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RateRelay

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Disclaimer Statement:

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Table of Contents:

Abstract	7
Chapter 1: Introduction	8
1.1 Statement of the problem	8
1.2 Objectives	8
Features for Normal Users	8
Features for Businesses Administrators	9
1.3 Significance of the work	10
1.4 Organization of the report	10
Chapter 2: Constraints, Standards/ Codes, and Earlier course work	12
2.1 Constraints	12
2.2 Standards and codes	12
2.3 Earlier coursework	12
Chapter 3: Literature Review	14
Chapter 4: Methodology	15
4.1 RateRelay Application (User Interface)	15
4.2 RateRelay Website (Business Administrator Interface)	49
4.3 RateRelay Website on Tablet and Mobile	85
4.4 Sentiment Analysis AI model	98
Chapter 5: Results and Analysis	99
Chapter 6: Conclusion	99
References	101

List of Figures:

Figure 1: First onboarding screen	16
Figure 2: Second onboarding screen	16
Figure 3: Third onboarding screen	16
Figure 4: Application sign-up screen.	17
Figure 5: Application sign-up validations.	17
Figure 6: Application sign-up username warning.	18
Figure 7: Application sign-up email warning.	18
Figure 8: Application success sign-up screen.	19
Figure 9: Application welcoming email sign-up screen.	19
Figure 10: Application forgot password screen.	20
Figure 11: Application check email screen.	20
Figure 12: Application user not found warning screen.	20
Figure 12: Application OTP email screen	21
Figure 13: Application OTP code screen	21
Figure 14: Application invalid OTP warning screen.	22
Figure 15: Application reset password screen	23
Figure 16: Application success reset password screen	23
Figure 17: Application sign-in screen	24
Figure 18: Application sign-in user not found warning	24
Figure 19: Application sign-in wrong password warning	24
Figure 20: Application user profile screen.	25
Figure 21: Application pick profile picture.	26
Figure 22: Application success updating profile picture	26
Figure 23: Application update bio screen	27
Figure 24: Application success updating bio screen	27
Figure 25: Application first user feedback screen	28
Figure 26: Application second user feedback screen	28
Figure 27: Application filter feedback depending on the business name screen	29
Figure 28: Application filter feedback depending on category screen	30
Figure 29: Application filtered feedback for restaurants category screen	30
Figure 30: Application sort feedback in either chronological order or reverse chronological order	31
Figure 31: Application sort feedback in chronological order	31
Figure 32: Application feedback deletion confirmation page.	32
Figure 33: Application followed businesses screen	33

Figure 34: Application actions button on the profile screen	34
Figure 35: Application reset password screen	34
Figure 36: Application reset password screen validations	34
Figure 37: Application success reset password screen	35
Figure 38: Application Home screen - gym category	36
Figure 39: Application home screen - beauty category	37
Figure 40: Application home screen - clothes category	37
Figure 41: Application home screen - devices category	37
Figure 42: Application home screen - restaurants category	37
Figure 42: Application messages screen	38
Figure 43: Application chat with business screen	38
Figure 44: Application search screen	39
Figure 45: Application search filters screen	39
Figure 46: Application search example 1	40
Figure 47: Application search example 2	40
Figure 48: Application search example 3	41
Figure 49: Application search example 4	41
Figure 50: Application notifications screen	42
Figure 51: Application post screen 1	42
Figure 52: Application post screen 2	42
Figure 53: Application other user profile screen	43
Figure 54: Application other user feedback screen	43
Figure 55: Application other user followed businesses screen	43
Figure 56: Application business profile screen 1	44
Figure 57: Application business profile screen 2	44
Figure 58: Application business profile screen 3	44
Figure 59: Application feedback form screen	45
Figure 60: Application success submitting feedback form	45
Figure 61: Application business feedback screen 1	46
Figure 62: Application business feedback screen 2	46
Figure 63: Application business feedback screen 3	46
Figure 64: Application username filter for business feedback screen	47
Figure 65: Application business feedback sorting screen	47
Figure 66: Application feedback tone filter for business feedback screen	47
Figure 67: Application business posts screen - newest to oldest.	48
Figure 68: Application business posts screen - oldest to newest.	48
Figure 69: Application business followers screen	49
Figure 70: Website sign-up screen.	50
Figure 71: Website sign-up validations.	51
Figure 72: Website sign-up screen.	51
Figure 73: Website sign-up validations.	52

Figure 74: Website sign-up screen.	52
Figure 75: Website sign-up validations.	53
Figure 76: Website sign-up admin name warning.	53
Figure 77: Website sign-up email warning.	54
Figure 78: Website welcoming email sign-up screen.	54
Figure 79: Website forgot password screen.	55
Figure 80: Website check email screen.	55
Figure 81: Website admin not found warning screen.	56
Figure 82: Website OTP email screen.	56
Figure 83: Website OTP code screen.	57
Figure 84: Website after writing OTP code screen.	57
Figure 85: Website invalid OTP warning screen.	58
Figure 86: Website reset password screen.	58
Figure 87: Website sign-in screen	59
Figure 88: Website sign-in validations.	59
Figure 89: Website sign-in admin not found warning.	60
Figure 90: Website sign-in wrong password warning.	60
Figure 91: Website home section.	61
Figure 92: Website sort feedback in either chronological order or reverse chronological order.	62
Figure 93: Website sort feedback in chronological order.	62
Figure 94: Website feedback sorting based on semantic analysis (positive, negative, and neutral).	62
Figure 94: Website positive feedback	63
Figure 95: Website feedback display from the business perspective.	63
Figure 95: Website feedback filtering by username.	64
Figure 96: Website business administrator profile section.	65
Figure 97: Website business administrator profile section.	65
Figure 98: Website business administrator profile section.	66
Figure 99: Website pick profile picture.	66
Figure 100: Website update phone number.	67
Figure 101: Website update description.	67
Figure 102: Website update location.	68
Figure 103: Website first business administrator feedback section.	68
Figure 104: Website second business administrator posts section.	69
Figure 105: Website third business administrator followers section.	69
Figure 106: Website actions button on the profile screen	70
Figure 107: Website reset password screen	70
Figure 108: Website reset password screen validations	71
Figure 109: Website dashboard section.	72
Figure 110: Website dashboard section - average rates chart.	72
Figure 111: Website dashboard section - age chart.	73
Figure 112: Website dashboard section - followers and feedback writers charts	73
Figure 113: Website dashboard section - feedback age ratio and gender ratio charts.	74

Figure 114: Website dashboard section - feedback status chart.	74
Figure 115: Website my posts section.	75
Figure 116: Website sort my posts in either chronological order or reverse chronological order.	75
Figure 117: Website post viewed as the business owner see.	76
Figure 118: Website edit post screen.	76
Figure 119: Website delete post screen.	77
Figure 120: Website create post section.	77
Figure 120: Website create post section after adding description and photo.	78
Figure 121: Website create post warning	78
Figure 122: Website messages section.	79
Figure 123: Website chat with user section - give the user a recommendation.	79
Figure 124: Website chat with user section - give the user a recommendation.	80
Figure 125: Website notifications section.	81
Figure 126: Website post section.	81
Figure 127: Website other user profile section.	82
Figure 128: Website other user feedback section.	82
Figure 129: Website sort feedback in either chronological order or reverse chronological order.	83
Figure 130: Website feedback filtering by category.	83
Figure 131: Website feedback filtering by category.	84
Figure 132: Website feedback filtering by feedback status.	84
Figure 133: Website Feedback Filtering by business name.	85
Figure 134: Website other user followed businesses section.	85
Figure 135: Website business profile section.	86
Figure 136: Website business profile section.	86
Figure 137: Website first business administrator feedback section.	87
Figure 138: Website first business administrator posts section.	87
Figure 139: Website first business administrator followers section.	88
Figure 140: Website sign-in tablet screen	89
Figure 141: Website tablet left sidebar screen	90
Figure 142: Website tablet profile screen - basic information	91
Figure 143: Website tablet profile screen - description and location	92
Figure 144: Website tablet profile screen - feedback, posts, followers	93
Figure 145: Website tablet dashboard screen - numbers and rates	94
Figure 146: Website tablet dashboard screen - charts	95
Figure 147: Website tablet posts screen	96
Figure 148: Website tablet post-creation screen	97
Figure 149: Website tablet messages screen	98
Figure 150: Website tablet chat screen	99
Figure 151: Website tablet notifications screen	100
Figure 152: Website tablet feedback screen	101
Figure 153: Website mobile screens	102

Abstract

There is always a first try for everything, but what if we could receive the best and most reliable try instead? In order to do this, we are aiming to develop RateRelay project. This initiative aims to furnish customers with insightful feedback on product and service quality. Furthermore, it offers businesses a platform to elevate customer satisfaction levels and efficiently market their offerings. Businesses can also gain valuable insights into customer preferences, and identify areas for improvement based on feedback and their most important target customers, thus enhancing their reputation among customers.

From our perspective, the most important aspects of the project involve letting customers share feedback to build trust between businesses and customers. Meanwhile, from the business's standpoint, the primary focus should be on enhancing customer satisfaction and gaining a higher number of loyal customers.

In addition to allowing customers to share feedback, we will enable them to browse multiple businesses to stay updated on the feedback for their products and services. They can also interact with businesses by browsing their posts and asking questions related to the product/service, facilitated through a messaging system.

Businesses will have the capability to create a dedicated profile where they can showcase information about their products/services, contact details, location. They will be able to communicate directly with customers, to answer customers questions, address concerns and improve their reputation on the platform. Additionally, they will gain access to performance insights via a dashboard.

Moreover, users will receive notifications about recent posts from businesses they follow, while business owners will be notified of feedback received from users.

Our development plan includes creating two distinct user interfaces: a customer interface as a mobile application and a business admin interface accessible via a website. Unlike existing platforms limited to specific regions, which are inaccessible in Arabic countries like Palestine, we envision a universally accessible application with enhanced features tailored to global markets.

In summary, the RateRelay project seeks to revolutionize feedback mechanisms, empower businesses to improve customer satisfaction and provide customers with a robust platform for engaging with businesses worldwide.

Chapter 1: Introduction

1.1 Statement of the problem

This project addresses a common issue faced by consumers: the lack of transparency in product and service quality, customer service standards, and overall communication at businesses. Often, customers make purchases without prior knowledge of these aspects, leading to potential dissatisfaction. The application aims to enhance the shopping experience by providing users with a platform where they can access and contribute to reviews of businesses. Users can share their experiences, helping others make informed decisions.

For businesses, the project offers a registration-based website where they can monitor customer feedback and gauge satisfaction levels through a comprehensive dashboard. This dashboard includes detailed statistics and charts that provide insights into customer sentiment. Additionally, an AI model analyzes feedback, categorizing it as positive, negative, or neutral, further aiding businesses in understanding and improving their services.

Furthermore, the platform enables businesses to post updates, effectively promoting their products and services to a wider audience. By bridging the gap between consumers and businesses, the application aims to foster better relationships and improve overall customer satisfaction in the marketplace.

1.2 Objectives

As outlined earlier, this project aims to introduce essential functionalities aimed at delivering an optimal solution to the problem at hand. The primary goals pursued by this project include:

Features for Normal Users

1. **Authentication:** This includes signing up, logging in, logging out, and resetting passwords.
2. **User Profiles:**
 - Users can create profiles with their picture and bio.
 - Profiles display businesses they follow and feedback they've given.
3. **Home Page:**
 - Provides navigation to businesses categorized by type.
4. **Search Page:**
 - Allows users to search for businesses.
 - Filters results by country, city, and category.

5. Viewing Other Profiles:
 - Users can visit other users' profiles.
 - They can see pictures, bios, feedback given, and businesses followed by others.
6. Business Profiles:
 - Accessible to users.
 - Shows contact information, location, and overall business rating.
 - Ratings based on product/service quality, customer service rate, and value for money.
 - Displays business posts, feedback from customers with filtering options, and business followers.
7. Writing Feedback:
 - Users can write feedback for businesses.
 - Feedback can include text, pictures, and three ratings: product/service quality, customer satisfaction, and value for money.
8. Following Businesses:
 - Users can follow or unfollow businesses.
 - Receive notifications about business updates and posts.
9. Communication:
 - Users can chat with businesses.
 - Purpose includes inquiries about products/services or lodging complaints.

Features for Businesses Administrators

1. Authentication: This includes the processes of signing up, logging in, logging out, and resetting passwords.
2. Business Profile:
 - Contains a logo, description, contact information, and location on Google Maps.
 - Displays feedback received with filtering options, posts made, and number of followers.
3. Navigation:
 - Businesses can navigate to profiles of other businesses and users.
4. Home Page:
 - Displays feedback received by the business in addition to providing filtering options.
 - Uses AI training models to analyze feedback tone (positive, negative, neutral).
5. Posts Page:
 - Shows all posts made by the business.
6. Communication:
 - Enables businesses to chat with users.
 - Purpose includes responding to product/service inquiries and addressing customer complaints for improvement.
7. Notifications:

- Alerts businesses when users submit feedback.
 - Provides direct access to the feedback page.
8. Detailed Dashboard:
- Provides comprehensive analytics on business performance.
 - Includes metrics such as number of followers, average Customer Service Rate, average Value Of Money Rate, average Product/Service Quality Rate, Total Number Of Feedback, Positive Feedback Number, Neutral Feedback Number, and Negative Feedback Number.
 - Charts display average rates over specified time periods (start to end dates).
 - Graphs demographics of feedback authors (age, gender).
 - Visualizes follower demographics and feedback sentiment.

1.3 Significance of the work

The RateRelay project aims to establish a pivotal platform for enhancing customer-business interactions through robust feedback mechanisms. Key points of significance include:

- **Transparent Feedback Loop:** Empowers customers to provide valuable feedback, fostering trust and transparency with businesses.
- **Business Focus on Satisfaction:** Prioritizes improving customer satisfaction to cultivate loyalty and market competitiveness.
- **Effective Marketing and Reputation Management:** Provides businesses with tools to elevate customer satisfaction levels and manage their online reputation effectively.
- **Comprehensive Business Profiles:** Enables businesses to showcase their offerings and engage directly with customers, enhancing service delivery.
- **Performance Insights and Analytics:** Offers businesses actionable insights through a detailed dashboard, supporting strategic decision-making.
- **Dual Interface Development:** Develops user-friendly interfaces for both customers (mobile app) and businesses (web platform), ensuring accessibility and usability.
- **Addressing Regional Market Gaps:** Fills a crucial gap in Arabic-speaking regions by offering a localized feedback and engagement platform, inspired by successful global models like Yelp.

In essence, RateRelay promises to revolutionize customer feedback and business engagement, positioning itself as a pivotal tool for enhancing service quality, customer satisfaction, and market presence.

1.4 Organization of the report

This report provides a comprehensive overview of the project's development journey, beginning with an exploration of the constraints encountered and their strategic resolutions. It proceeds to detail the standards and technologies adopted, followed by a thorough exposition

of the project's processes and features. The report then analyzes the outcomes achieved before culminating in a conclusive summary that encapsulates the entirety of the work undertaken.

Chapter 2: Constraints, Standards/ Codes, and Earlier course work

2.1 Constraints

Through developing our application and website, we faced multiple constraints:

1. Due to our lack of formal coursework in mobile development during university, initially determining the optimal technologies for implementing our application idea was challenging.
2. The Google Maps feature we utilized for address selection and business location display had a limited free trial period.
3. Developing the application with Flutter took longer than anticipated, partly because the Android Studio application caused significant slowdowns on our laptop during development.

2.2 Standards and codes

This project utilized a variety of technologies, standards, frameworks, and tools:

- For mobile frontend development, Flutter and the GetX library were employed.
- React.js was utilized for website frontend development.
- Node.js and Express were chosen for building APIs on the backend.
- MySQL database served as the database management system.
- Git and Github were used for source code management.
- Socket.io facilitated the implementation of the chatting feature and notifications.
- Google Maps API was integrated for address selection and displaying specific locations.
- The project adhered to Software Engineering Standards, following the REST architecture.

2.3 Earlier coursework

To develop this application, our reliance heavily drew upon the foundational courses within the Computer Engineering program:

1. Programming courses, including C programming, data structures, and algorithms: Courses in programming languages (like C) and data structures provided foundational programming skills. Knowledge gained in algorithms helped in optimizing code performance and implementing efficient data processing logic. These courses laid the groundwork for understanding and implementing complex functionalities within the application, ensuring robustness and efficiency in our codebase.
2. Databases Course: this course provided essential knowledge and skills in designing and managing databases, it enabled us to effectively structure and store data within the MySQL database used in the application. Understanding database concepts such as tables, relationships, and SQL queries was crucial for data management in our project.
3. Web Programming Course: It equipped us with the skills to build the frontend of the web application using React.js. Concepts such as handling user interactions, designing responsive layouts, and integrating with backend APIs were applied directly in our project.
4. Software Engineering and Advanced Software Engineering: These courses provided methodologies and best practices in software development. They emphasized the importance of software architecture, design patterns, and project management techniques. Applying principles from these courses helped in structuring the application according to the REST architecture, ensuring scalability, and managing the development process efficiently.
5. Distributed Operating Systems Course: This course introduced principles and techniques for developing and managing distributed systems. It provided insights into designing scalable backend systems, which was crucial for our application's backend development.

Chapter 3: Literature Review

Trying something new can be complex and exhausting, especially when there are numerous options to consider. This process can be inconvenient, time-consuming, and tiring, particularly for individuals with limited finances or those who cannot afford to experiment extensively to find what they need. Similarly, people with limited time often seek specific items but lack the time to try multiple options.

In Palestine, people often turn to social media to address this problem. They create groups on platforms like Messenger and Facebook to ask if anyone has tried a particular service or product from a business and to gather ratings and reviews. However, this method is inconvenient, communication is challenging, and posts are not easily accessible.

Recognizing this gap, we conceived the idea of integrating feedback sharing with technology to develop our mobile application and website called 'RateRelay.' This platform aims to be the first in Palestine to provide such a service, accessible to people worldwide.

'RateRelay' offers feedback services that can positively impact the environment in Palestine by increasing the visibility of businesses, highlighting the quality of their products or services, and enabling interaction and communication between users and business owners. This interaction helps users find what they want and allows businesses to enhance their products and services by understanding customer needs through feedback analysis.

One well-known feedback service providing a similar solution is Yelp, which operates in the United States but not in Palestine. Yelp Inc. is an American company that runs the Yelp.com website and the Yelp mobile app, publishing crowd-sourced reviews about businesses and allowing users to view them. We drew inspiration from Yelp's main features to incorporate into our application and website, adding new features to enhance the user experience.

In conclusion, our application and website 'RateRelay' address the challenges of communication and limited resources faced by people in Palestine seeking high-quality products and services. By providing a streamlined platform for review feedback, 'RateRelay' offers a much-needed solution for improving user experiences and helping businesses better understand and meet customer needs.

Chapter 4: Methodology

In this section, we will outline the features designed for both regular users, who are the intended audience of our application, and business administrators, who are the primary audience of our website.

4.1 RateRelay Application (User Interface)

1. On-boarding Screens

Onboarding screens are very important in any application to introduce our RateRelay application, we used three onboarding screens in order to let the users set expectations, highlight the benefits of our application to increase engagement, and encourage them to sign up.

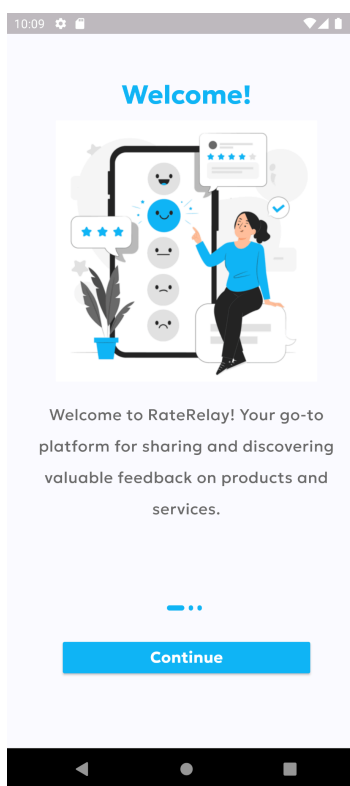


Figure 1: First onboarding screen

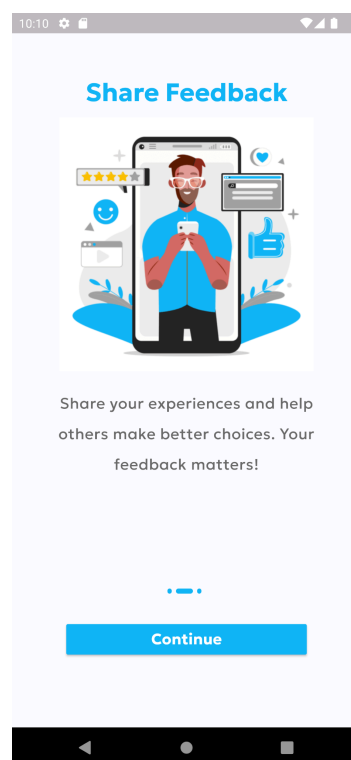


Figure 2: Second onboarding screen

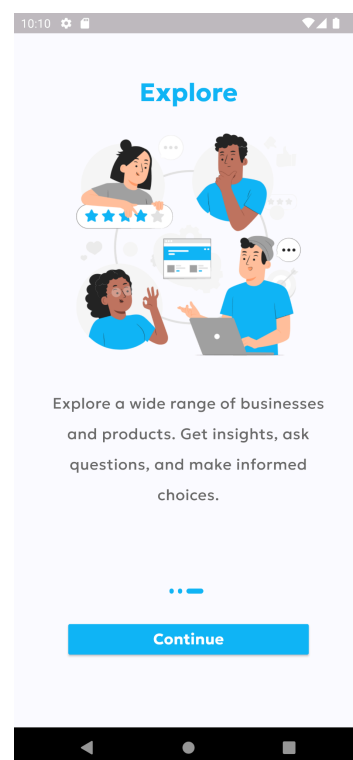


Figure 3: Third onboarding screen

2. Authentication Screens

Our Authentication Screens include three fundamental functions: signing up for new users, signing in for registered users, and password recovery for those who have forgotten their credentials.

❖ Sign-up Screens

During sign-up, users must enter their username, email, password, age, and gender. The username and email must be unique; if either is already in use by

another account, users will receive a warning. Each field undergoes validation. If validation fails, the app displays a warning message and prevents sign-up until all fields pass validation. The age and gender fields are crucial for business admins, who utilize them in their dashboards for analyzing customer demographics and feedback statistics.

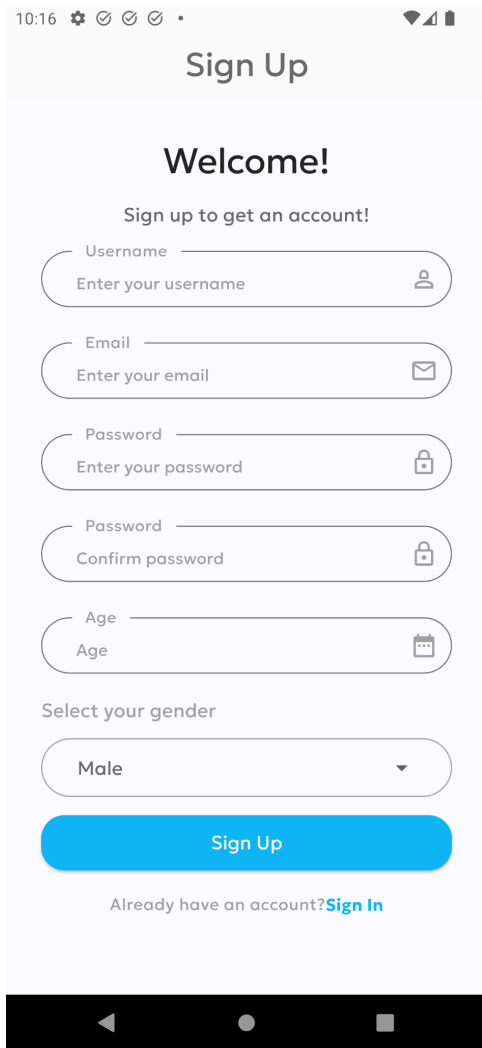


Figure 4: Application sign-up screen.

