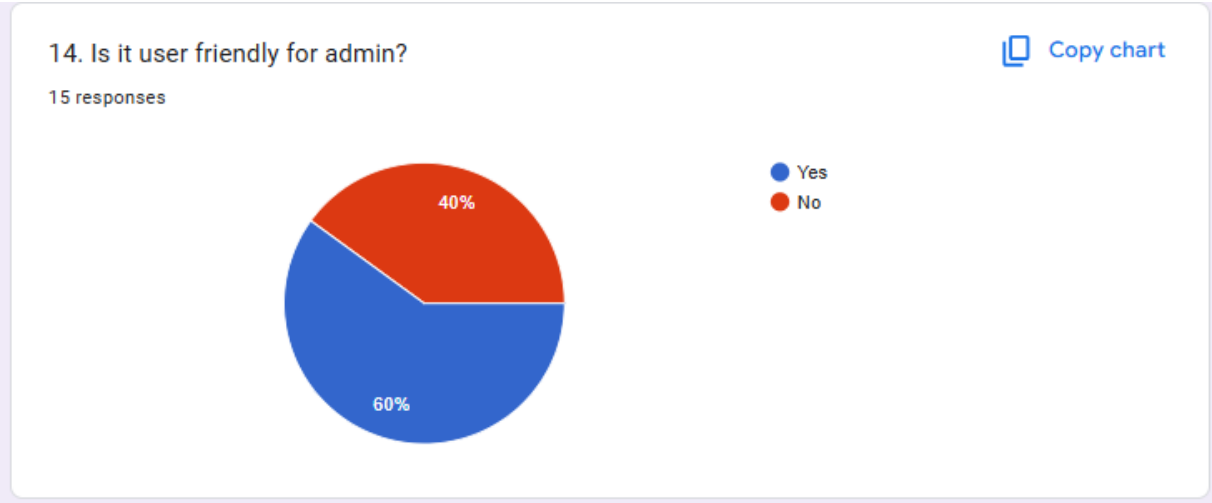

Figure 6.1.3.4 User friendly of the application

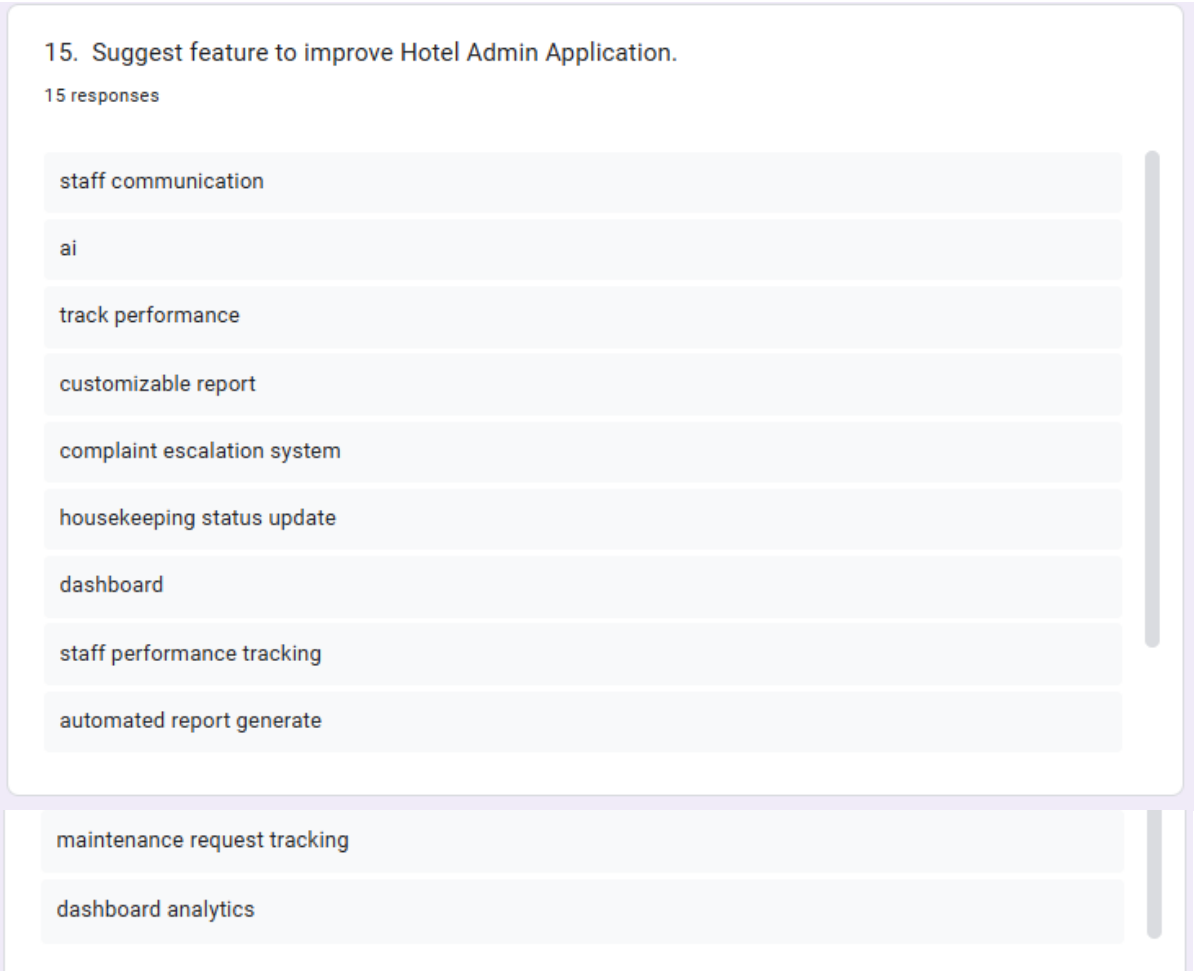

Figure 6.1.3.5 Recommend of respondent

Most respondents rate their overall experience as 3, comprising 60% in total. 60% of respondents rate their satisfaction with the admin application UI as 3. 60% of respondents believe the admin application helps in processing feedback and find the admin application user-friendly. From respondents' suggestions, customizable reports might be the most suitable addition for the admin application.

6.2 Testing Setup and Result

6.2.1 User Mobile Application

6.2.1.1 Test Case 1 – Main Application

Test Case	Target Output	System Output
Select feedback button	Navigate to feedback page	Display feedback page
Select history button	Navigate to history page	Display history page

Table 6.2.1.1 Test Case 1 – Main Application

6.2.1.2 Test Case 2 – Feedback page

Test Case	Target Output	System Output
Enter in information	Allows user to enter in information	Information success to fill in
Select date	Able to choose date in calendar	Success to choose date and selected display in text
Click voice recognition	Able to capture voice and convert to text	Success to capture voice and convert to text
Show sentiment result	Able to use feedback inserted to do analysis and display result	Success shows sentiment result based on inserted feedback
Click submit button when all information filled	Able to save all information in firebase	Success to save all information in firebase
Click submit button when information is not fully filled	Not able to save information in firebase	Information failed to save in firebase

Table 6.2.1.2 Test Case 2 – Feedback page

6.2.1.2 Test Case 3 – History page

Test Case	Target Output	System Output
Pulls record from firebase	Display all comments for viewing	Display all feedback for viewing

Table 6.2.1.3 Test Case 3 – History page

6.2.2 Admin Mobile Application

6.2.2.1 Test Case 4 – Main Application

Test Case	Target Output	System Output
Select feedback button	Navigate to feedback page	Display feedback page
Select report button	Navigate to report page	Display report page

Table 6.2.2.1 Test Case 4 – Main Application