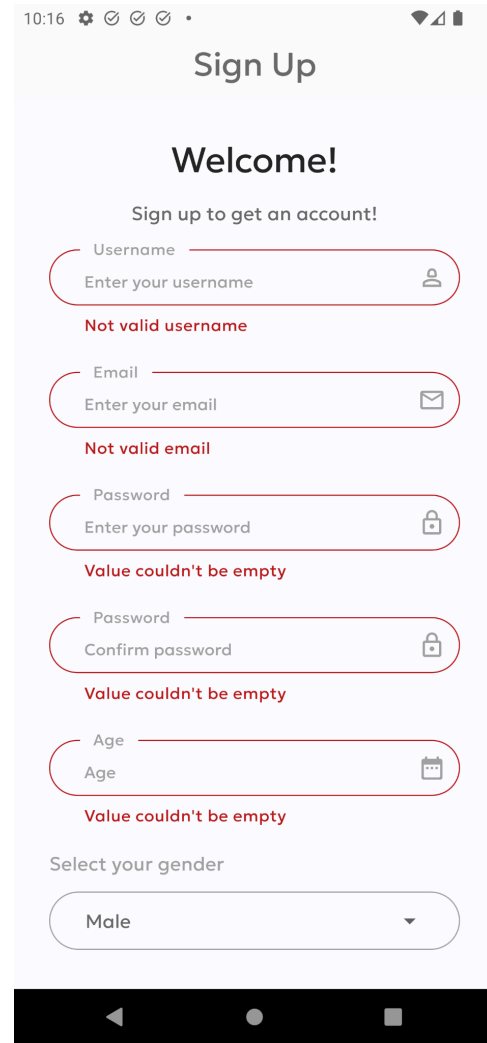


Figure 5: Application sign-up validations.

Here are two screens that demonstrate the warnings users receive if they attempt to use the same email or username that is already associated with another account:

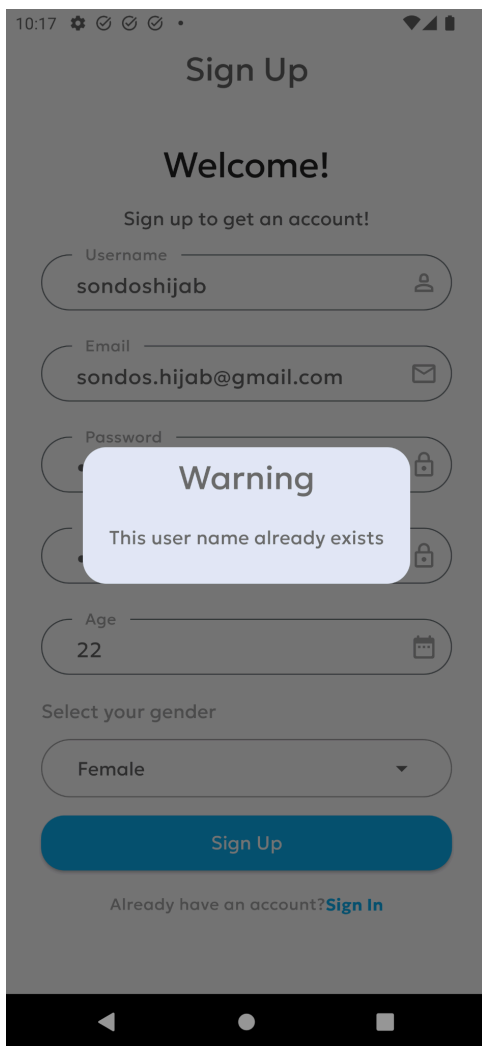


Figure 6: Application sign-up username warning.

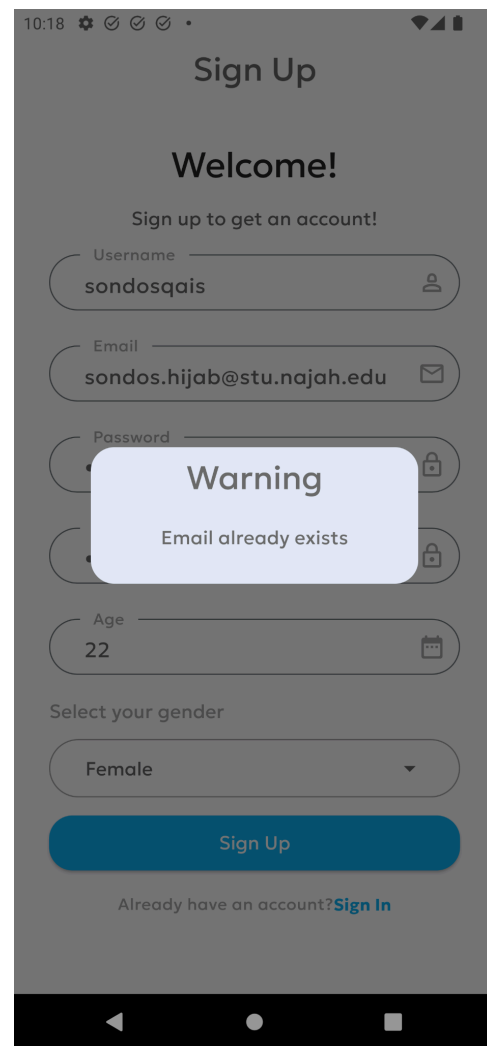


Figure 7: Application sign-up email warning.

These screens show the success message users receive upon completing the sign-up process successfully and being successfully registered in our database. Additionally, we send an email to confirm their registration.

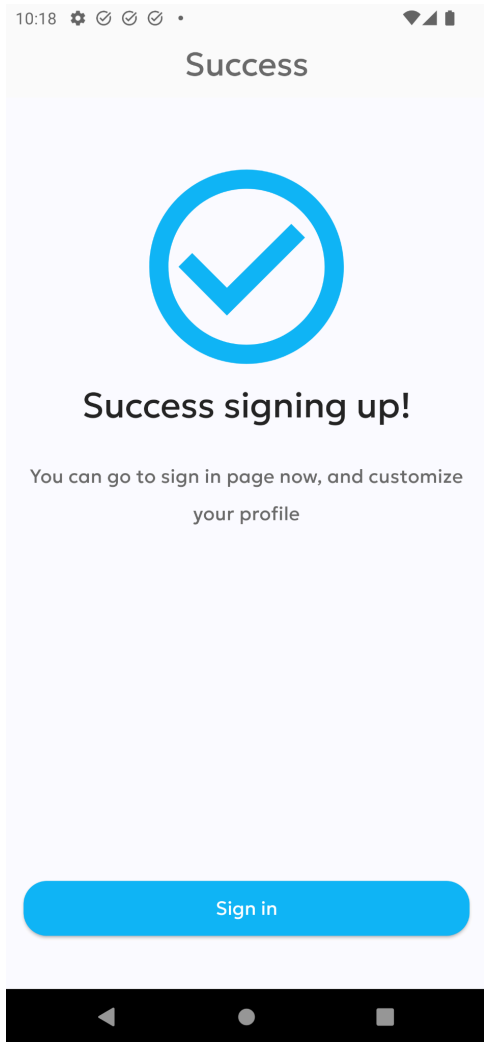


Figure 8: Application success sign-up screen.

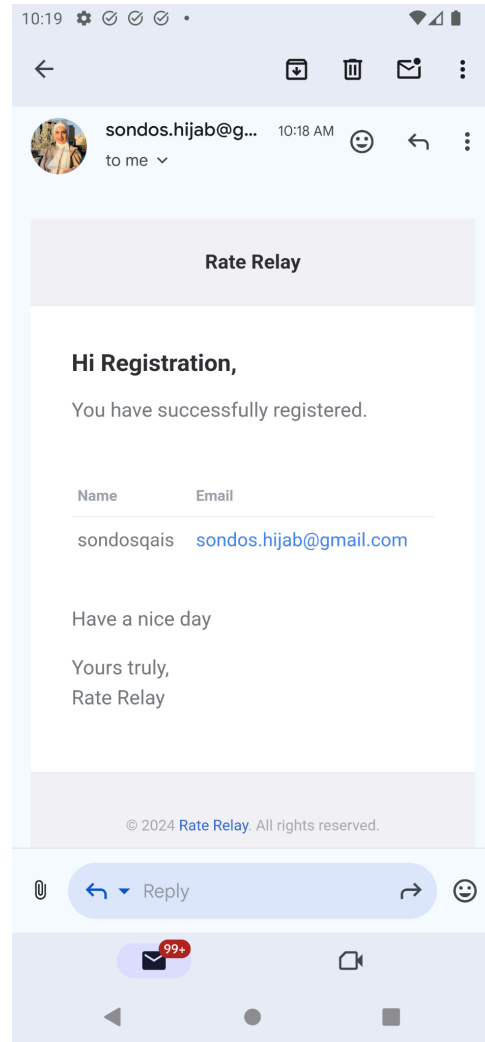


Figure 9: Application welcoming email sign-up screen.

❖ Forgot Password Screens

When resetting their password if they forget it, users are directed to enter their email address. The email input field undergoes validation; if the user enters an email that is not registered in our database, they receive a warning message.

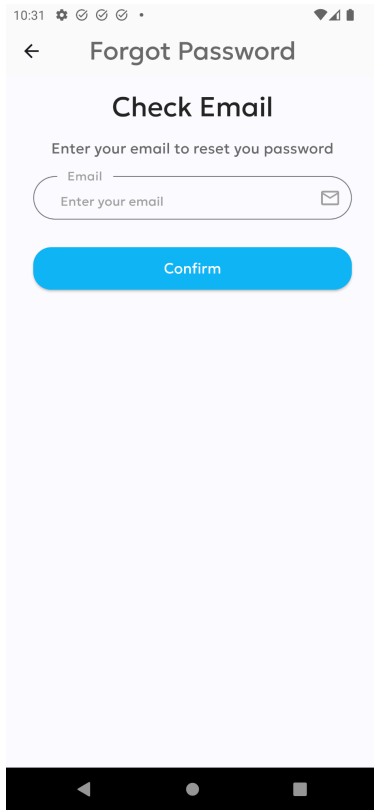


Figure 10: Application forgot password screen.

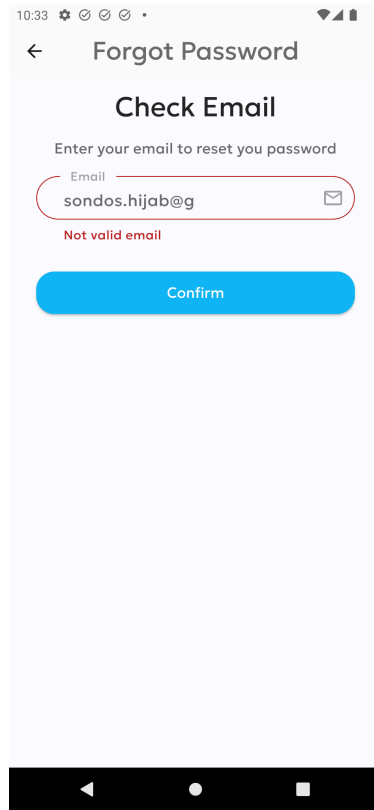


Figure 11: Application check email screen.

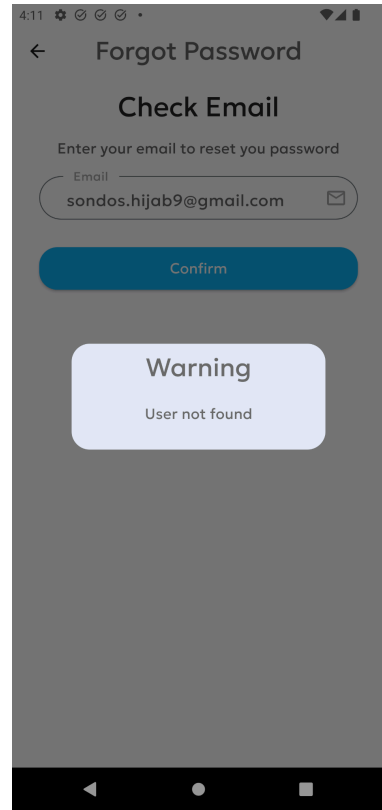


Figure 12: Application user not found warning screen.

If the email exists in our database, the user will receive an OTP to their email account and be redirected to the OTP code entry screen.

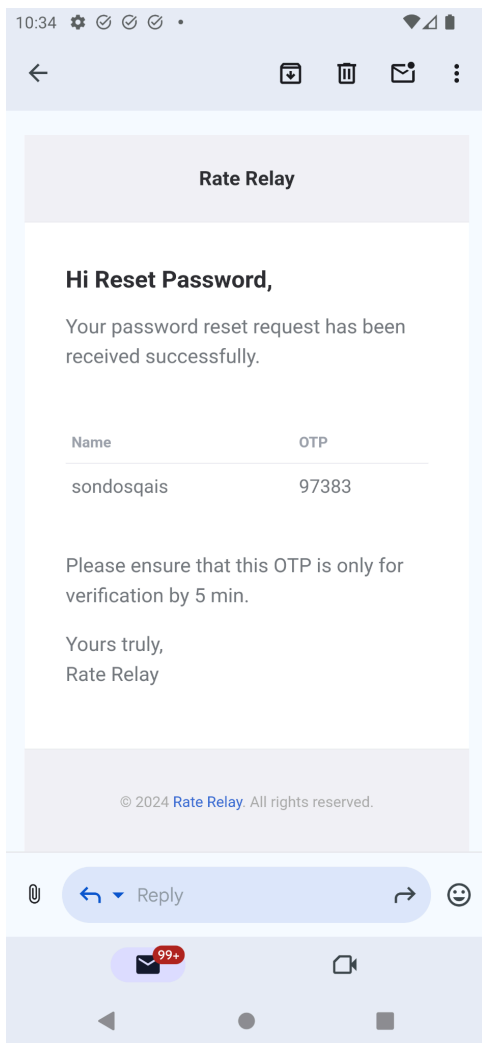


Figure 12: Application OTP email screen

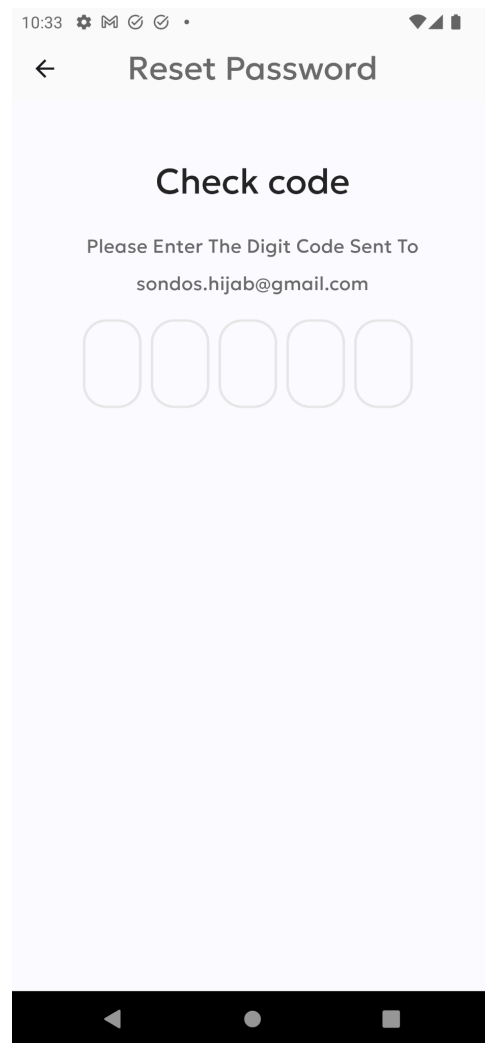


Figure 13: Application OTP code screen

If they enter the wrong OTP, they will receive a warning and won't be able to reset their password.

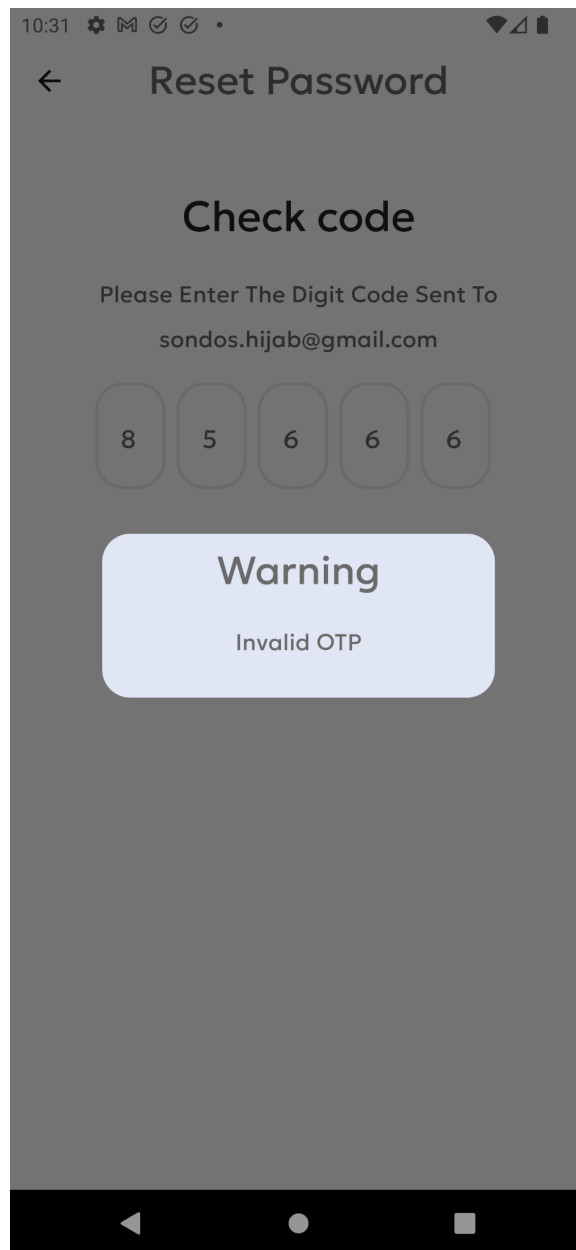


Figure 14: Application invalid OTP warning screen.

Upon entering the correct OTP, they will proceed to reset their password by entering and confirming a new password. Each field undergoes validation. After successfully resetting their password, they will be directed to a success page and then redirected to the sign-in page.

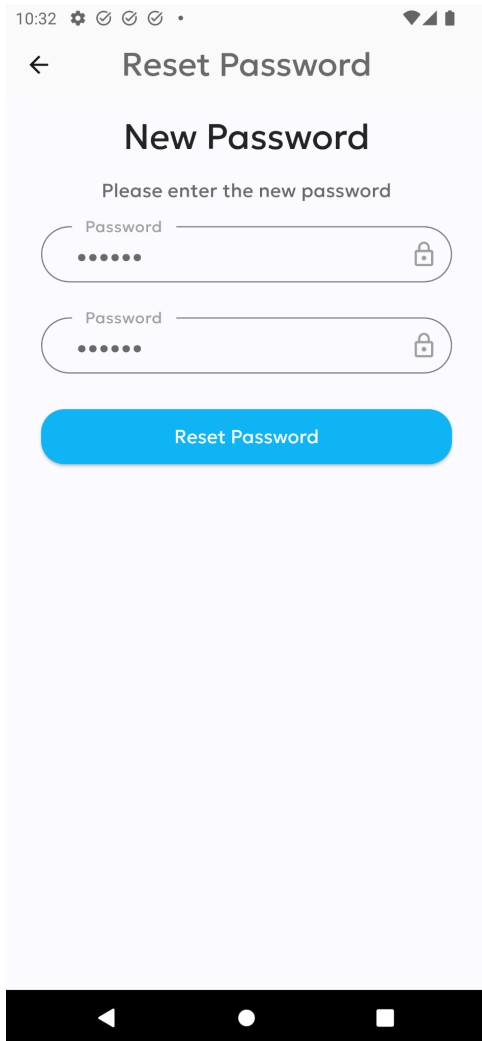


Figure 15: Application reset password screen

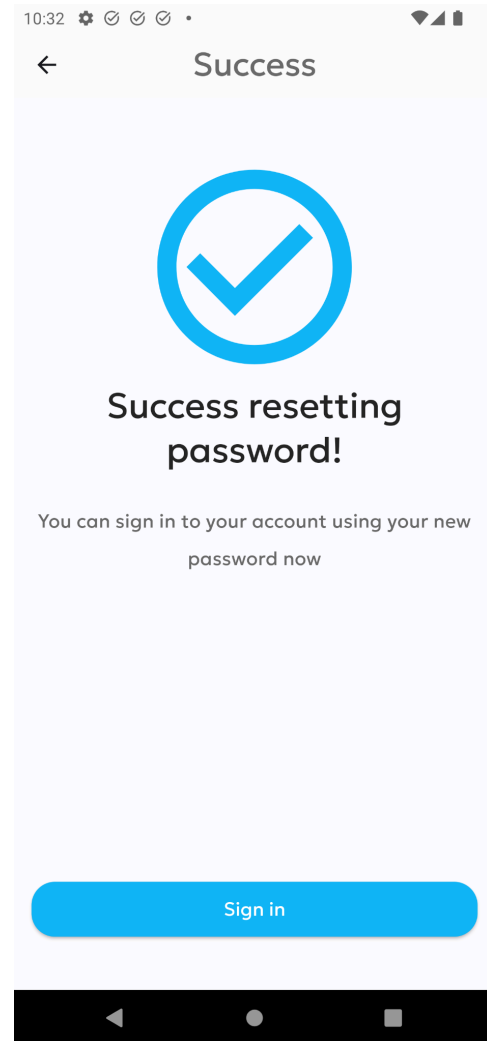


Figure 16: Application success reset password screen

❖ Sign-in Screens

The sign-in screen prompts users to enter their username and password. If they enter an incorrect username or password, they will receive a warning message and won't be able to sign in.

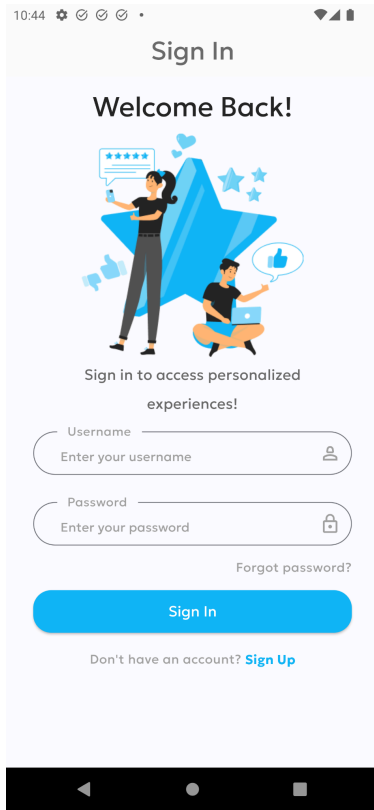


Figure 17: Application sign-in screen

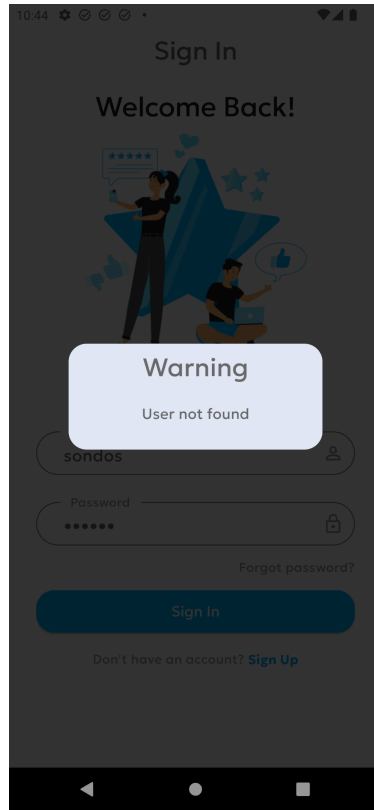


Figure 18: Application sign-in user not found warning

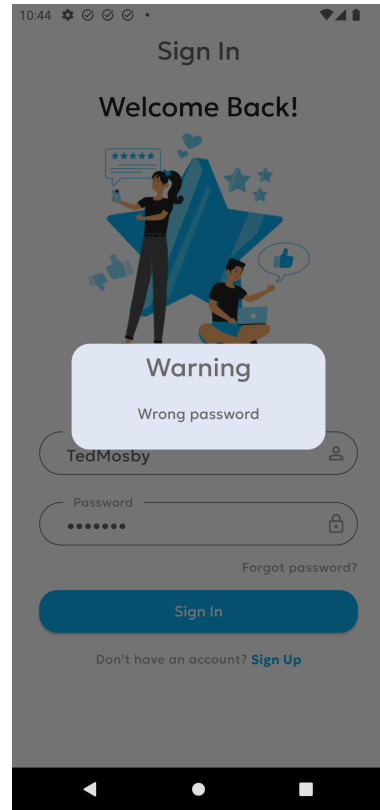


Figure 19: Application sign-in wrong password warning

3. Profile

Upon signing in, users are redirected to their profile page. This page includes their profile picture, bio, action buttons for resetting the password and logging out, and two additional buttons. One button directs them to view the feedback they provided for businesses, while the other button leads them to a list of businesses they follow.

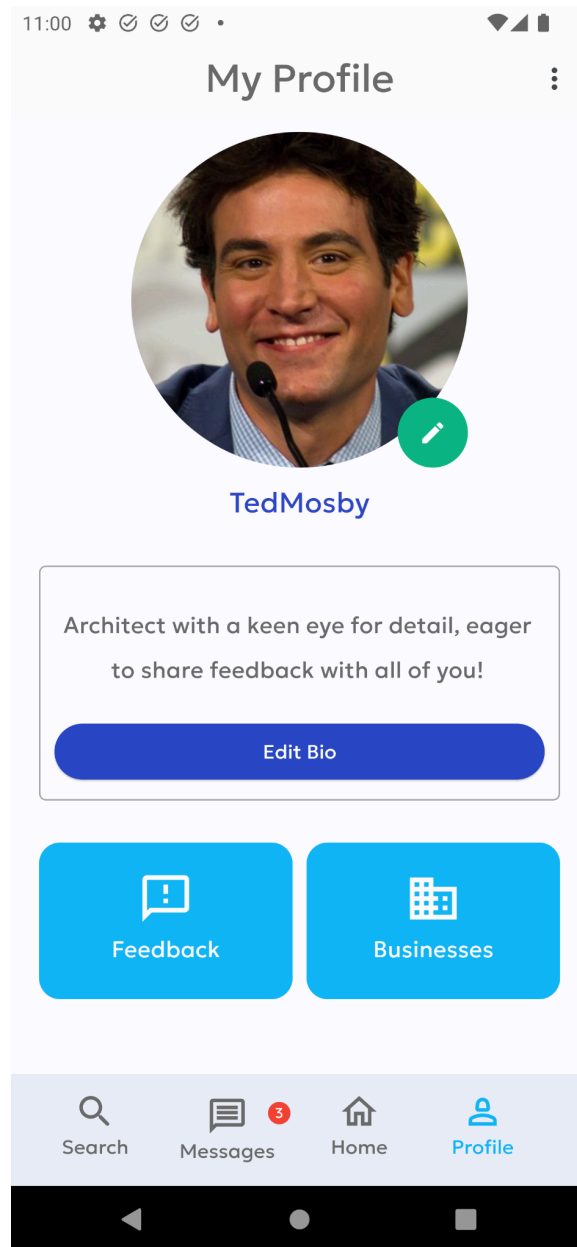


Figure 20: Application user profile screen.

They can also update their bio by clicking on the "Update Bio" button. After making changes, they will receive a confirmation message indicating the update was successful.

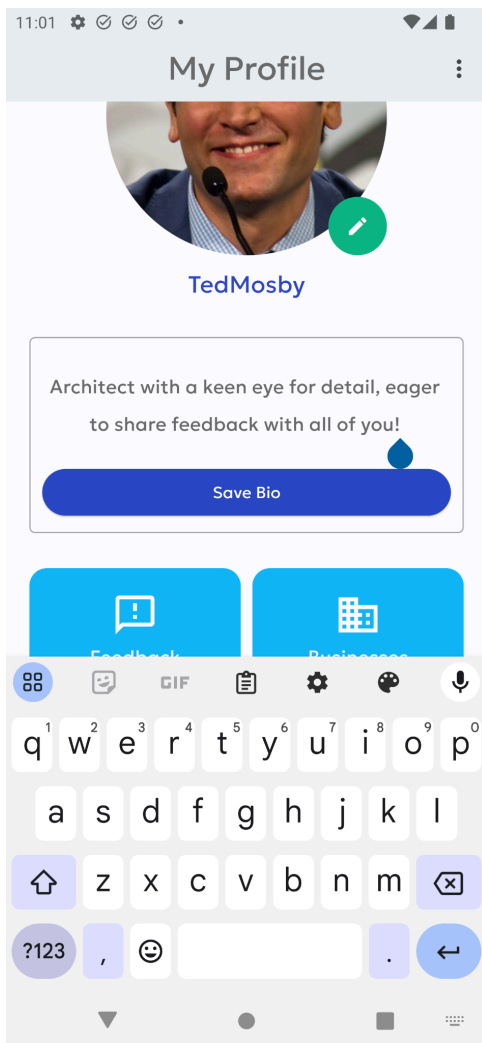


Figure 23: Application update bio screen

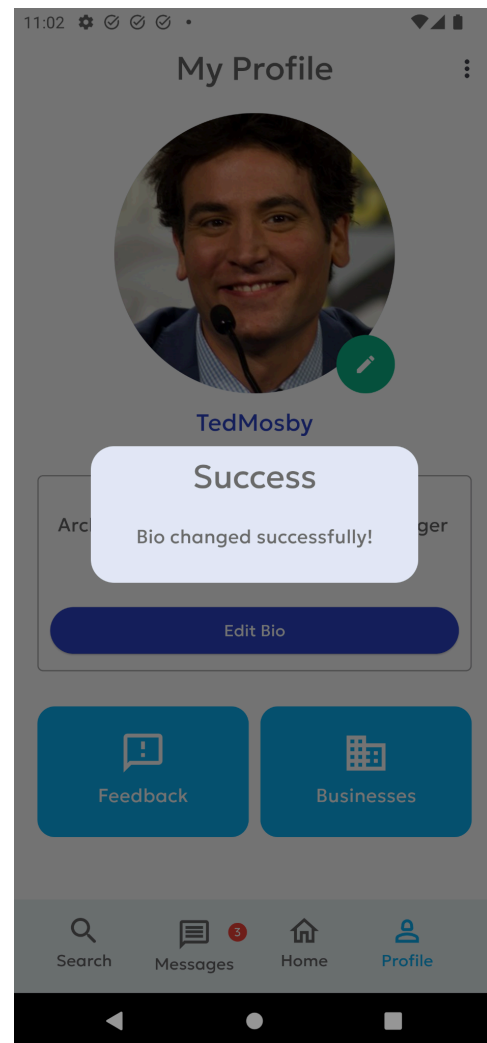


Figure 24: Application success updating bio screen

Clicking on the "User Feedback" button redirects users to their feedback page, where each feedback is displayed within a card showing all relevant information: the feedback's picture, username, business name, description, customer service rate, value of money rate, product/service quality rate, and the date and time the feedback was created. Users have the option to delete their feedback directly from this page.

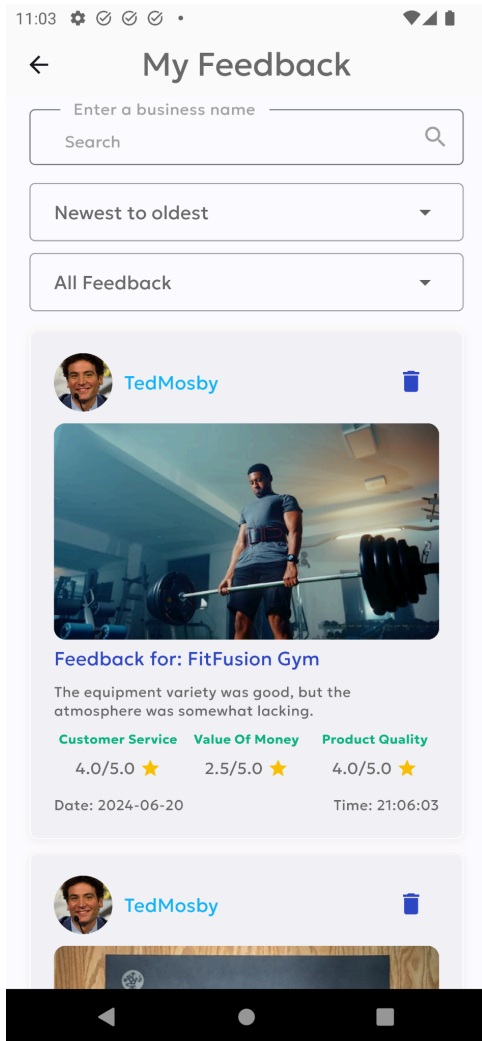


Figure 25: Application first user feedback screen

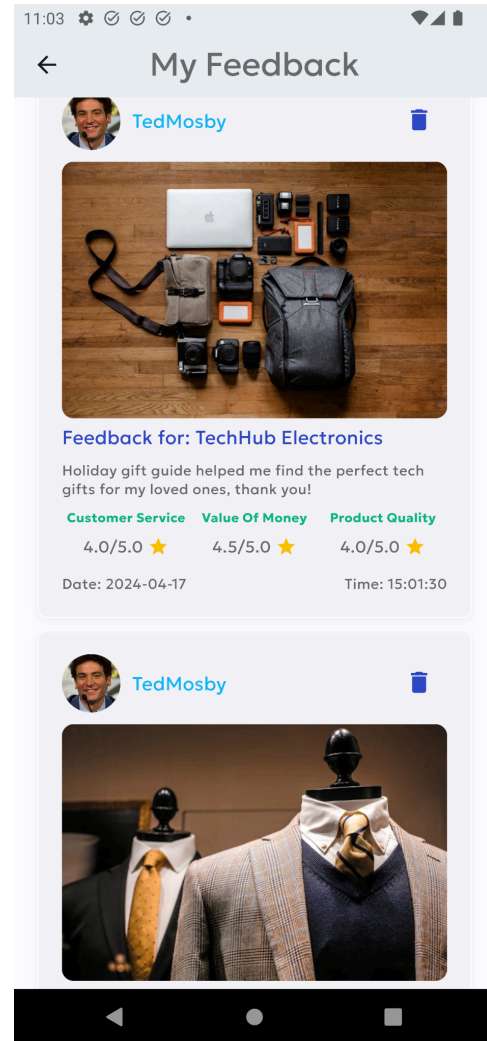


Figure 26: Application second user feedback screen

Users have the ability to apply filters on the feedback page, including the option to search for feedback specific to a particular business.

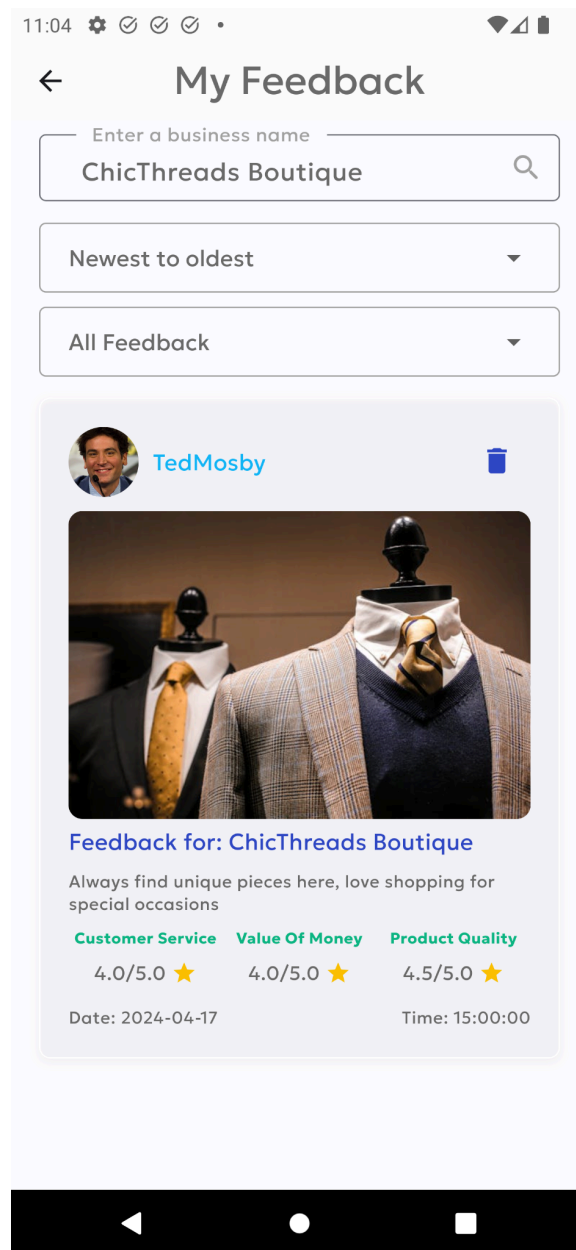


Figure 27: Application filter feedback depending on the business name screen

They also have the option to display feedback based on the category of the business.

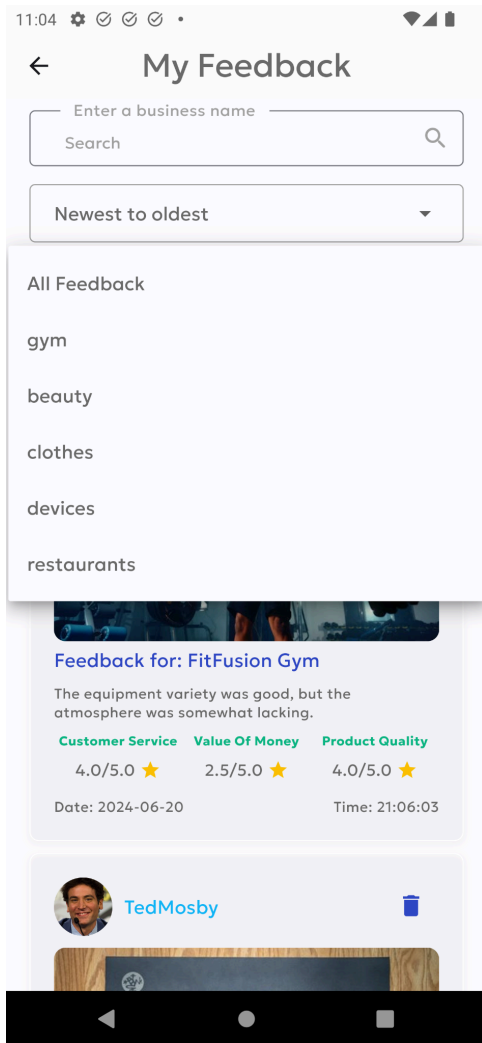


Figure 28: Application filter feedback depending on category screen

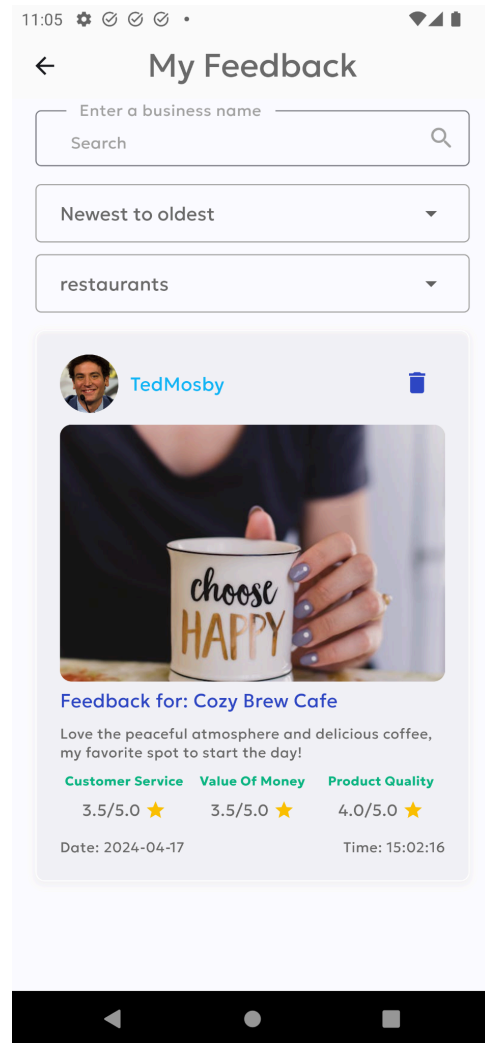


Figure 29: Application filtered feedback for restaurants category screen

They also have the option to display the feedback in either chronological order (from old to new) or reverse chronological order (from new to old).

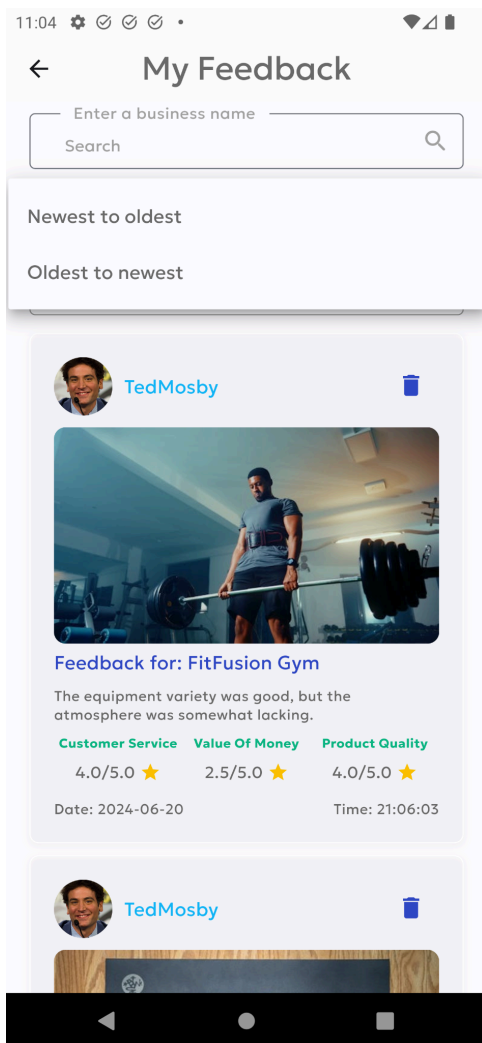


Figure 30: Application sort feedback in either chronological order or reverse chronological order

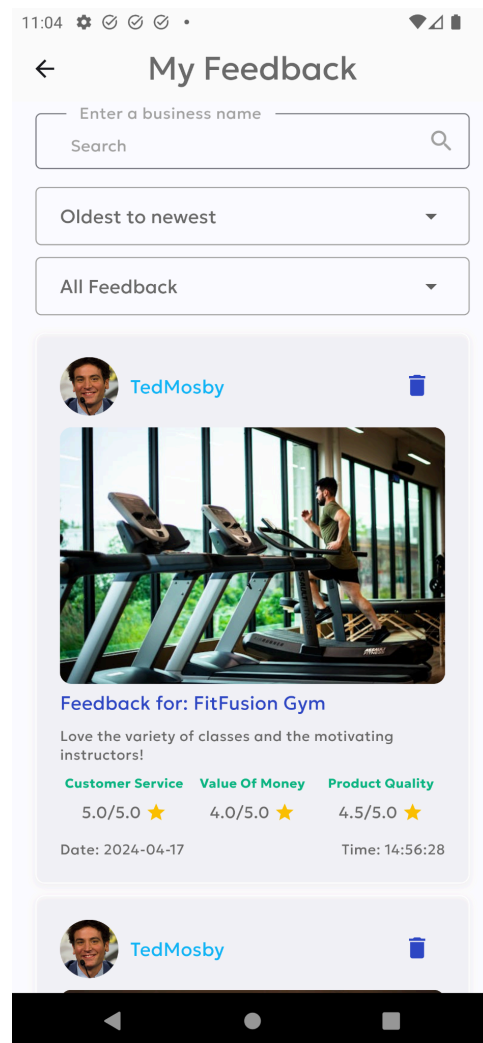


Figure 31: Application sort feedback in chronological order

When the user clicks on the delete button, they will be prompted with a confirmation dialog to either proceed with the operation or cancel it.

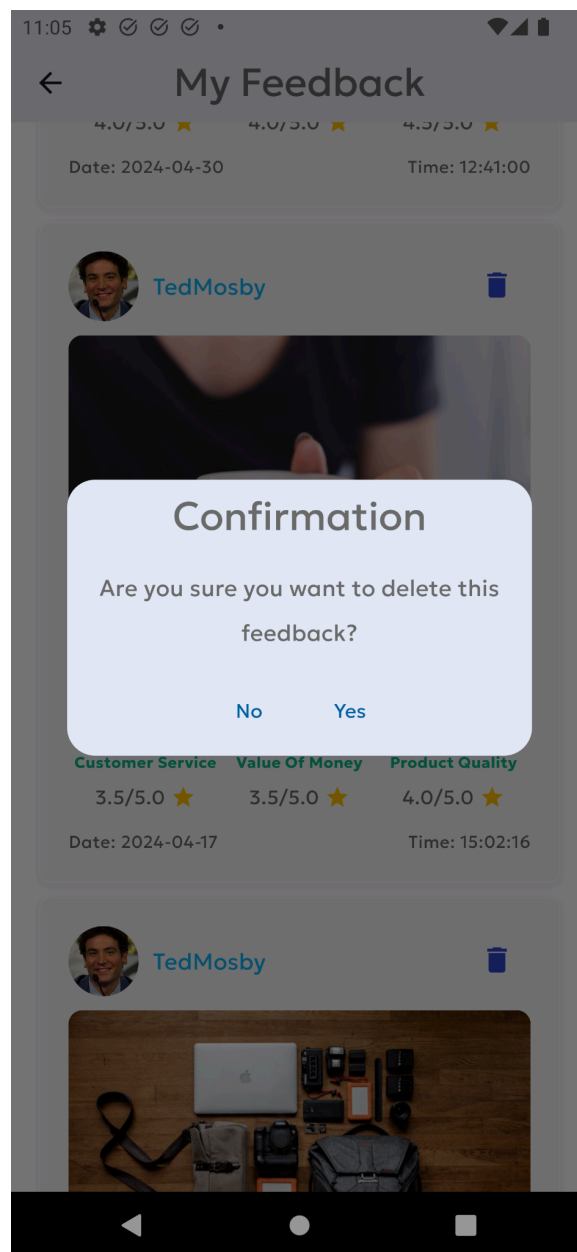


Figure 32: Application feedback deletion confirmation page.

When the user clicks on the "Businesses" button, they will be redirected to the followed businesses page, where a list of businesses that the user follows is displayed.

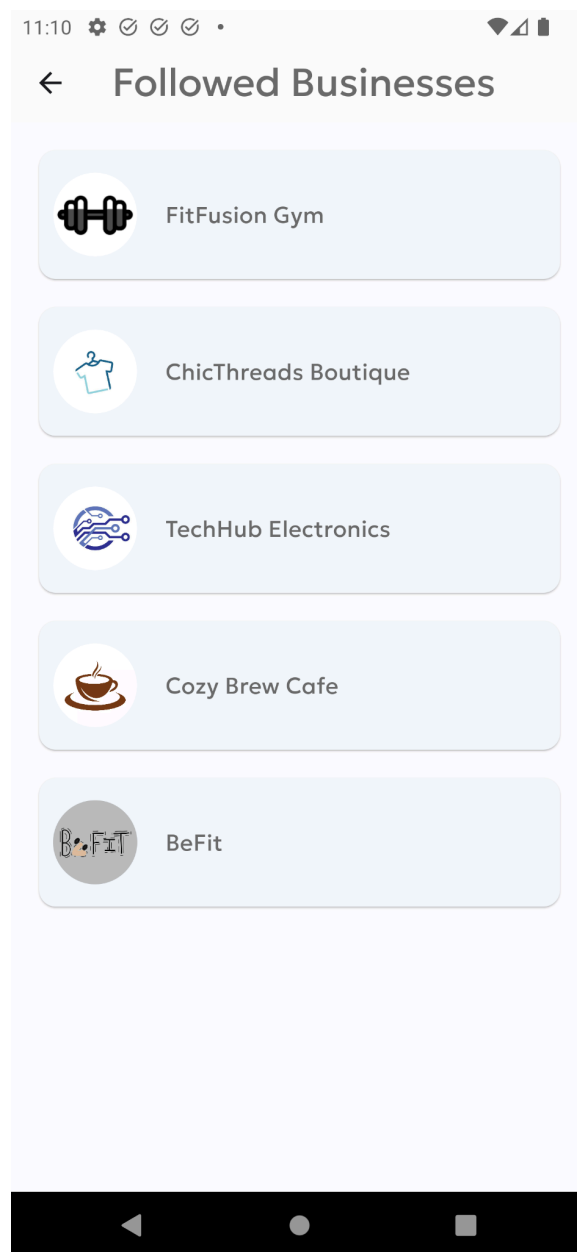


Figure 33: Application followed businesses screen

When the user clicks on the actions button at the top of the profile page, a list of actions will be displayed, including options to reset their password or log out.