6.2.2.2 Test Case 5 – Feedback page

Test Case	Target Output	System Output
Retrieve data from firebase	Display all feedback for viewing	Display all feedback for viewing
Select sorting drop down menu	Display drop down menu for choosing	Success to display drop down menu and able to do selection
Click “All” button from drop down menu	Display all comment	All comments successfully displays
Click “Action Taken” button from drop down menu	Display only “Action Taken” feedback	All “Action Taken” feedback display only
Click “Action Not Taken” button from drop down menu	Display only “Action Not Taken” feedback	All “Action Not Taken” feedback display only
Click remark button	Able to display remark form	Remark form successfully display
Click submit button	Able to save remark information in firebase	Success to save remark data in firebase

Table 6.2.2.2 Test Case 5 – Feedback page

6.2.2.3 Test Case 6 – Report page

Test Case	Target Output	System Output
Select rating drop down box	Display rating drop down box for selection	Success to display rating drop down box and able to do selection
Click remark drop down box	Display remark drop down box for selection	Success to display remark drop down box and able to do selection
Click "None" button for remark and rating	Display only "None" feedback	All "None" feedback display only
Click "All" button for remark and rating	Display all feedback	All feedback successfully displays
Click "None" for rating and select "None" or "All" or "Action Taken" or "Action Not Taken" for remark	Did not display feedback	No feedback display
Click "None" or "All" or "Positive" or "Slightly Positive" or "Neutral" or "Slightly Negative" or "Negative" for rating and click "None" for remark	Did not display feedback	No feedback display
Click "All" for rating and click "Action Taken" for remark	Able to display all feedback that had action taken	All action taken feedback success display
Click "All" for rating and click "Action Not Taken" for remark	Display all feedback that action not taken	All action not taken feedback success display
Click "Positive" for rating and click "All" from remark	Display all feedback with positive rating	All positive rating feedback display