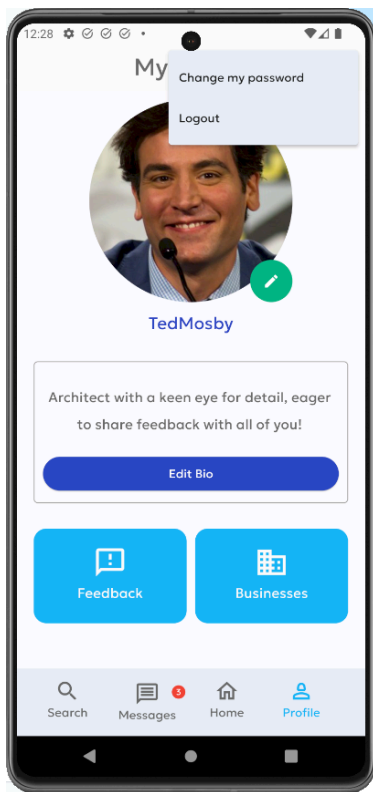


Figure 34: Application actions button on the profile screen

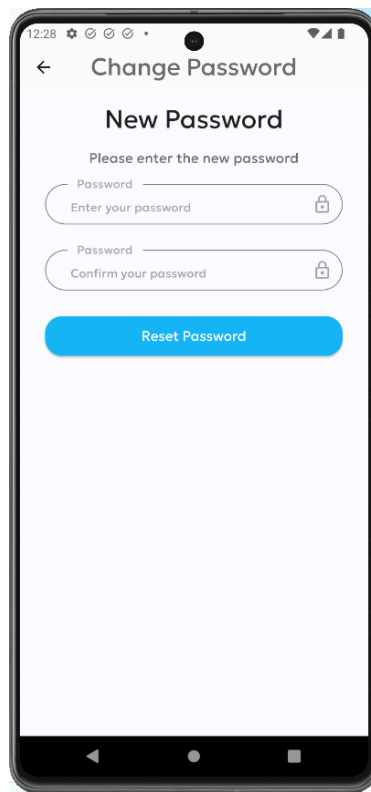


Figure 35: Application reset password screen

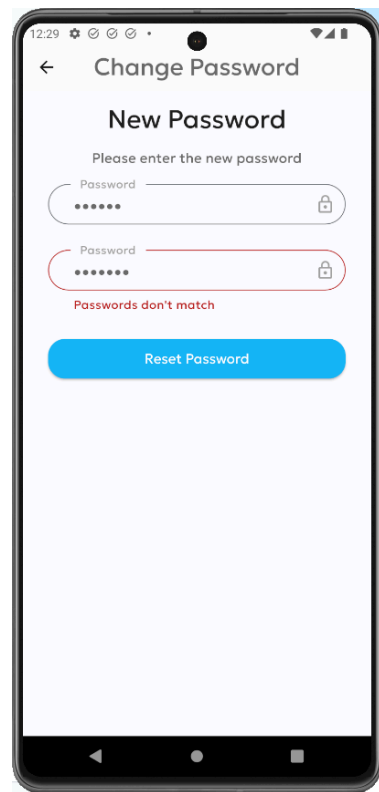


Figure 36: Application reset password screen validations

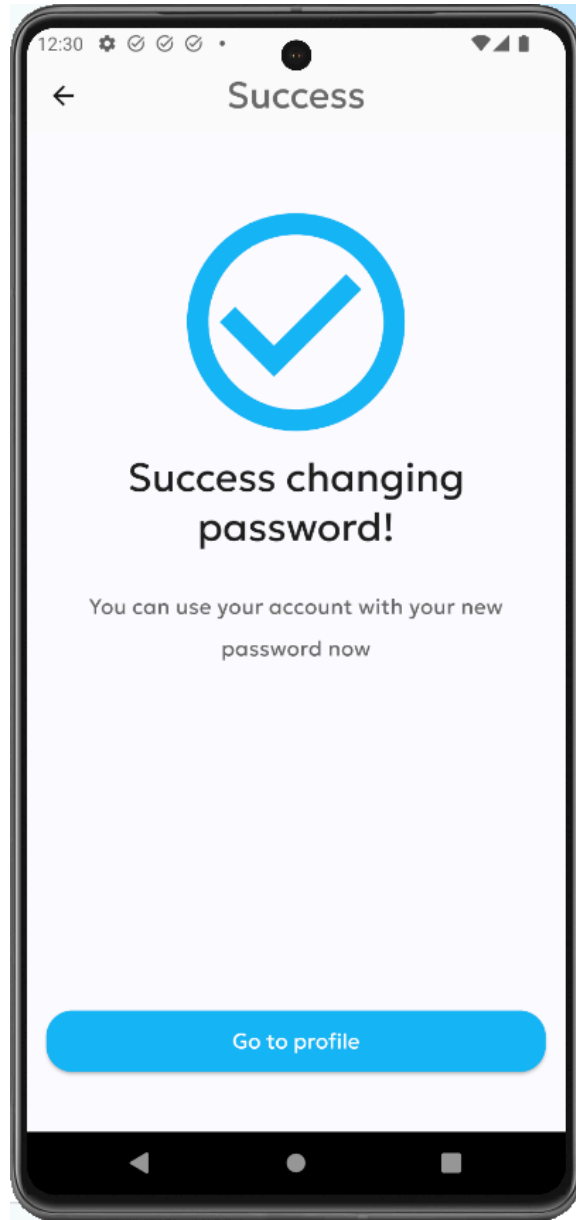


Figure 37: Application success reset password screen

4. Home Screen

The home screen features a personalized welcoming message for each user, a notification button that redirects to the notifications page, a slider showcasing all application categories, and a list of buttons for each category. Clicking on these buttons displays businesses categorized under the selected category.

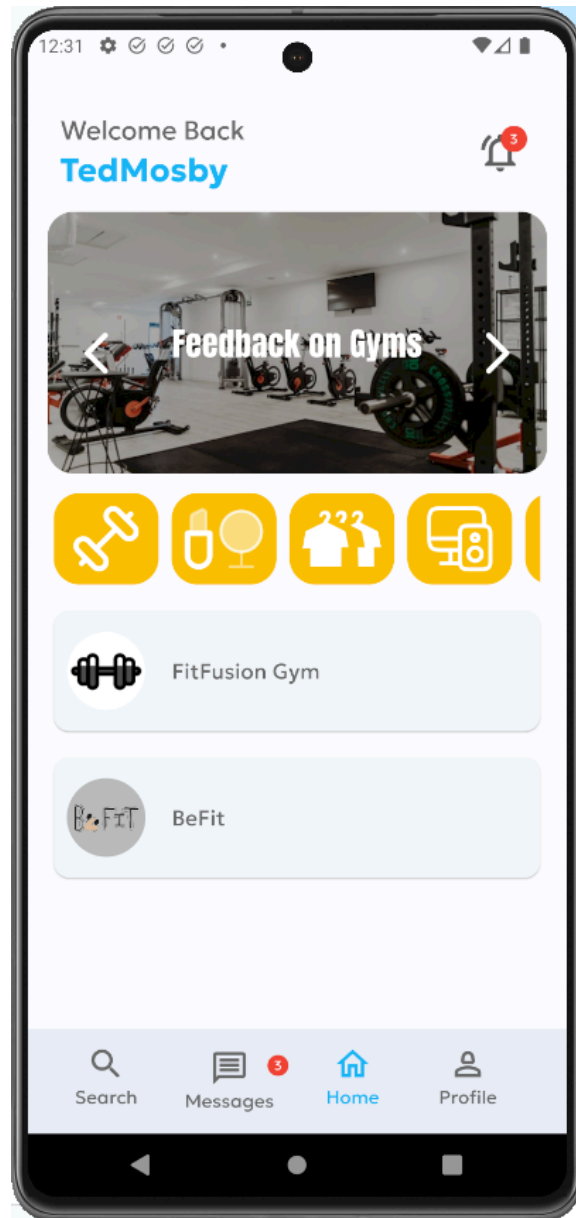


Figure 38: Application Home screen - gym category

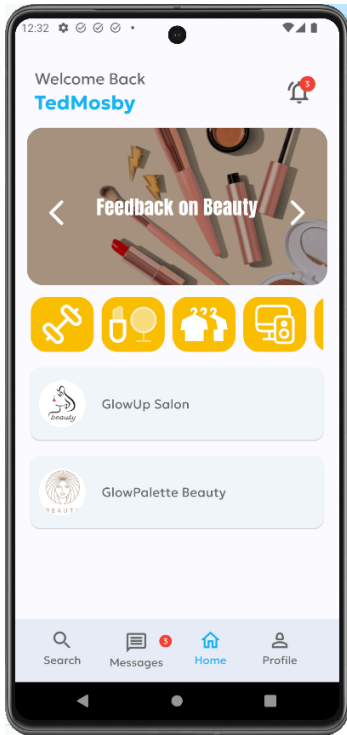


Figure 39: Application home screen - beauty category

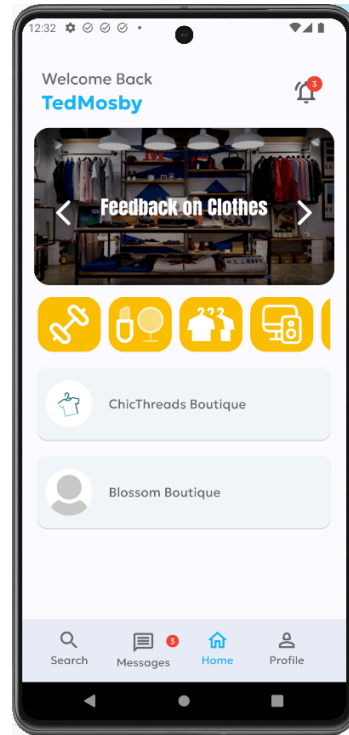


Figure 40: Application home screen - clothes category

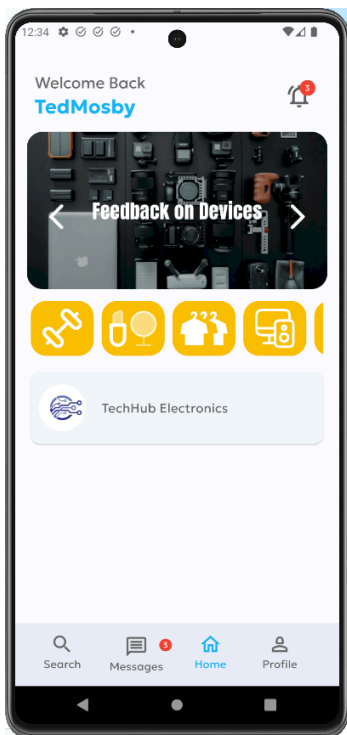


Figure 41: Application home screen - devices category

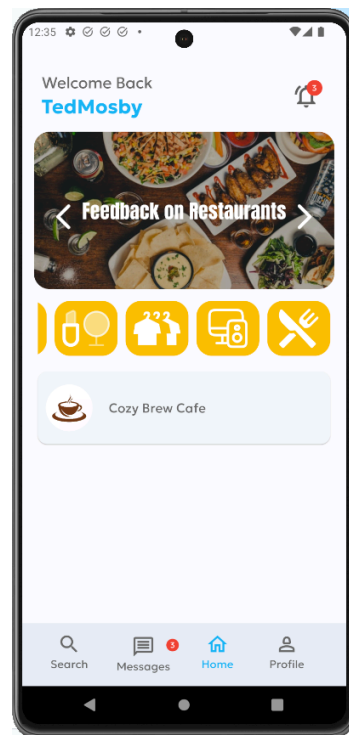


Figure 42: Application home screen - restaurants category

5. Messages Screen/ Chat Screen

The Messages screen lists all businesses with whom the user had chats. Each business card displays a badge indicating the number of unread messages if there are any. Clicking on a chat redirects the user to a real-time messaging chat page powered by socket.io. Here, users can send text and pictures, facilitating detailed communication such as lodging complaints about product quality with visual evidence, enabling businesses to promptly address and satisfy customer concerns.

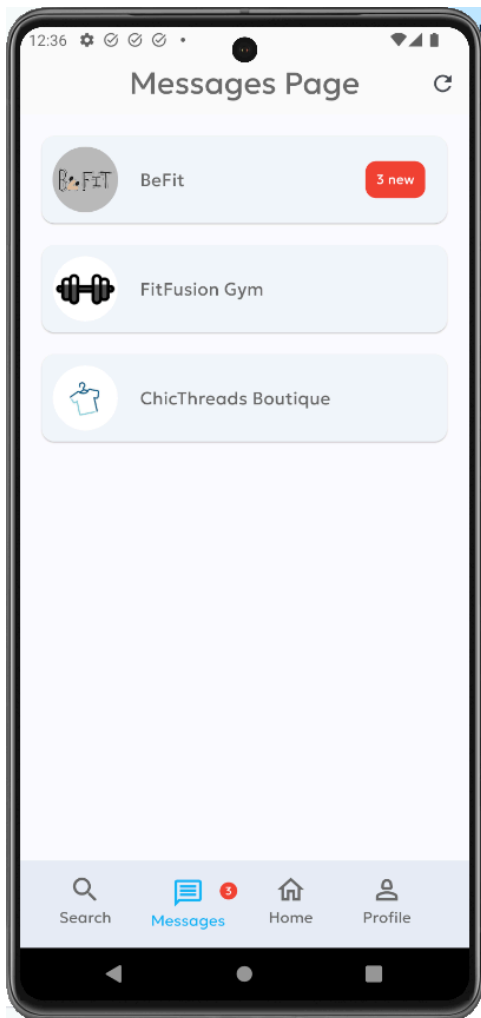


Figure 42: Application messages screen

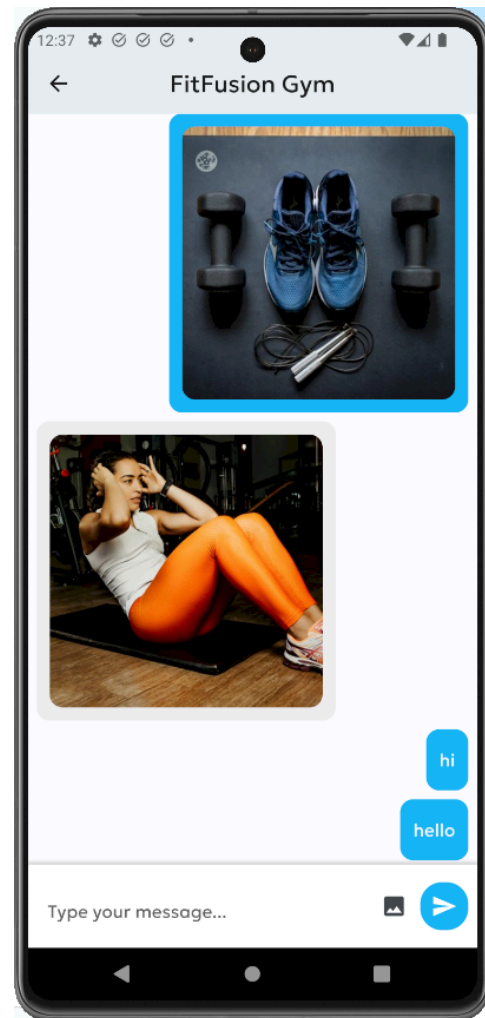


Figure 43: Application chat with business screen

6. Search Screens

When clicking on the "Search" button from the bottom navigation bar, the user is redirected to the search screen. Here, they can search for businesses by entering a search query for the business name and optionally filtering by country, city, and category to refine their results.

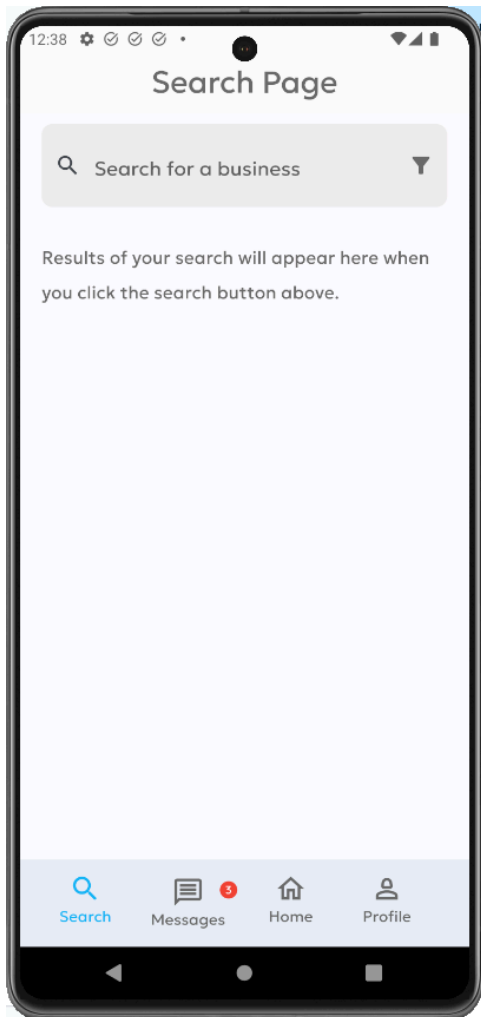


Figure 44: Application search screen

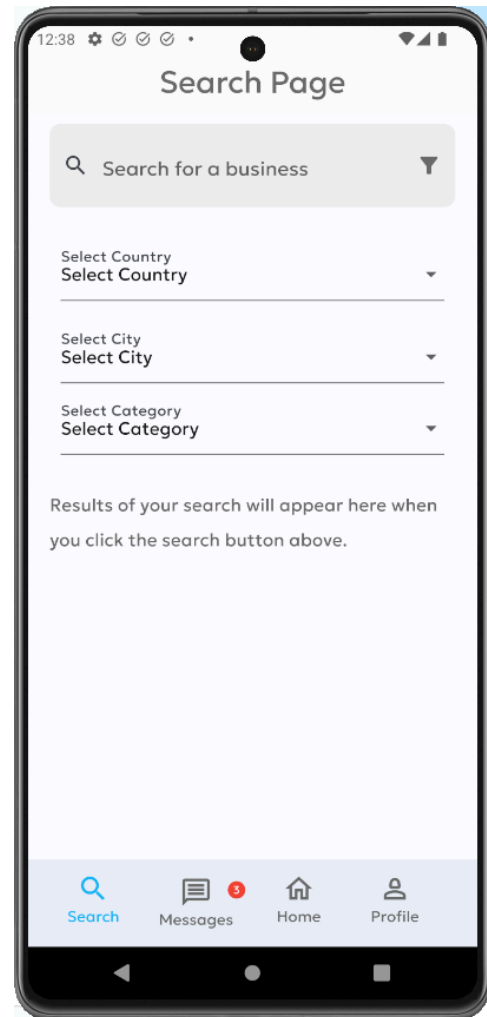


Figure 45: Application search filters screen

Users can also search for businesses within a specified country, city, and category without necessarily entering a business name for their search query.

Here's an example of searching using only the country filter:

If a user selects a country without specifying a business name, they will see a list of businesses located in that country.

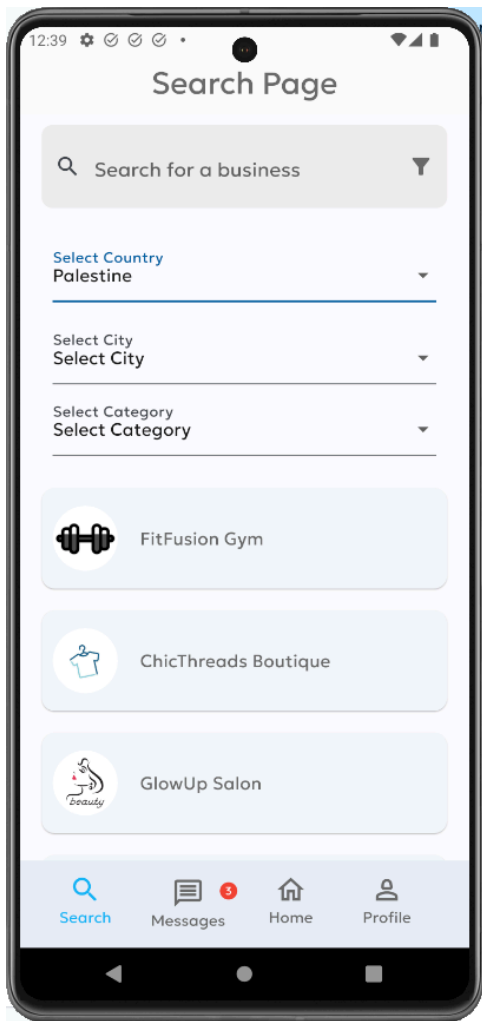


Figure 46: Application search example 1

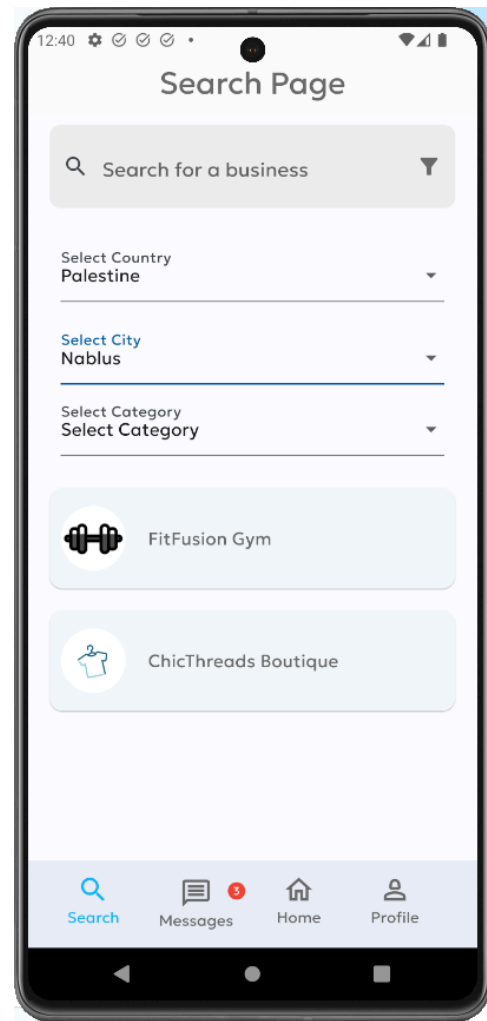


Figure 47: Application search example 2

Here are examples of searches using a country and search query, and another using country, city, and category without a search query:

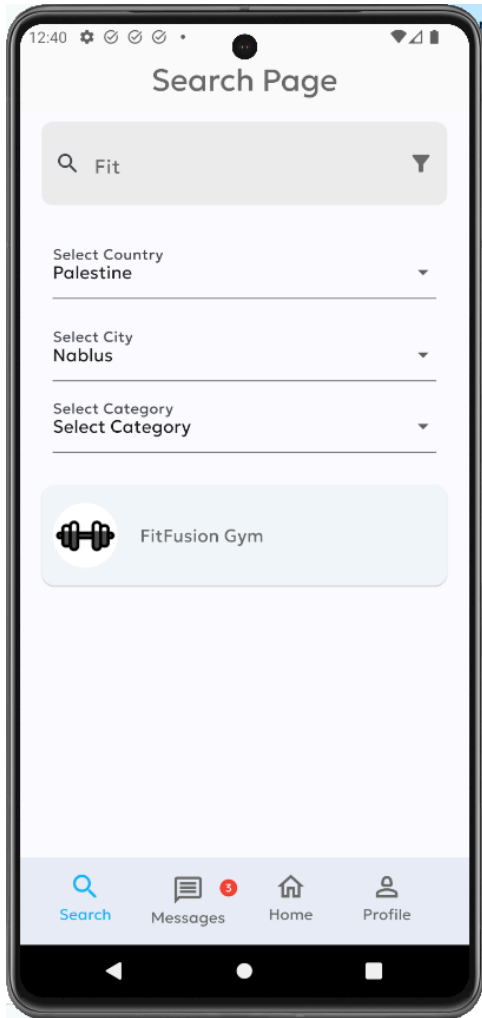


Figure 48: Application search example 3

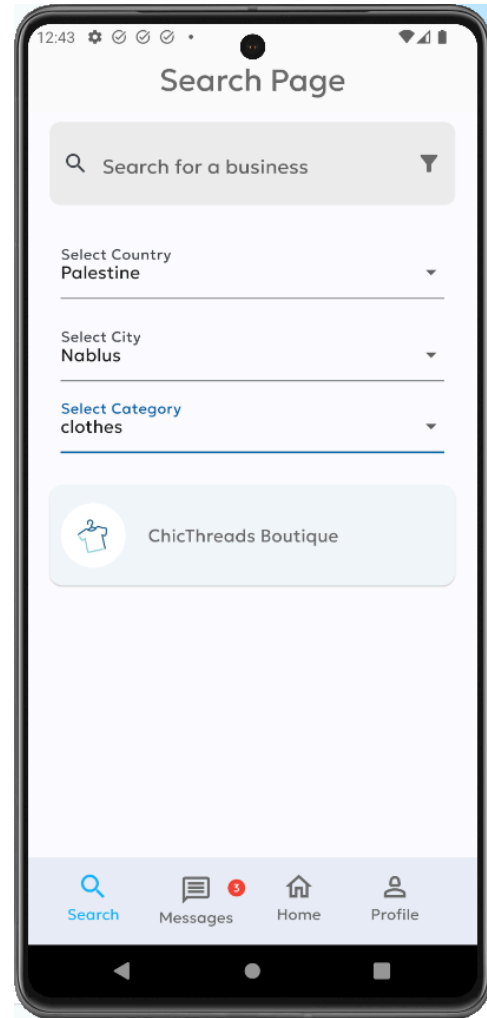


Figure 49: Application search example 4

7. Notifications Screen / Post Screen

When a user clicks on the notifications button on the home screen, they are redirected to the notifications screen. Here, all notifications received from businesses they follow for their posts are listed. Clicking on a specific notification redirects the user to the post page, where they can view detailed information including the post picture, business name, post description, and the date and time the post was created.

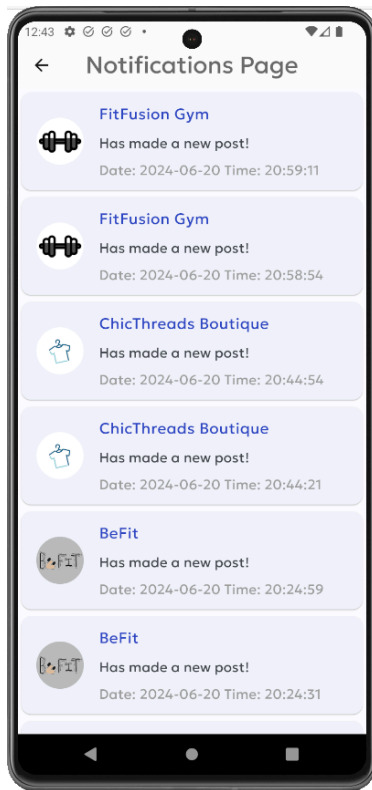


Figure 50: Application notifications screen

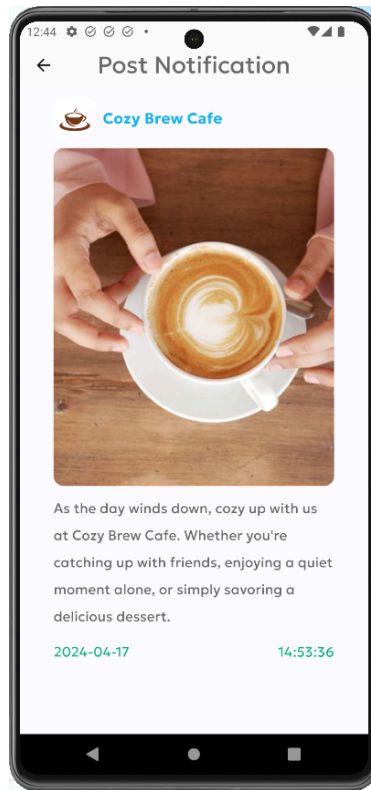


Figure 51: Application post screen 1

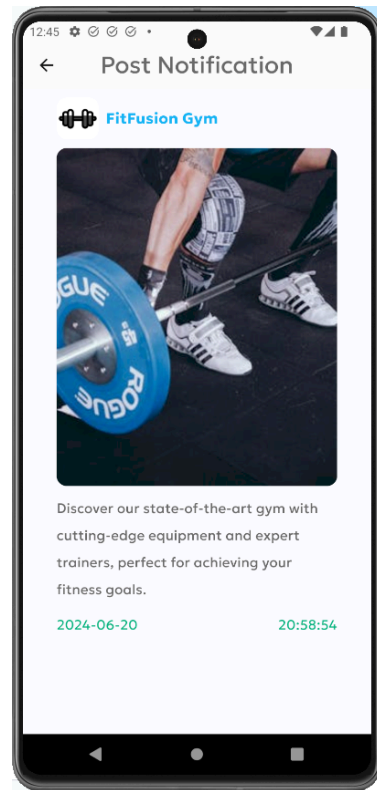


Figure 52: Application post screen 2

8. User Page

When the user clicks on another user's name from a feedback card or from a follower card, they will be redirected to the user profile page. This page is similar to theirs but does not include buttons for updating the profile picture or bio, nor does it include the buttons for resetting the password and logging out that are present on their own profile page. Additionally, when viewing feedback provided by this user, there will be no option to delete the feedback, unlike on their own feedback screen.

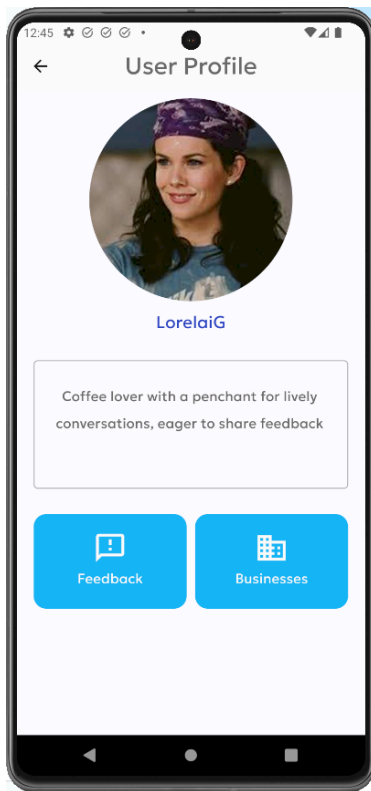


Figure 53: Application other user profile screen

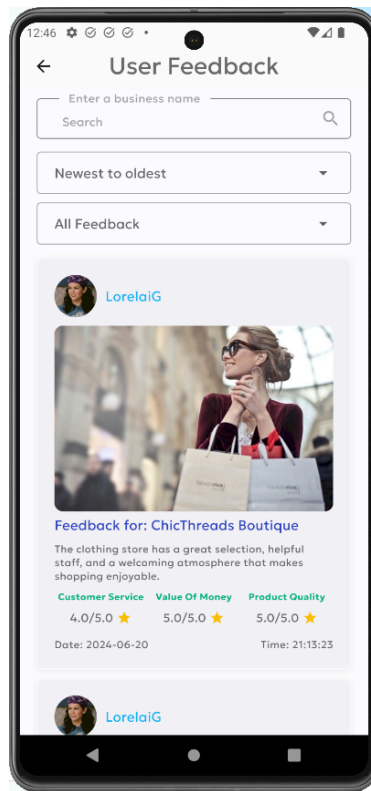


Figure 54: Application other user feedback screen

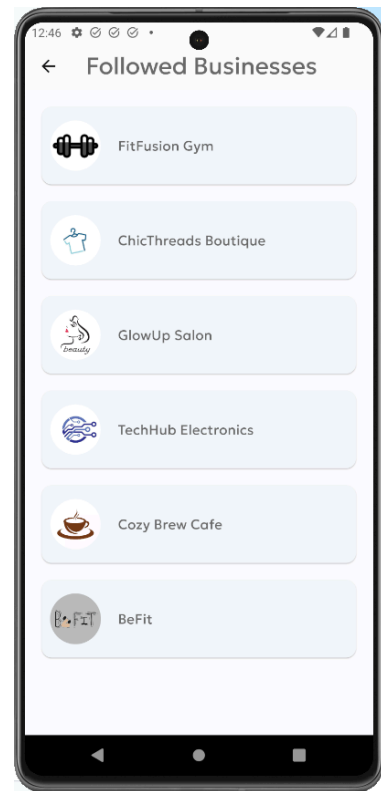


Figure 55: Application other user followed businesses screen

9. Business Screen

When clicking on a business from the home screen, search screen, or followed businesses screen, the user will be directed to the business screen, which consists of four main sub-screens.

1. Business Profile Screen

This screen features the business logo, name, description, category, and administrator email. Additionally, it includes a button allowing the user to follow or unfollow the business to receive notifications when the business makes posts.

The screen also includes a section for business ratings, which displays the average ratings for customer service, value for money, and product quality.

A marker, including latitude and longitude coordinates, will be displayed on Google Maps to indicate the location of the business.

There are also two buttons: one for adding feedback for the business, which directs the user to the feedback submission page, and another for sending a message, which redirects the user to the chat page with that business.

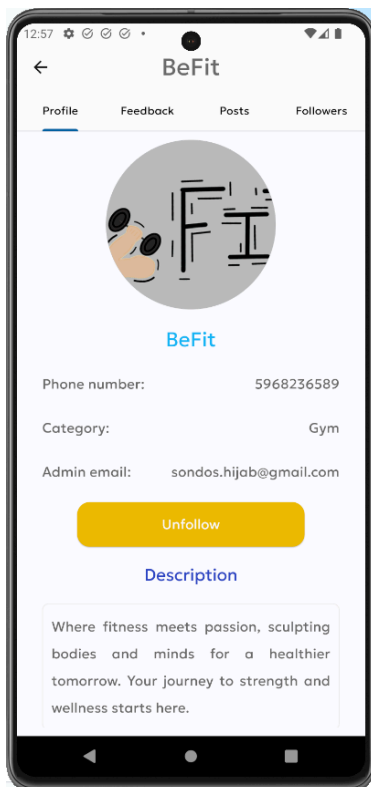


Figure 56: Application business profile screen 1

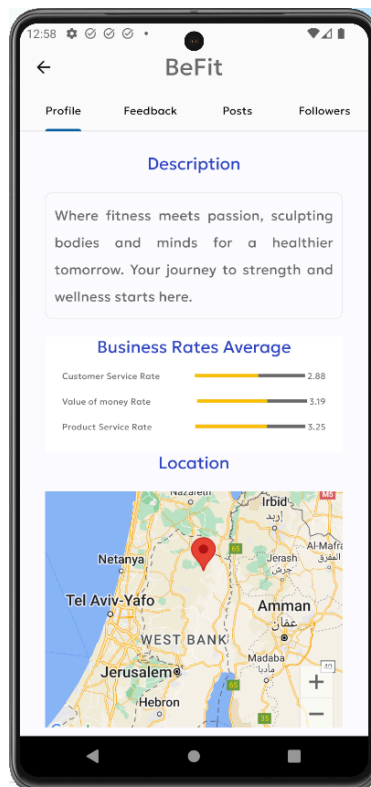


Figure 57: Application business profile screen 2

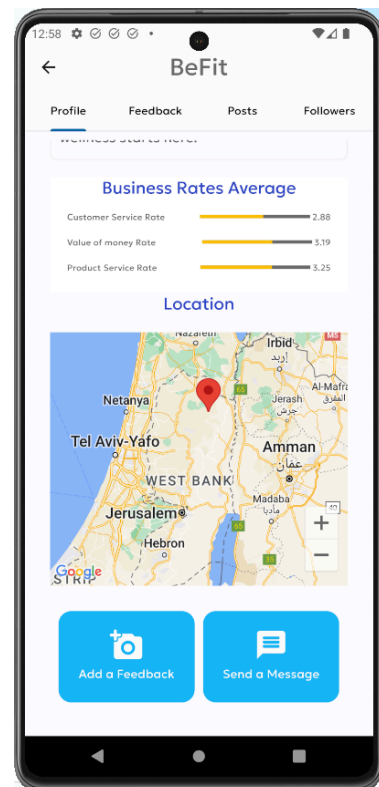


Figure 58: Application business profile screen 3

Those two screens display:

1. Add Feedback Screen:
Users are prompted to enter a feedback description along with ratings for customer service, value for money, and quality, each on a scale of 5, and a feedback picture.
2. Success Message Screen:
After submission, users receive a success message confirming the feedback was submitted successfully.

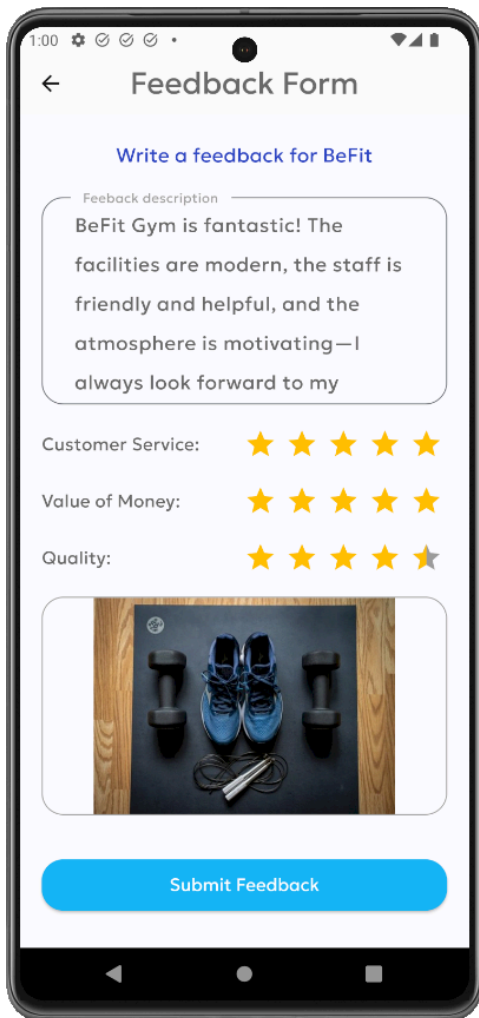


Figure 59: Application feedback form screen

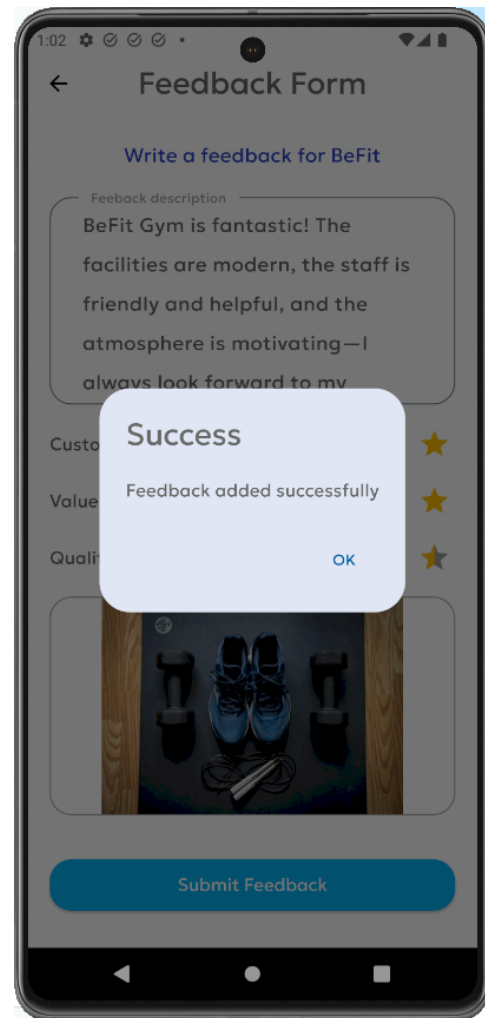


Figure 60: Application success submitting feedback form

2. Business Feedback Screen

This screen displays all the feedback provided for the specific business. Each feedback includes detailed information such as the description, username of the feedback giver, feedback picture, submitted ratings, and the date and time when the feedback was submitted. Users have the ability to filter feedback based on the username of the feedback giver, sorting by either chronological order (from old to new) or reverse chronological order (from new to old), and filtering by feedback tone (positive, negative, neutral status).

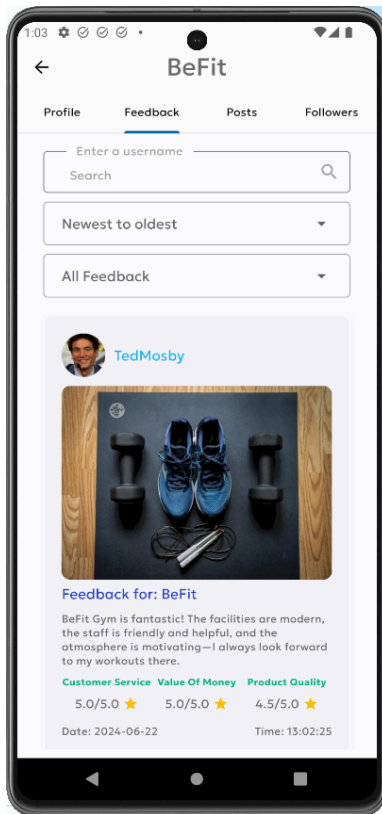


Figure 61: Application business feedback screen 1

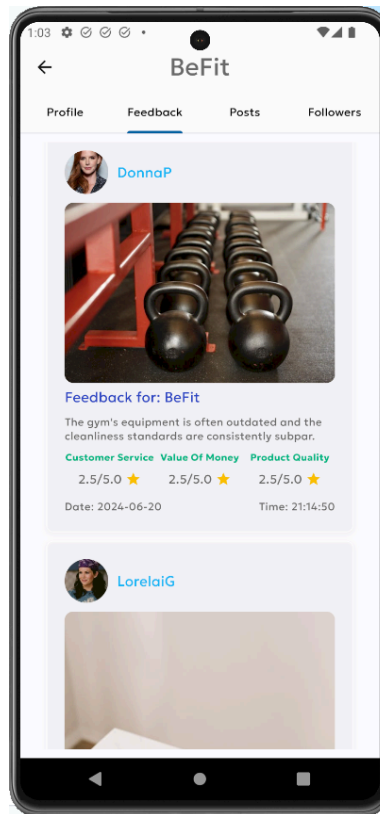


Figure 62: Application business feedback screen 2

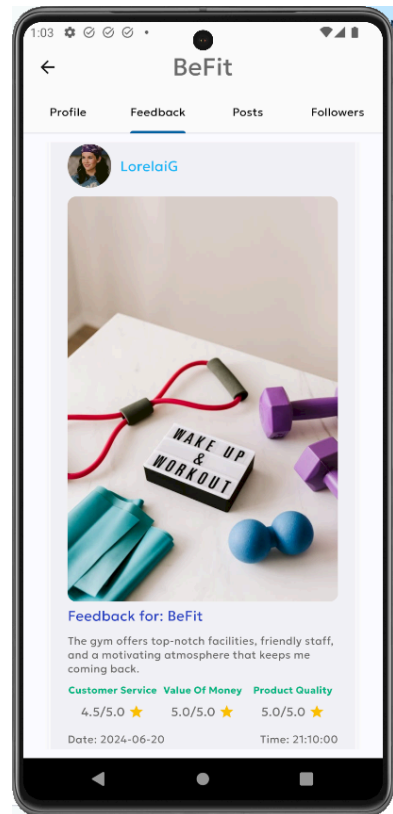


Figure 63: Application business feedback screen 3

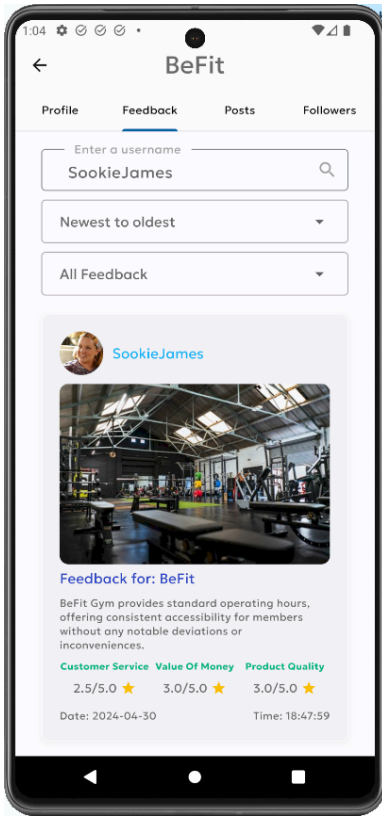


Figure 64: Application username filter for business feedback screen

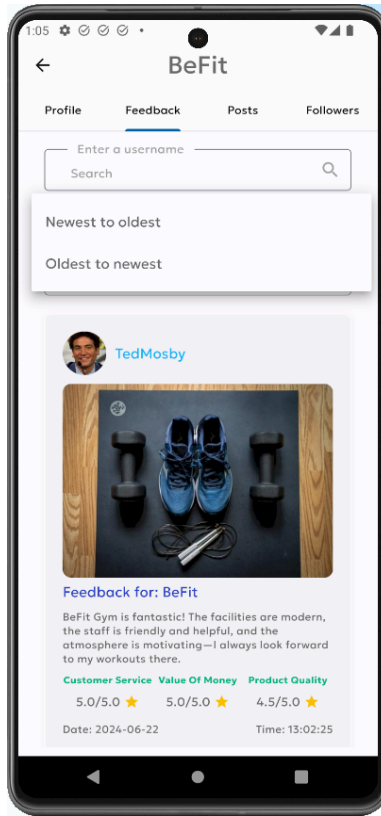


Figure 65: Application business feedback sorting screen

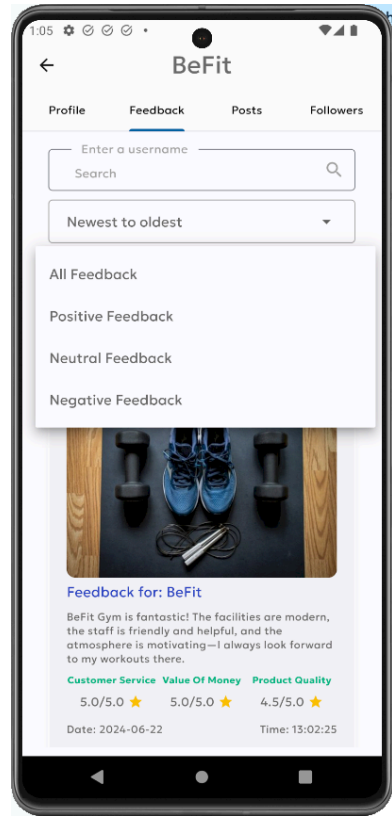


Figure 66: Application feedback tone filter for business feedback screen

3. Business Posts Screen

This screen presents all the posts made by the business, which can be displayed in either chronological order (from old to new) or reverse chronological order (from new to old).

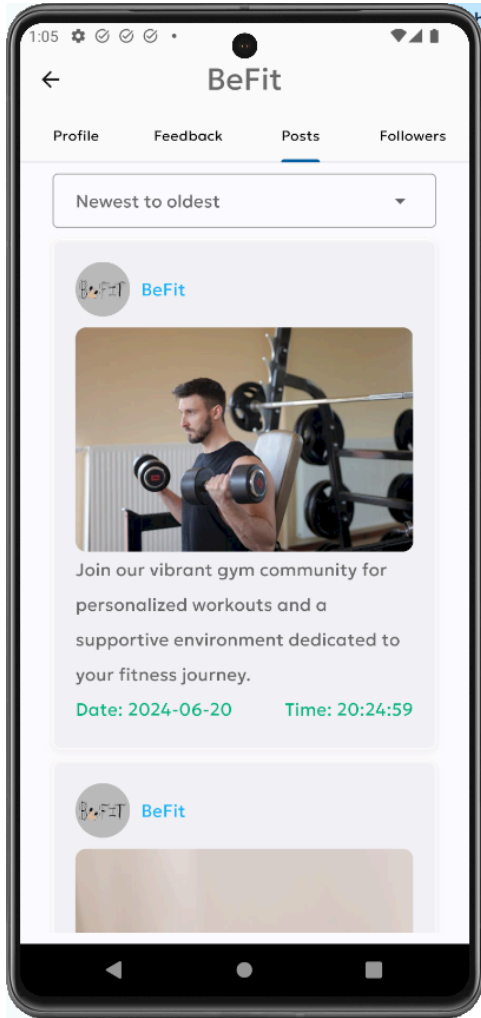


Figure 67: Application business posts screen - newest to oldest.

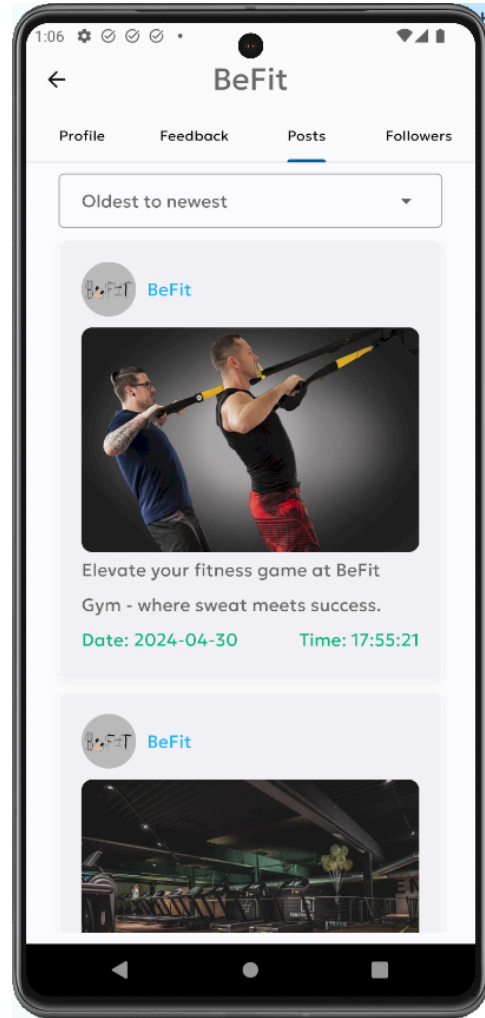


Figure 68: Application business posts screen - oldest to newest.

4. Business Followers

This screen displays the total number of followers for the business along with a list of the business followers. Clicking on a follower redirects the user to the specific user's page.