Click “Positive” for rating and click “Action Taken” from remark	Display all action taken feedback with positive rating	All action taken positive rating feedback display
Click “Positive” for rating and click “Action Not Taken” for remark	Display all action not taken feedback with positive rating	All action not taken positive rating feedback display
Click “Slightly Positive” for rating and click “All” for remark	Display all feedback with slightly positive rating	All slightly positive rating feedback display
Click “Slightly Positive” for rating and click “Action Taken” for remark	Display all action taken feedback with slightly positive rating	All action taken slightly positive rating feedback display
Click “Slightly Positive” for rating and click “Action Not Taken” for remark	Display all action not taken feedback with slightly positive rating	All action not taken slightly positive rating feedback display
Click “Neutral” for rating and click “All” for remark	Display all feedback with neutral rating	All neutral rating feedback display
Click “Neutral” for rating and click “Action Taken” for remark	Display all action taken feedback with neutral rating	All action taken neutral rating feedback display
Click “Neutral” for rating and click “Action Not Taken” for remark	Display all action not taken feedback with neutral rating	All action not taken neutral rating feedback display
Click “Slightly Negative” for rating and click “All” for remark	Display all feedback with slightly negative rating	All slightly negative rating feedback display
Click “Slightly Negative” for rating and click “Action Taken” for remark	Display all action taken feedback with slightly negative rating	All action taken slightly negative rating feedback display

Click “Slightly Negative” for rating and click “Action Not Taken” for remark	Display all action not taken feedback with slightly negative rating	All action not taken slightly negative rating feedback display
Click “Negative” for rating and click “All” for remark	Display all feedback with negative rating	All negative rating feedback display
Click “Negative” for rating and click “Action Taken” for remark	Display all action taken feedback with negative rating	All action taken negative rating feedback display
Click “Negative” for rating and click “Action Not Taken” for remark	Display all action not taken feedback with negative rating	All action not taken negative rating feedback display

Table 6.2.2.3 Test Case 6 – Report page

6.2.3 Accuracy of Sentiment Analysis

6.2.3 1 Test Case 7 – Accuracy of Sentiment Analysis

Test Case	Target Output	System Output	Result
Analyze “bad service”	Negative	Negative	Pass
Analyze “food is nice， service bad”	Slightly Negative	Slightly Negative	Pass
Analyze “the staff is friendly, the room is clean”	Positive	Positive	Pass
Analyze “staff is friendly, facilities is outdated”	Neutral	Neutral	Pass
Analyze “staff is friendly”	Positive	Positive	Pass
Analyze “服务还行”	Neutral	Neutral	Pass
Analyze “food is nice”	Slightly Positive	Slightly Positive	Pass
Analyze “kakitangan pejabat depan mesra dan membantu”	Slightly Positive	Slightly Positive	Pass
Analyze “Slow WIFI”	Slightly Negative	Slightly Negative	Pass
Analyze “标准的房间”	Neutral	Neutral	Pass

Table 6.2.3.1 Test Case 7 – Accuracy of Sentiment Analysis

6.2.4 Accuracy of Voice Recognition

6.2.4.1 Test Case 8 – Accuracy of Voice Recognition

Test Case	Target Output	System Output	Result
Speak “bad service”	“bad service”	“bad service”	Pass
Speak “服务还行”	“服务还行”	“服务还行”	Pass
Speak “food is nice”	“food is nice”	“food is nice”	Pass
Speak “Slow WIFI”	“Slow WIFI”	“Slow WIFI”	Pass
Speak “fresh food”	“fresh food”	“fresh food”	Pass
Speak “标准的房间”	“标准的房间”	“标准的房间”	Pass
Speak “中规中矩的服务”	“中规中矩的服务”	“中规中矩的服务”	Pass
Speak “常规的食物”	“常规的食物”	“常规的食物”	Pass
Speak “impressive service”	“impressive service”	“impressive service”	Pass
Speak “common food”	“common food”	“common food”	Pass

Table 6.2.4.1 Test Case 8 – Accuracy of Voice Recognition

6.3 Implementation Issues and Challenges

This initiative faced considerable obstacles because of the merging of two different technologies: Python (for sentiment analysis) and Android Studio (for app creation). The core hurdle was bridging the gap between these ecosystems—Python and Java—requiring extensive research to establish seamless communication within a mobile environment. Limited documentation further complicated the process.

After thorough exploration, I identified ChaquO as a framework to run Python code in Android Studio. However, this introduced a new obstacle: the latest Python version's incompatibility with critical libraries like NLTK (Natural Language Toolkit), essential for sentiment analysis. To resolve this, I downgraded Python, sacrificing newer features to ensure functionality.

A separate challenge arose when retrieving Firebase data in Android Studio, specifically within an adapter nested in a fragment. Early efforts to handle data from the primary fragment were unsuccessful, demanding a redesigned approach to handle operations within the adapter's constraints.

In summary, this project demanded rigorous problem-solving—from reconciling programming languages to addressing compatibility challenges and enhancing data flow. Despite these hurdles, the process provided invaluable insights into cross-platform integration and adaptive development.

6.4 Timeline

Task ID	Task	Task Duration	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13
	1: INTRODUCTION														
1	Problem Statement and Motivation	1													
2	Objective	1													
3	Project Scope and Direction	1													
4	Contribution	1													
	2: LITERATURE REVIEW														
5	Find Hotel Feedback System	1													
6	Summary of Limitation	1													
7	Comparison Table	1													
	3: SYSTEM METHODOLOGY														
8	Methodology	1													
9	System Equation	1													
10	Use Case diagram	2													
	4: SYSTEM DESIGN														
11	System flow of Sentiment Analysis	1													
12	Syetem Flow of User Mobile Application	2													
13	System Flow of Admin Mobile Appication	2													
	5:IMPLEMENT AND TESTING														
14	Hardware Setup	1													
15	Software Setup	1													
16	Setting and Configurataion	2													
17	Sytem Operation	5													
	6: SYSTEM EVALUATION DISCUSSION														
18	System Evaluation Survey Results	1													
19	Testing Setup and Result	2													
20	Implementation Issues and Challenges	1													
	7: CONCLUSION AND RECCOMENDATION														
21	Conclusion	1													
22	Recommendation	1													
23	Finalize FYP2 Report	2													
24	FYP2 Report Submission	1													

Figure 6.4 Timeline

6.5 Objective Evaluation

The project effectively reached objectives by implementing a voice recognition feature that streamlines the feedback submission process. This innovative function enables customers to provide feedback through speech, significantly enhancing convenience and efficiency. Users simply press the voice recognition button and speak their comments, which are automatically converted into text.

The feedback system includes a categorization feature that assists administrators in promptly identifying the relevant department for each piece of feedback, whether positive or negative. This functionality enables swift response to department-specific issues, facilitating rapid performance improvements across hotel operations.

The integrated sentiment analysis provides administrators with immediate insights into customer emotions and opinions. The system categorizes feedback into five distinct sentiment levels (positive, slightly positive, neutral, slightly negative, negative), allowing for quick assessment of overall customer satisfaction. The analysis evaluates feedback based on keywords entered by customers, which may reflect mixed sentiments about different aspects of service. For example, a comment such as "staff is friendly, but facilities are outdated" presents positive feedback about personnel but negative remarks about infrastructure. In such cases, the system calculates an overall neutral sentiment while still identifying the specific positive and negative elements for different departments.

This comprehensive solution combines voice recognition, intelligent categorization, and sentiment analysis to create an efficient feedback management system that benefits both customers and hotel administration.

Chapter 7 Conclusion and Recommendation

7.1 Conclusion

Hotels, being the main accommodation choice for tourists, greatly influence Malaysia's tourism industry. Their performance is crucial, leading hotels to implement feedback systems to collect customer opinions for improvement. However, current feedback systems still struggle to quickly translate feedback into actionable improvements.

First, hotels require excessive time to collect feedback. When using written feedback methods, many customers decline to participate due to today's fast-paced society.

Next, collected customer feedback is disorganized and time-consuming to process. The messy feedback requires staff to first identify relevant departments before forwarding the information for improvements. This lengthy process slows down hotel enhancement efforts.

Additionally, hotel staff face difficulties understanding customer sentiments. The overwhelming volume of feedback makes it challenging to quickly grasp customer feelings. Staff need considerable time to properly comprehend customer opinions and relay them to appropriate departments.