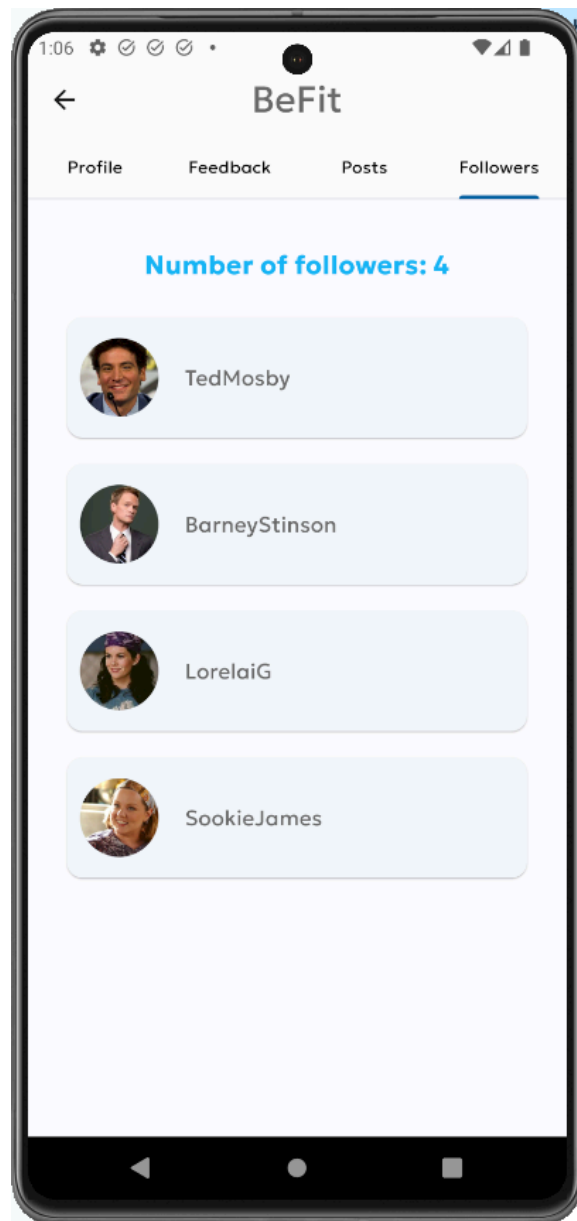


Figure 69: Application business followers screen

4.2 RateRelay Website (Business Administrator Interface)

1. Authentication Screens

Our Authentication Screens include three fundamental functions just like in our application: signing up for new business administrators, signing in for registered business administrators, and password recovery for those who have forgotten their credentials.

❖ Sign-up Screens

During the sign-up process, business administrators are required to provide their username, email, password, business name, phone number, description, category, country, and city. Both the business name and email must be unique; if either is already associated with another account, a warning will be issued. Each field undergoes validation, and if any field fails, the website will display a warning message and block sign-up until all fields are correctly validated. The business name, category, country, and city fields are essential for users, as they use these fields to filter and search for businesses.

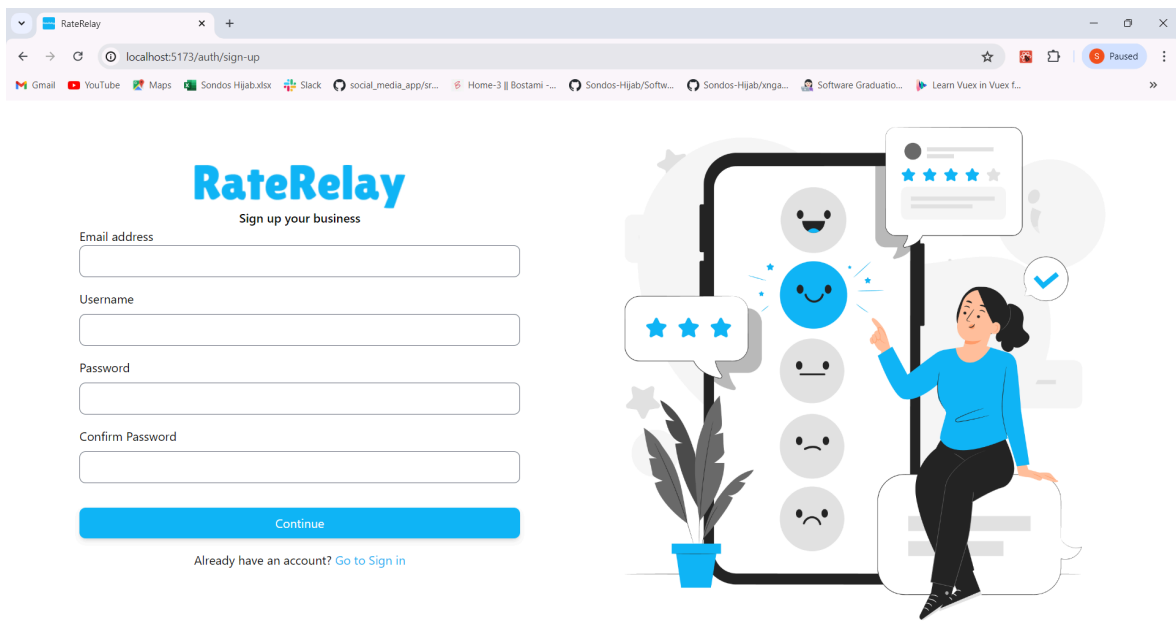


Figure 70: Website sign-up screen.

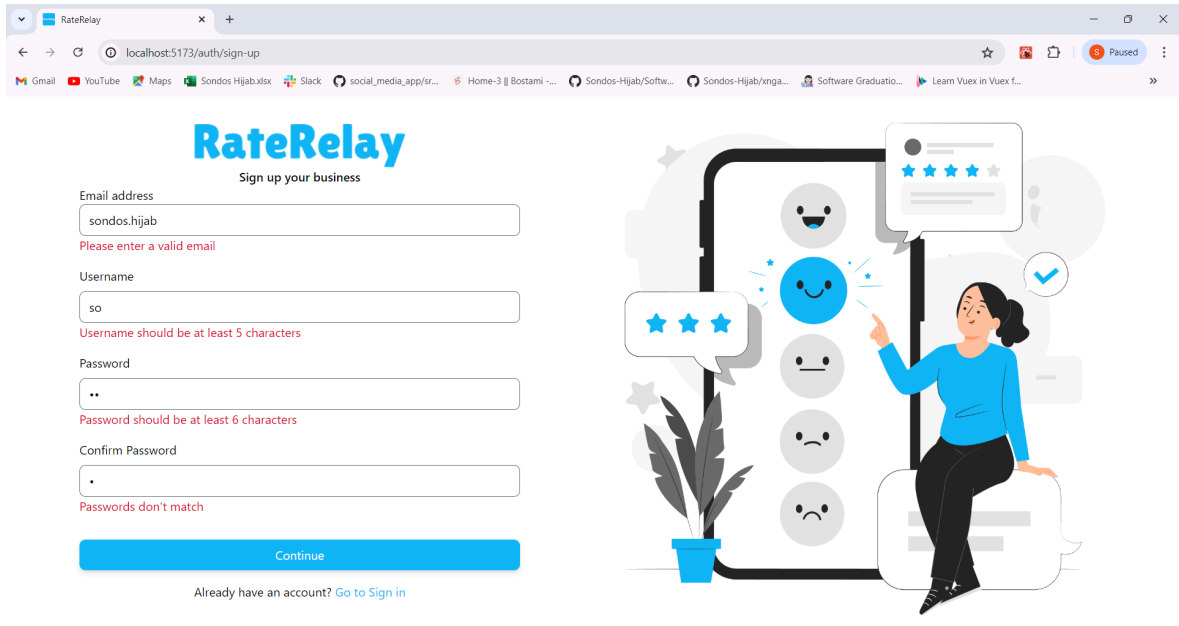


Figure 71: Website sign-up validations.

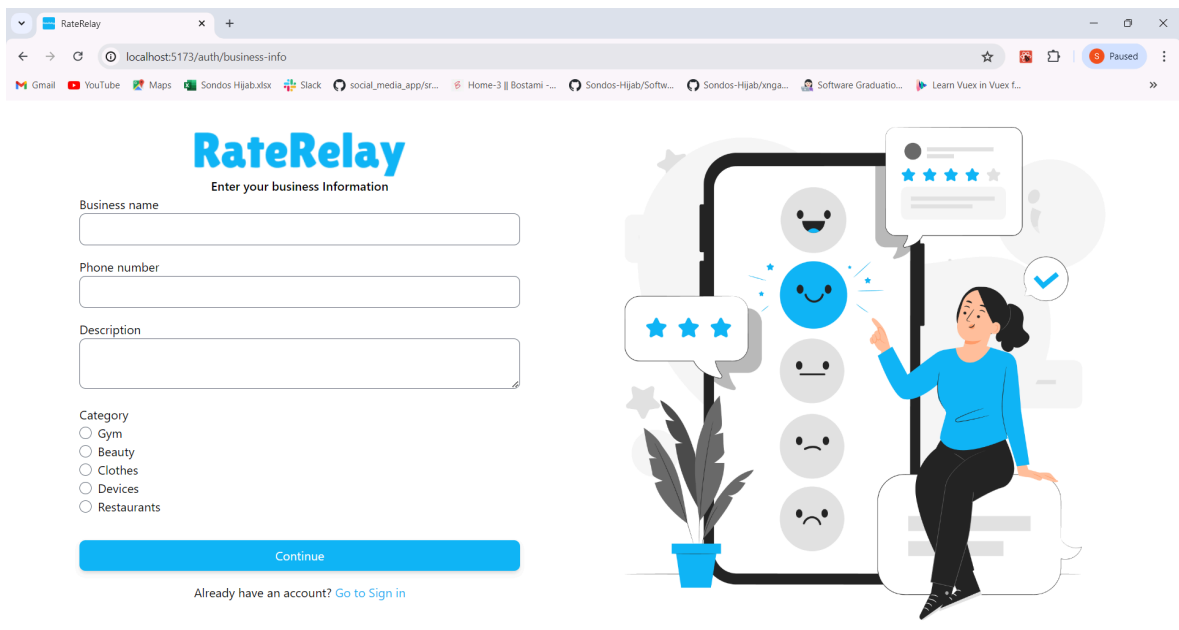


Figure 72: Website sign-up screen.

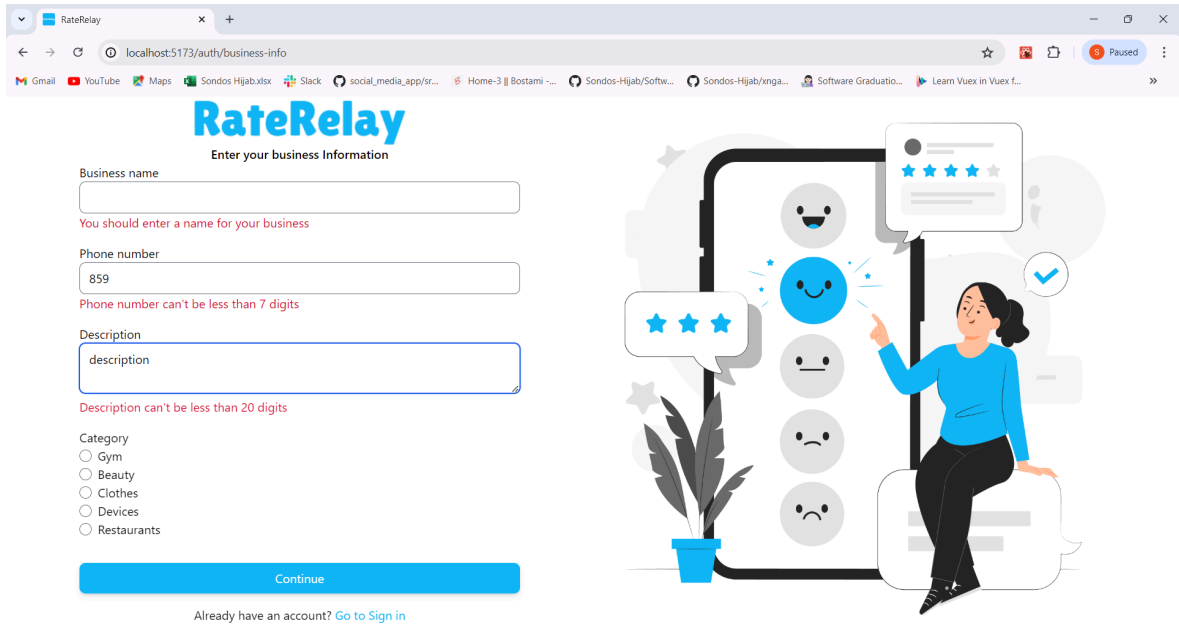


Figure 73: Website sign-up validations.

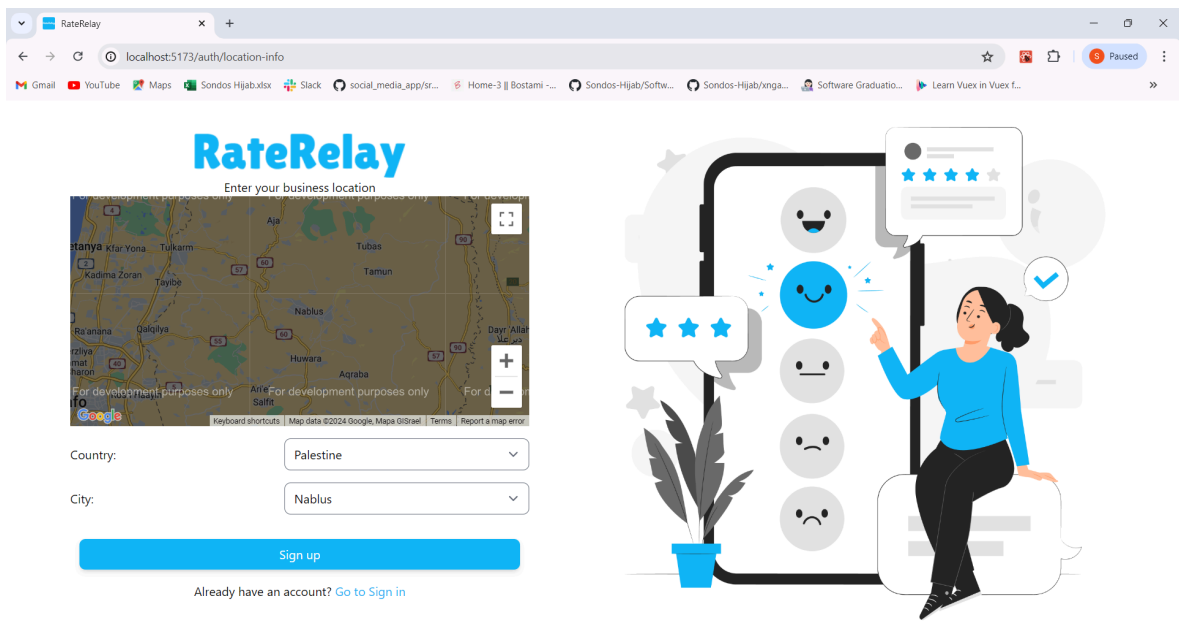


Figure 74: Website sign-up screen.

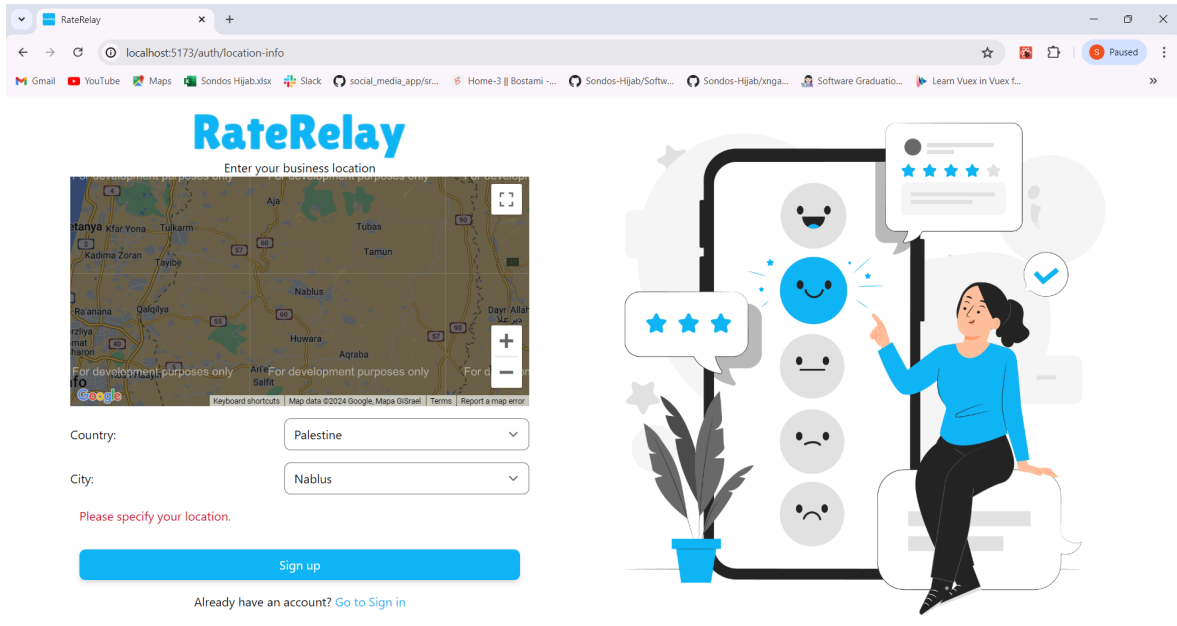


Figure 75: Website sign-up validations.

Here are two screens that illustrate the warnings business administrators receive if they try to use an email or business name that is already linked to another account:

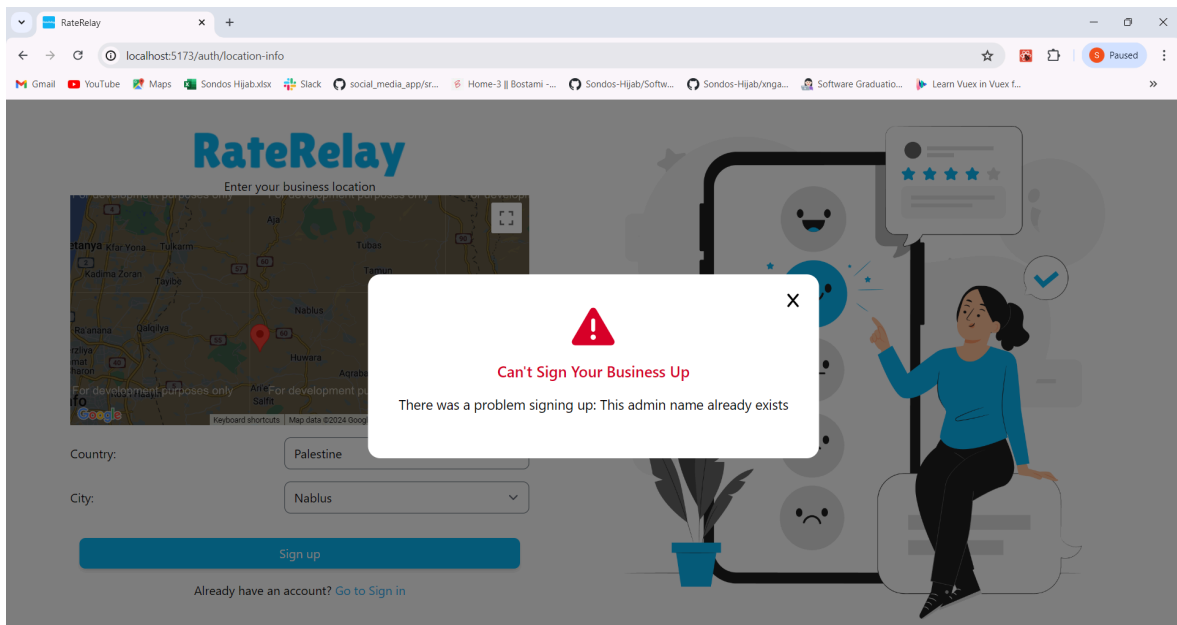


Figure 76: Website sign-up admin name warning.

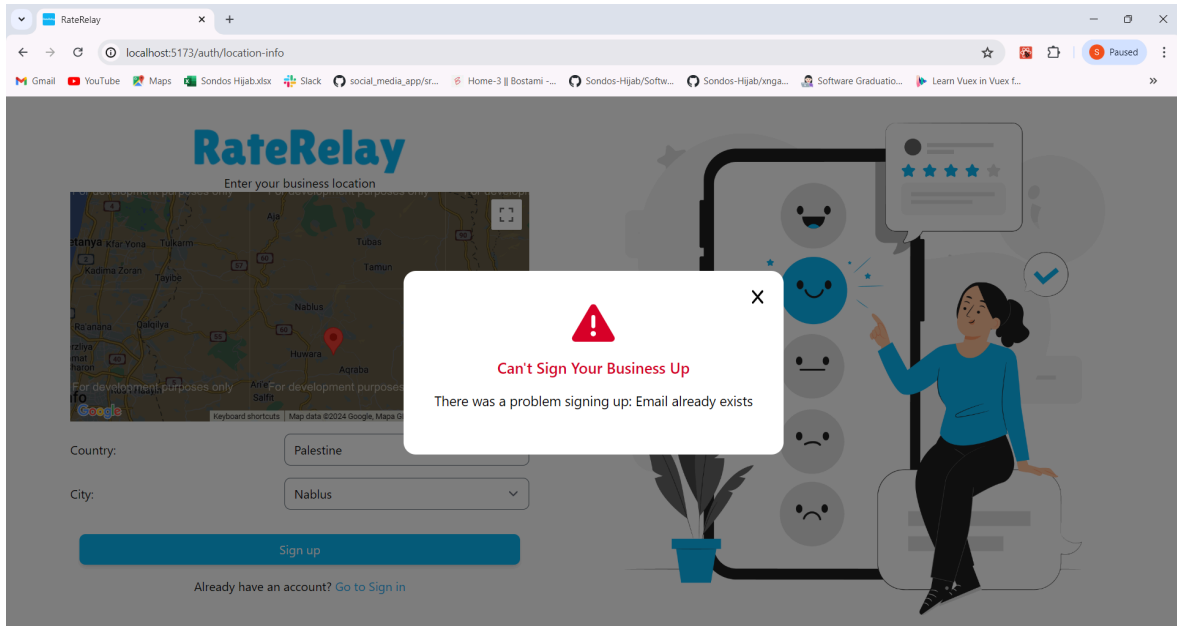


Figure 77: Website sign-up email warning.

These screens display the success message business administrators receive once they have successfully completed the sign-up process and are registered in our database. Additionally, a confirmation email is sent to verify their registration.

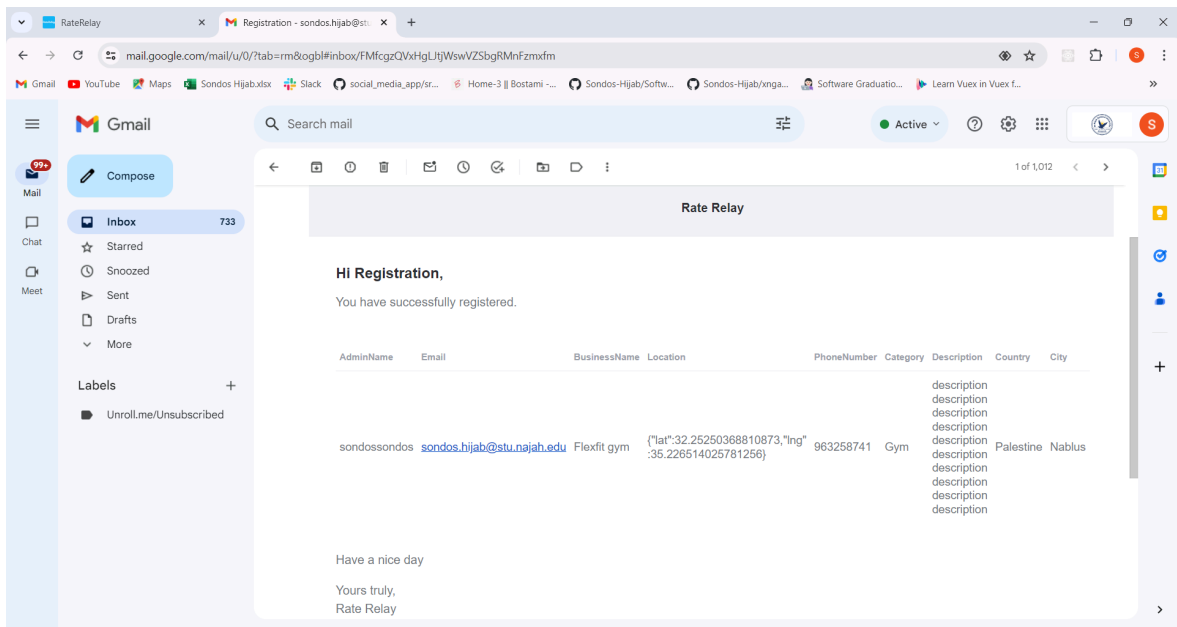


Figure 78: Website welcoming email sign-up screen.

- ❖ Forgot Password screens
Just as explained in the user application.