To address these issues, I investigated existing feedback systems at Eastern & Oriental Hotel, MTREE Hotel, and Grand Kampar Hotel. My research revealed similar problems to those mentioned above.

Based on these findings, I propose implementing voice recognition to accelerate feedback collection, along with a categorization feature to help staff process feedback faster. The system will also include sentiment analysis to provide immediate insight into customer emotions. In essence, designed to solve persistent issues in hotel feedback collection, this initiative enhances response quality and guest satisfaction.

7.2 Recommendations

A comprehensive survey was carried out to determine potential enhancement opportunities within the hotel feedback system. The proposed technological solution aims to facilitate the complete feedback management cycle, catering to both end-user customers and administrative users (primarily comprising management personnel). This integrated system architecture is specifically designed to mitigate prevalent challenges observed in conventional hotel feedback systems.

Using survey methods enables understanding of different customer perspectives, which may help address system weaknesses. By identifying these weaknesses, developers can improve the system. Evaluation surveys help developers better understand the application from customers' viewpoints.

First, based on respondents' recommendations, multi-language support was implemented. Keywords in Chinese and Malay were added to the sentiment analysis library. This enhancement helps better analyze emotions of Chinese and Malay-speaking users.

The second recommendation from respondents was customizable reports. This feature distinguishes between the two most critical feedback elements: ratings (customer satisfaction levels) and remarks (whether administrative action was taken).

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Appendix

Survey Question Form

Survey for user experience for Final Year Project - Hotel Feedback System

Greetings, I am Low Jiang Nan, a final-year undergraduate student pursuing a degree in Information Systems with a specialization in Business Information Systems. I am currently conducting a research study titled "Hotel Feedback System." As part of this project, I am collecting feedback from users to better understand their experiences. I would sincerely appreciate a few minutes of your time to share your valuable insights by answering the following questions. Your input will play a crucial role in advancing my research.

Here is the information that needs to be conveyed:

1. Purpose of the Questionnaire:

- Improving the customer feedback experience.
- Streamlining feedback management for managers.
- Ensuring continuous application enhancement.

2. This questionnaire is divided into two sections:

- Section A - Personal Information and Hotel Feedback Experience
- Section B- Hotel Feedback Application
- Section C - Hotel Admin Application

* Indicates required question

Acknowledgement *

By taking part in this questionnaire, I acknowledge that my participation is entirely
voluntary. I am aware that the information I provide will be utilized solely for research and development purposes, handled with strict confidentiality, and anonymized for collective analysis. I grant permission for the gathered data to be used in analysis and reporting, with the assurance that my personal information will not be disclosed in any subsequent publications or reports.