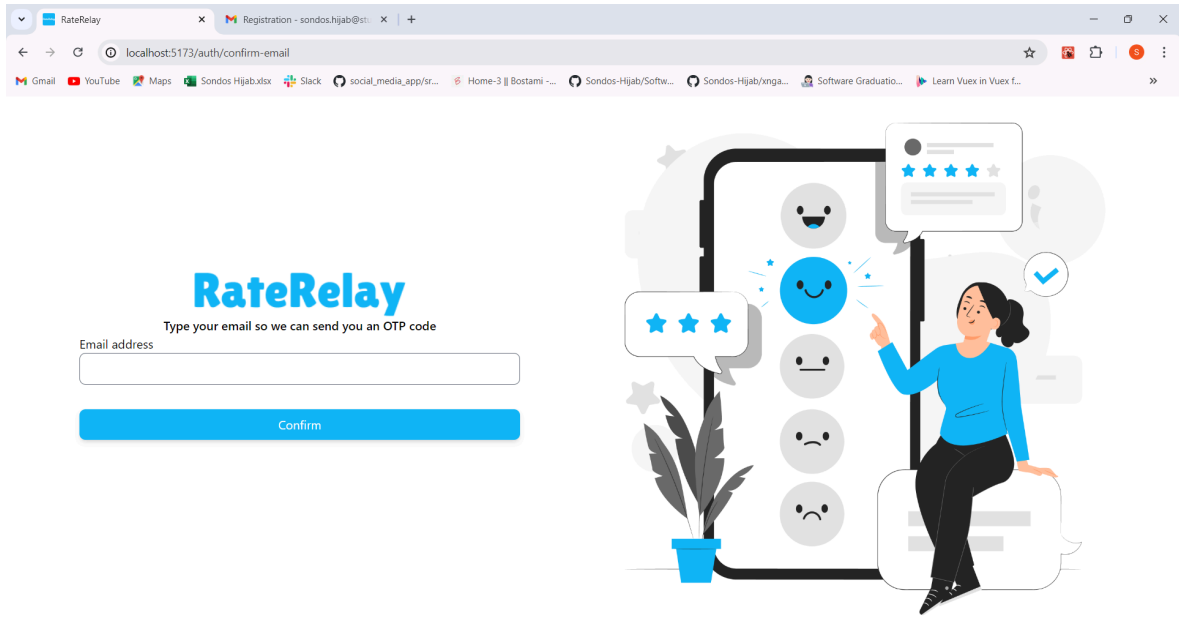


Figure 79: Website forgot password screen.

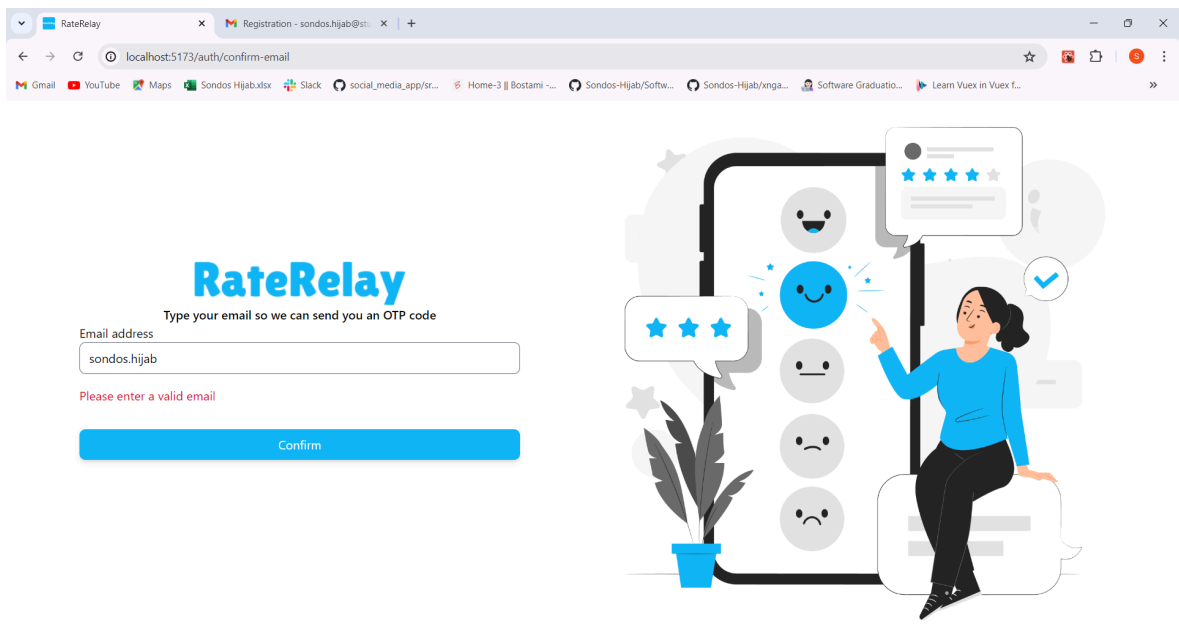


Figure 80: Website check email screen.

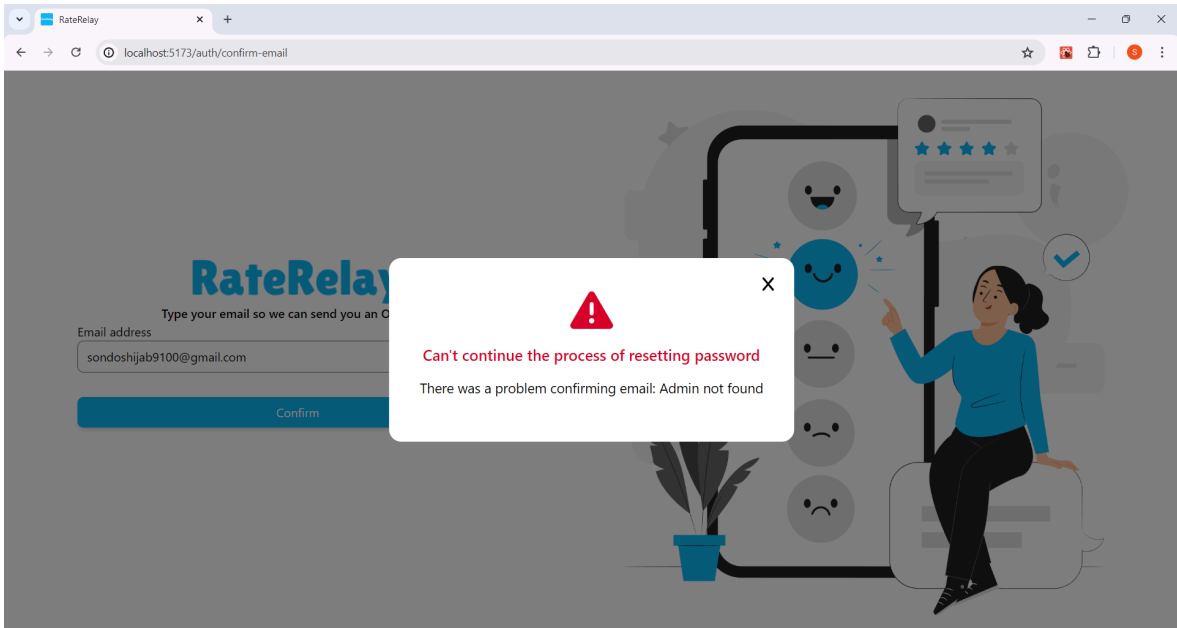


Figure 81: Website admin not found warning screen.

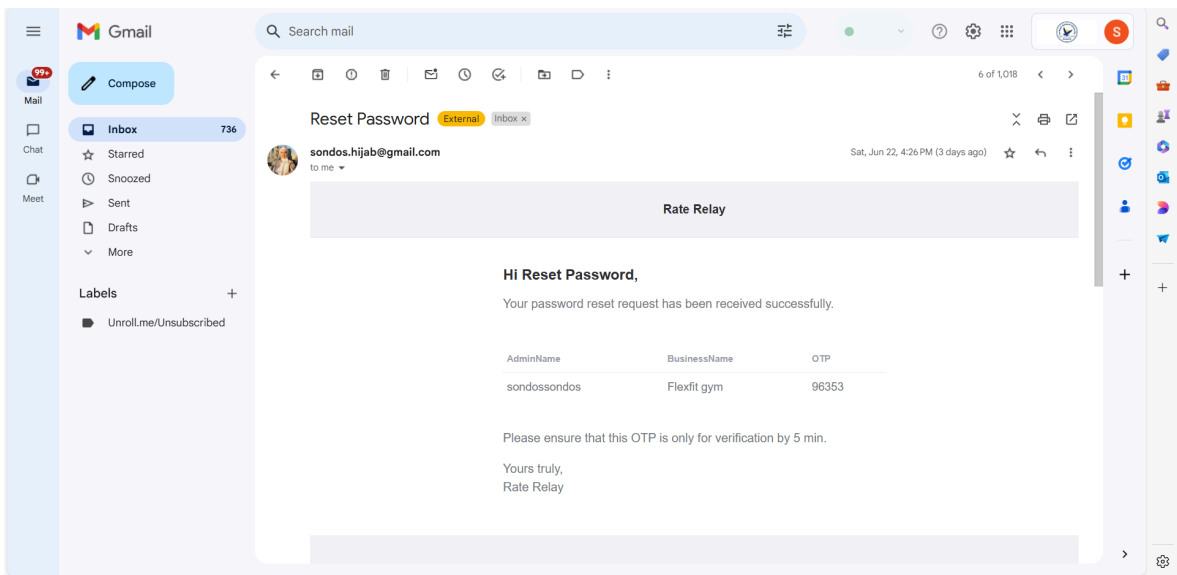


Figure 82: Website OTP email screen.

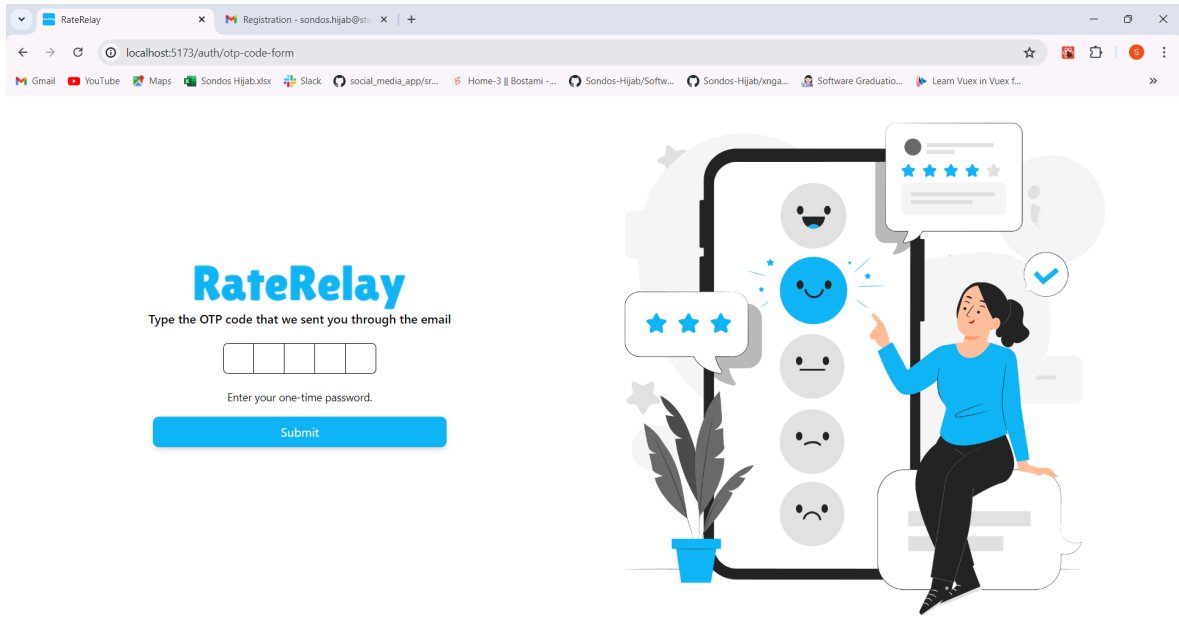


Figure 83: Website OTP code screen.

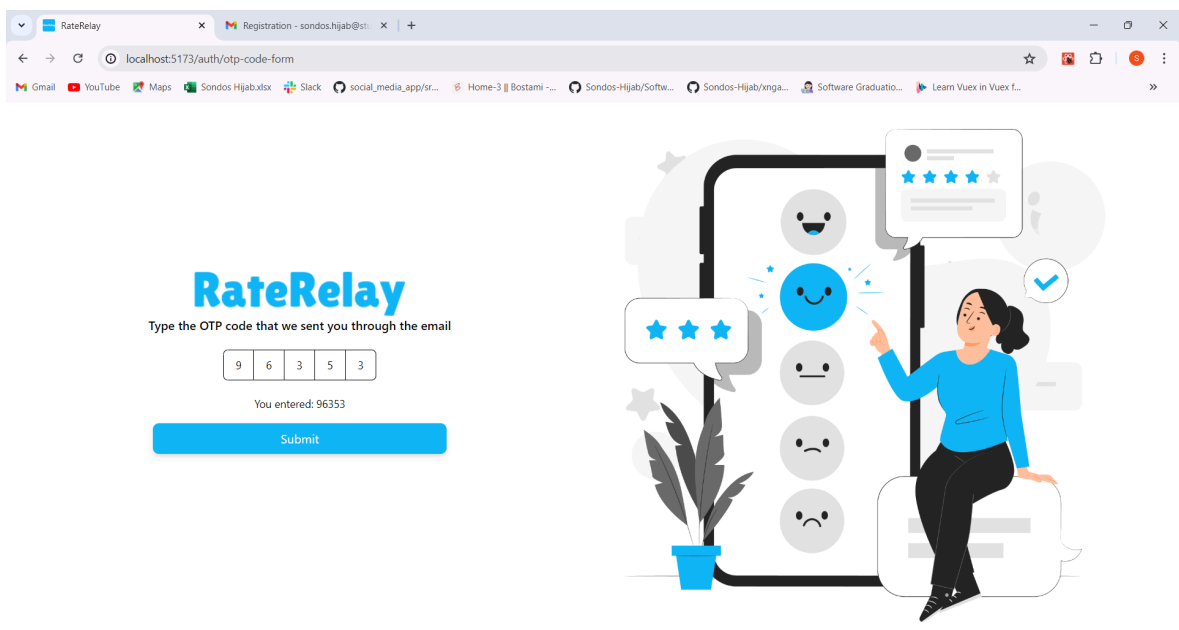


Figure 84: Website after writing OTP code screen.

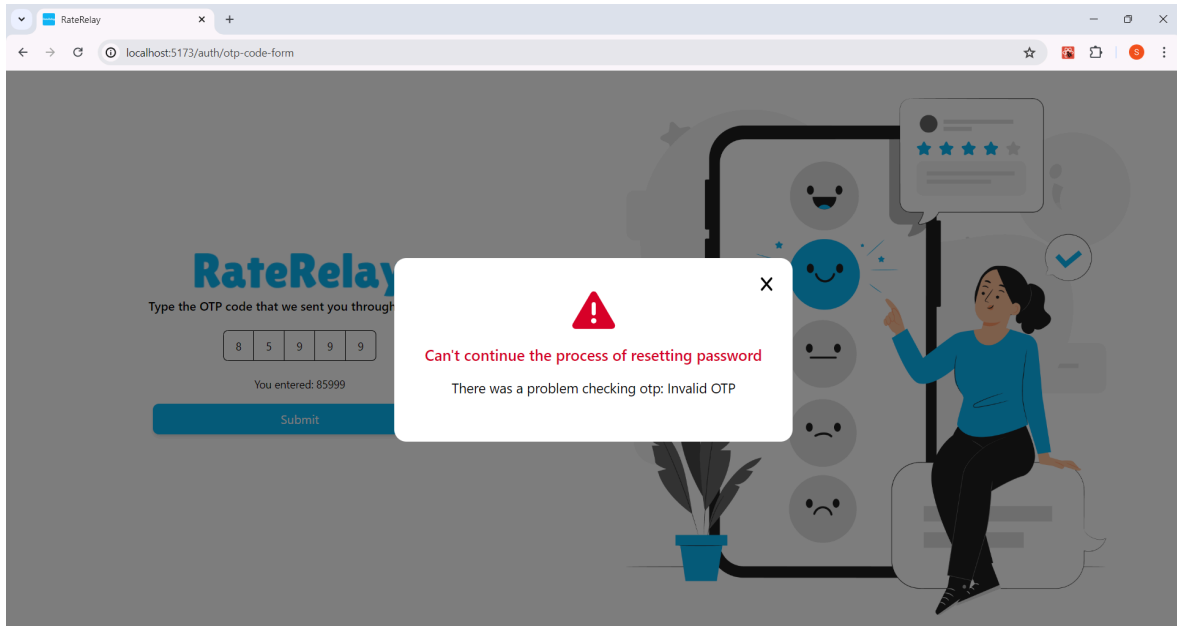


Figure 85: Website invalid OTP warning screen.

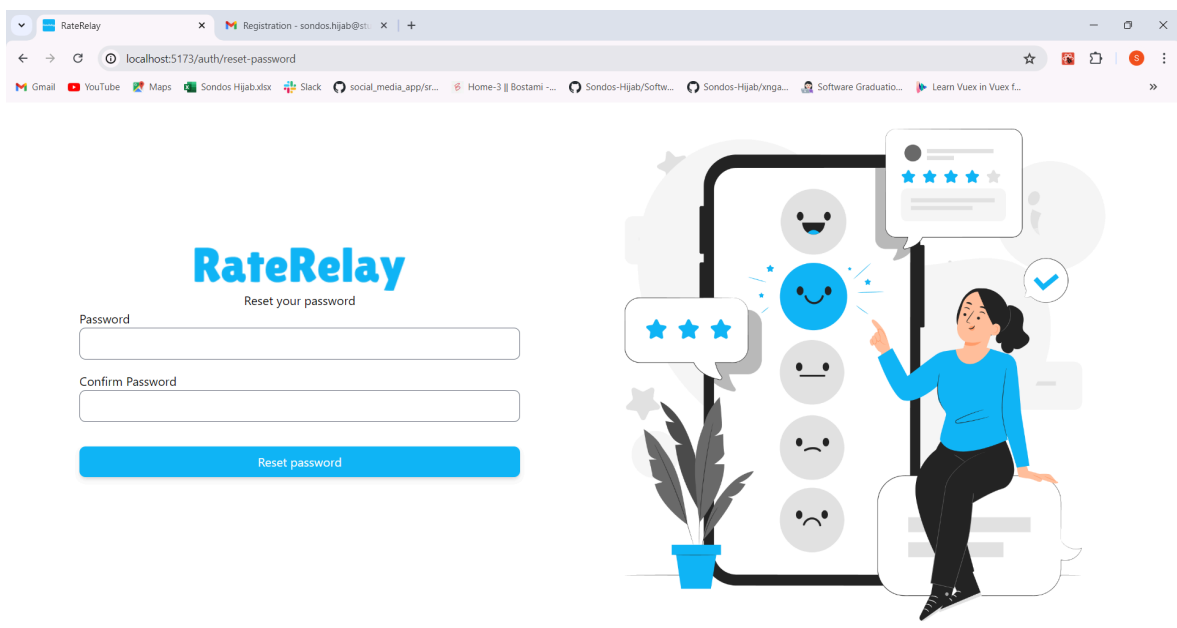


Figure 86: Website reset password screen.

❖ Sign-in Screens

Just as explained in the user application.

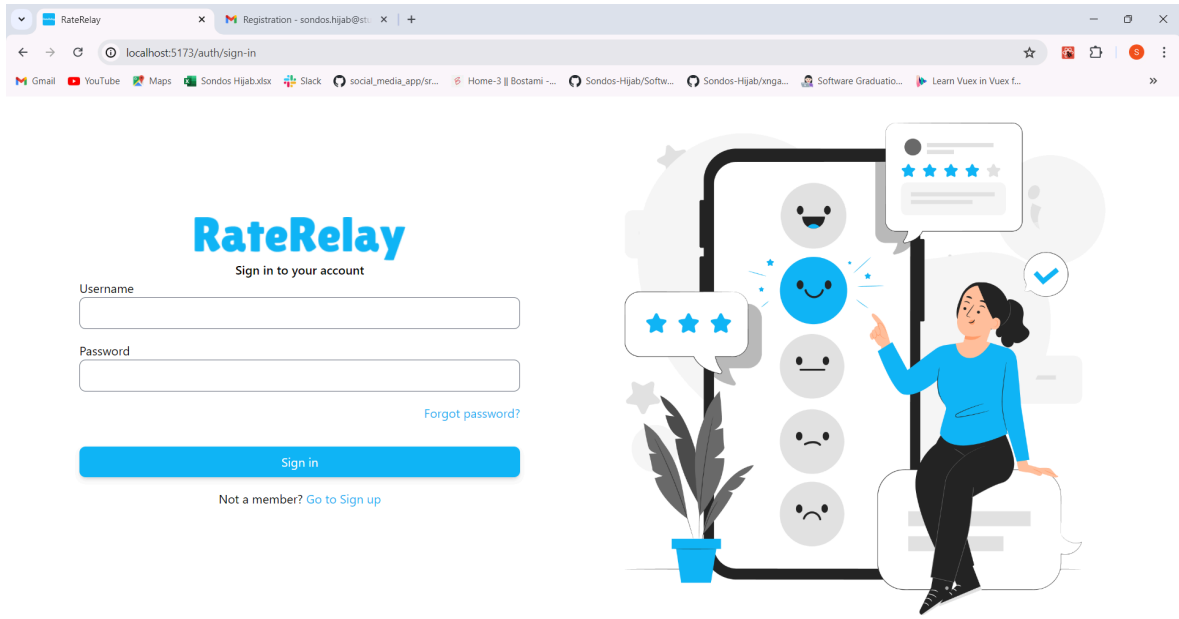


Figure 87: Website sign-in screen

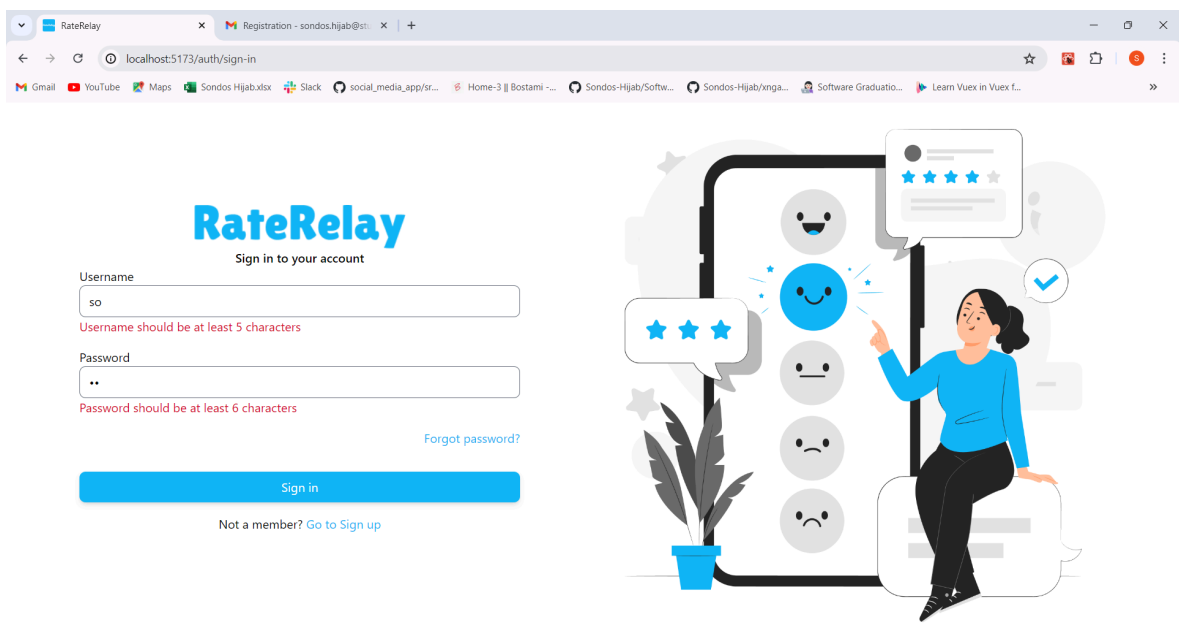


Figure 88: Website sign-in validations.