◯ Yes

◯ No

Section A - Personal Information and Hotel Feedback Experience Section

1.How old are you? *

- ◯ Below 21
- ◯ 21-30
- ◯ 31-40
- ◯ Above 40

2.What is your gender

- ◯ Male
- ◯ Female

3.What is your current status *

- ◯ Student
- ◯ Unemployed
- ◯ Employed
- ◯ Retired

4. How often do you provide feedback after a hotel stay? *

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

5. How do you feel when providing feedback beforehand? *

	1	2	3	4	5	
Very dissatisfied	◯	◯	◯	◯	◯	Very satisfied

Section B- Hotel Feedback Application

6.How did you make hotel feedback before? *

- ◯ Writing on paper
- ◯ Answer on website

7. Is it convenient for you to provide feedback? *

- ◯ Yes
- ◯ No

8. Is it user friendly for you to provide feedback? *

- ◯ Yes
- ◯ No

What feature would attract you most to provide feedback? *

- ◯ User friendly
- ◯ Convinence to use
- ◯ Able to convert spoken word to text

10. Suggest feature to improve Hotel Feedback Application. *

Your answer

Section C - Hotel Admin Application

11. How would you rate your overall experience with the Hotel Admin Application? *

	1	2	3	4	5	
Very Poor	○	○	○	○	○	Excellent

12. How do you satisfied about UI admin application? *

	1	2	3	4	5	
Very dissatisfied	○	○	○	○	○	Very satisfied

13. Do you think admin application help in progress feedback? *

○ Yes

○ No

14. Is it user friendly for admin? *

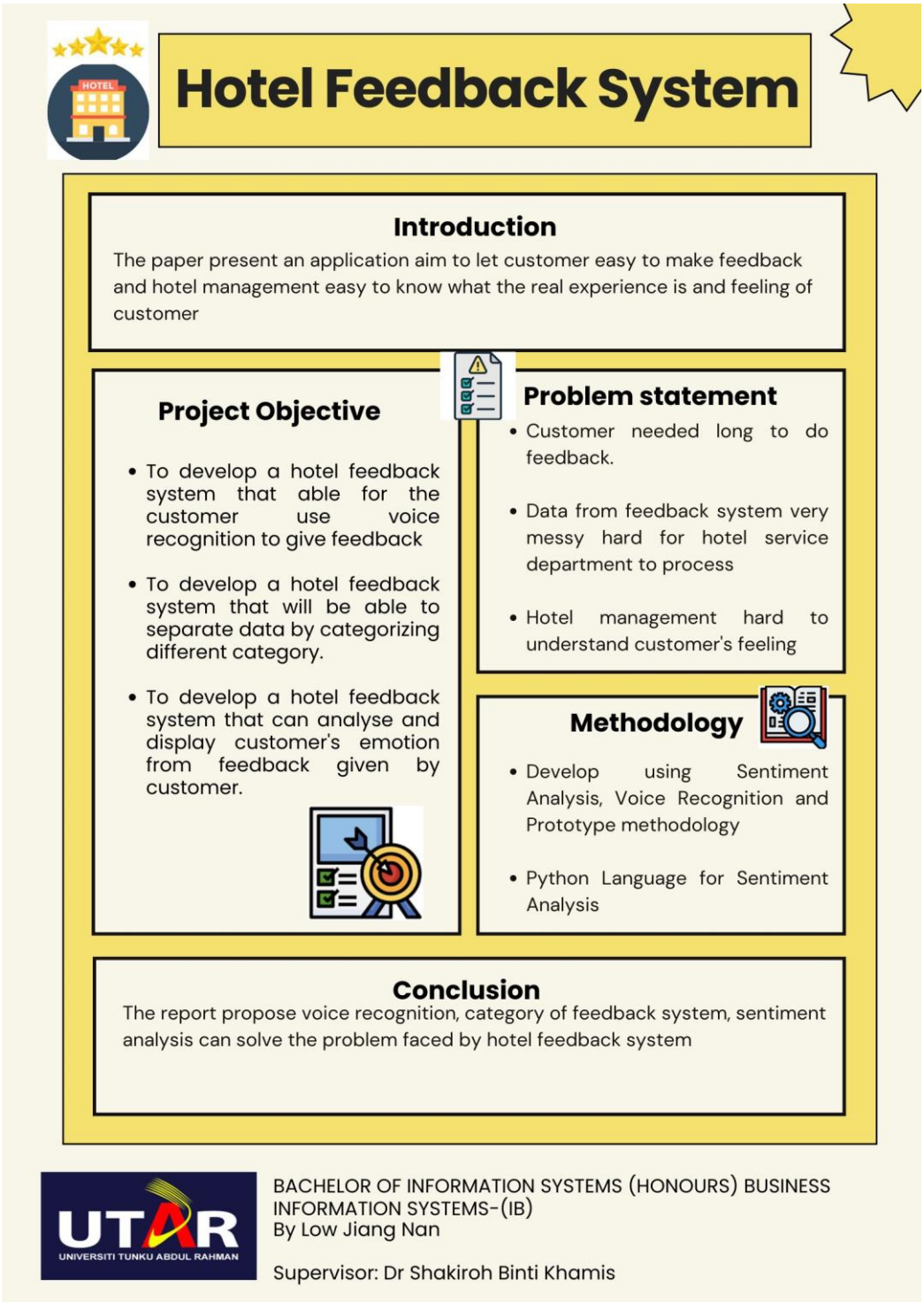
○ Yes

○ No

15. Suggest feature to improve Hotel Admin Application.

Your answer

POSTER


Hotel Feedback System
Introduction
The paper present an application aim to let customer easy to make feedback and hotel management easy to know what the real experience is and feeling of customer
Project Objective
• To develop a hotel feedback system that able for the customer use voice recognition to give feedback
• To develop a hotel feedback system that will be able to separate data by categorizing different category.
• To develop a hotel feedback system that can analyse and display customer's emotion from feedback given by customer.
Problem statement
• Customer needed long to do feedback.
• Data from feedback system very messy hard for hotel service department to process
• Hotel management hard to understand customer's feeling
Methodology
• Develop using Sentiment Analysis, Voice Recognition and Prototype methodology
• Python Language for Sentiment Analysis
Conclusion
The report propose voice recognition, category of feedback system, sentiment analysis can solve the problem faced by hotel feedback system
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