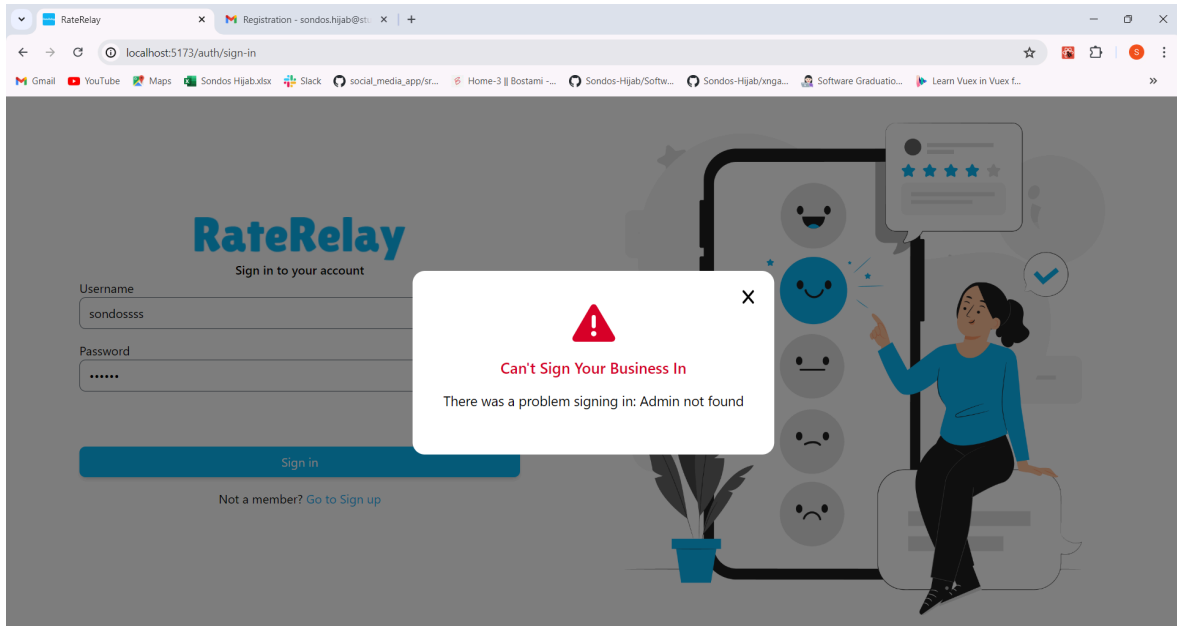


Figure 89: Website sign-in admin not found warning.

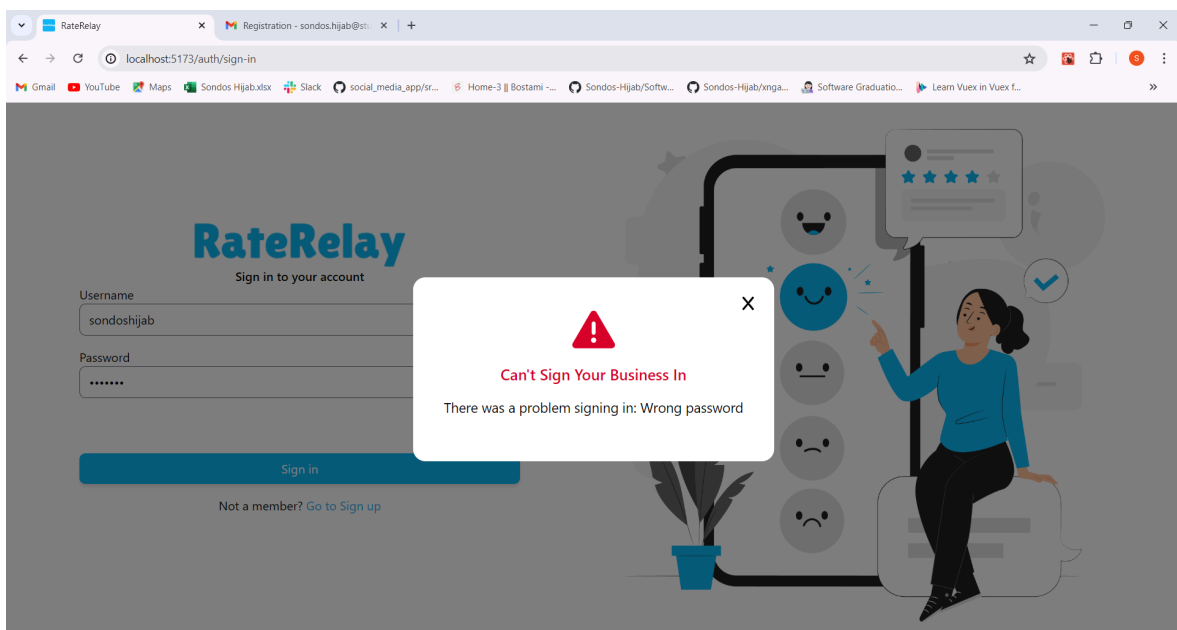


Figure 90: Website sign-in wrong password warning.

2. Home Page

Upon signing in, business administrators are redirected to their home page. This page is divided into two sections: a sidebar on the left and the main content area on the right. The sidebar allows navigation between various sections, including Business Profile, Home, Dashboard, My Posts, Create Post, Messages, Notifications, and Logout.

In the Home section, business administrators can view the recent feedback received from users. They have the option to sort feedback from newest to oldest and vice versa. Additionally, they can filter feedback based on its sentiment (positive, negative, or neutral) and search for feedback by username.

Furthermore, there is a "Send Message" button that, when clicked, redirects administrators to the Messages section, allowing them to send a message to the respective user.

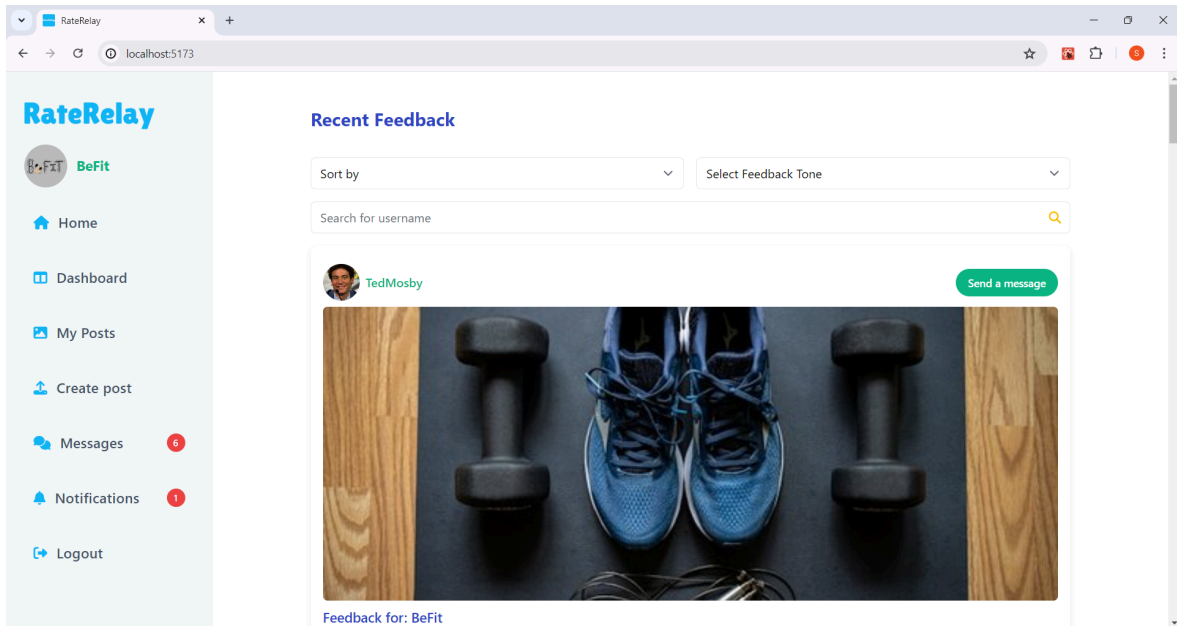


Figure 91: Website home section.

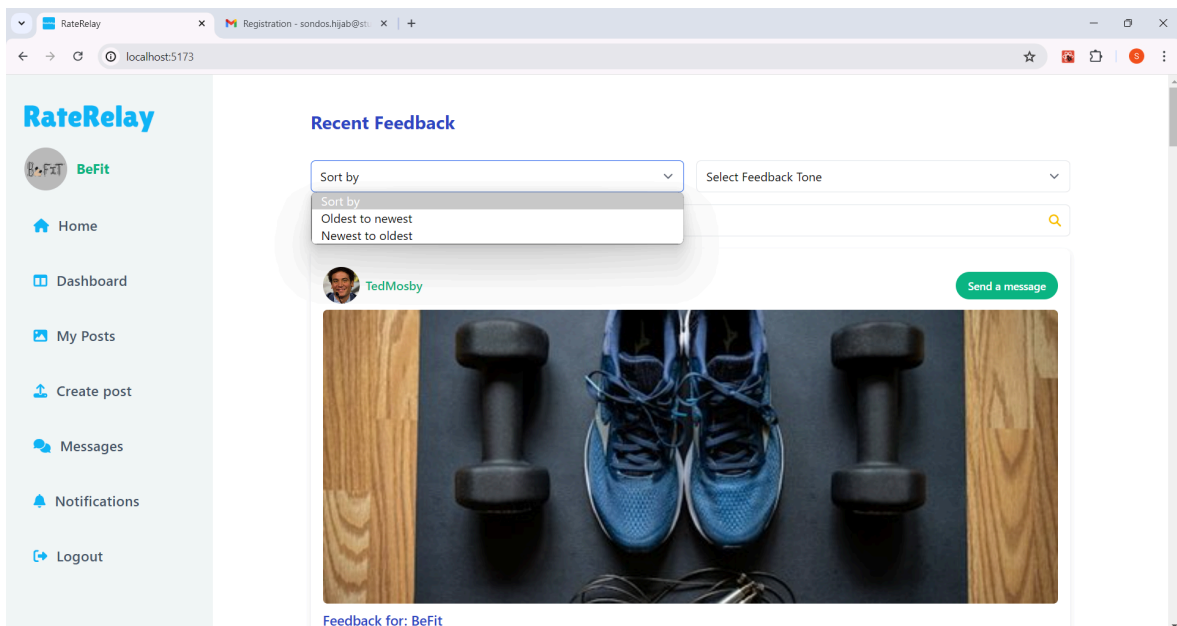


Figure 92: Website sort feedback in either chronological order or reverse chronological order.

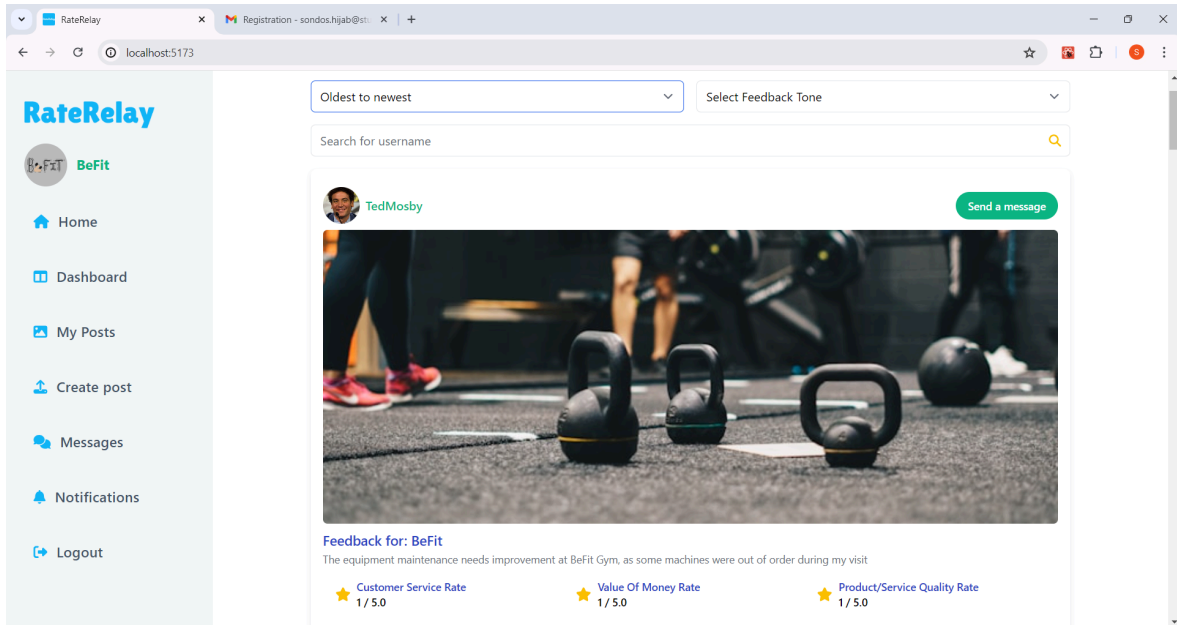


Figure 93: Website sort feedback in chronological order.

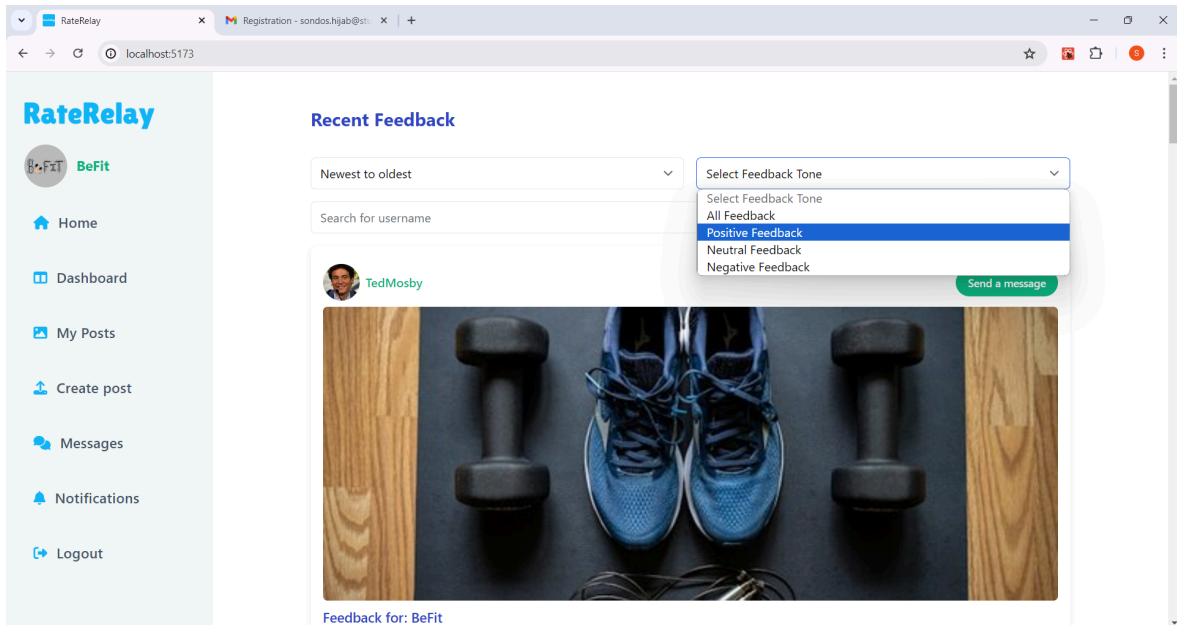


Figure 94: Website feedback sorting based on semantic analysis (positive, negative, and neutral).

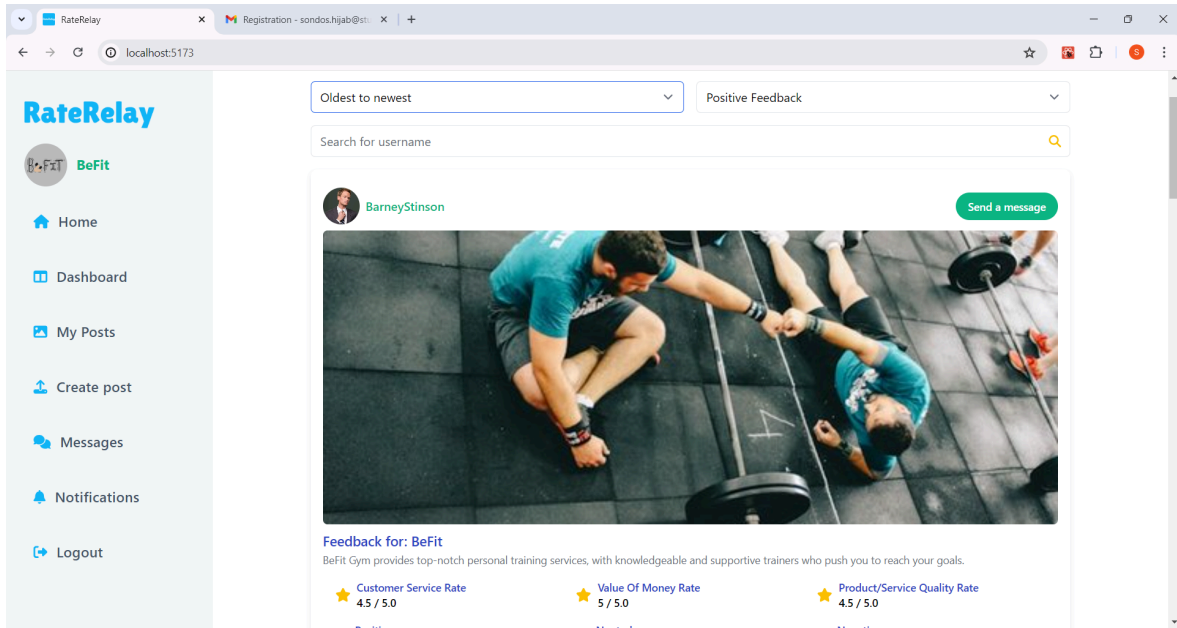


Figure 94: Website positive feedback

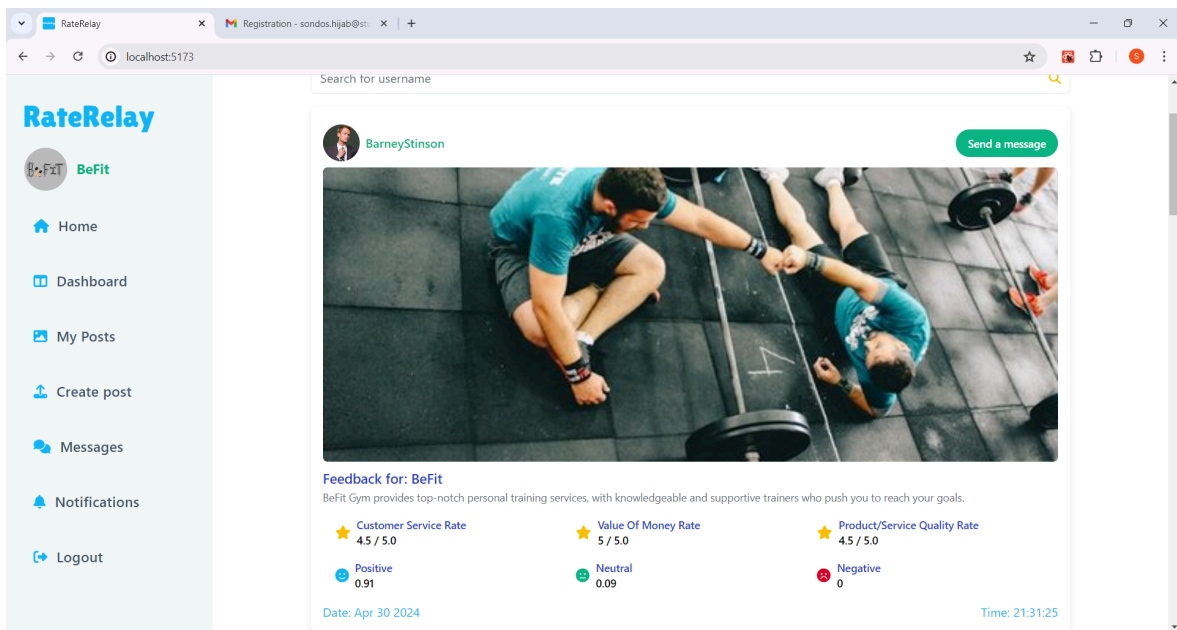


Figure 95: Website feedback display from the business perspective.

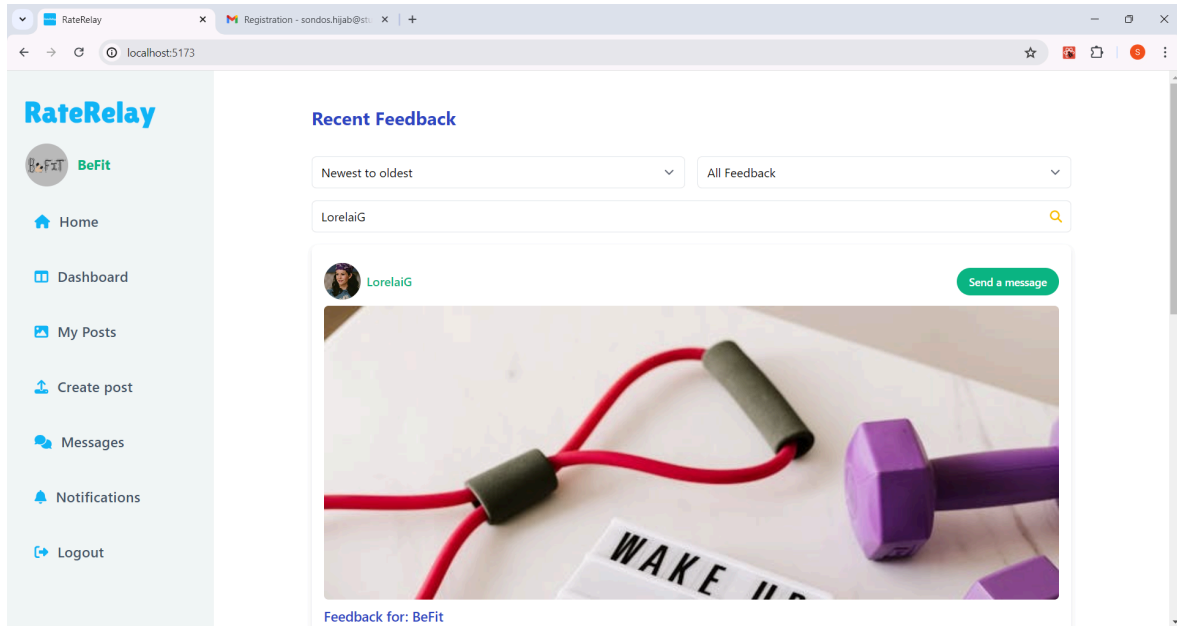


Figure 95: Website feedback filtering by username.

3. Business Profile

This section includes the business profile picture, business name, phone number, category, number of followers, description, and location. Edit icons are available, allowing the business administrator to update the profile picture, phone number, description, and location by clicking on the respective icons.

Afterward, there are three additional buttons: The first button enables administrators to view feedback provided by users, the second button displays a list of posts shared by the business administrator, and the third button leads to a list of users who follow the business administrator.

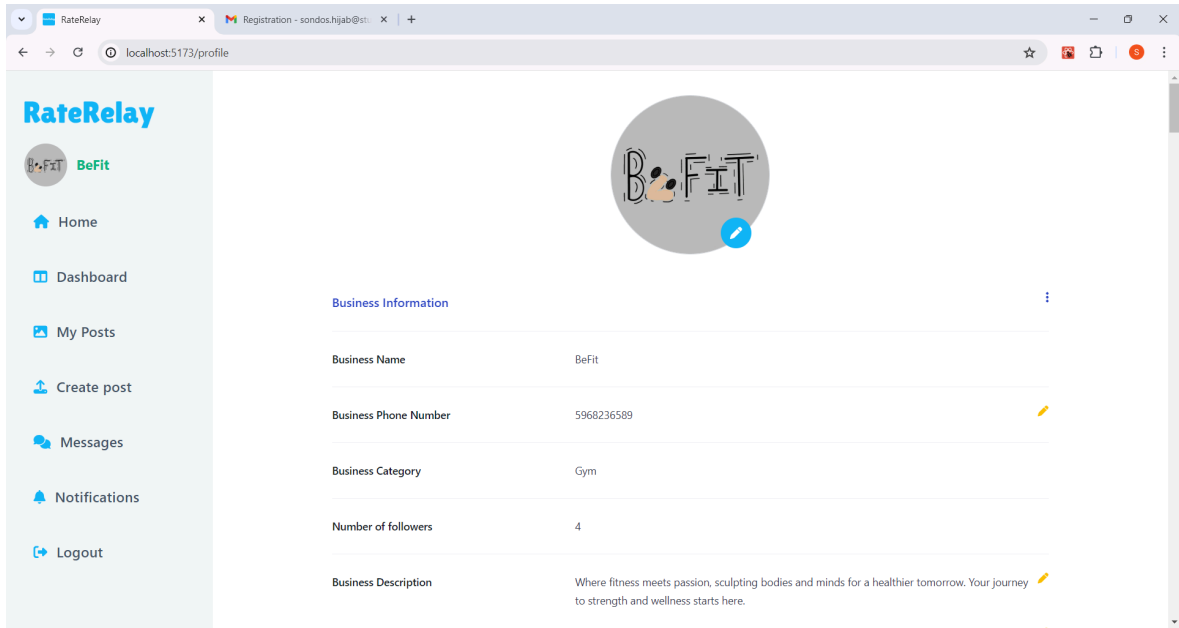


Figure 96: Website business administrator profile section.

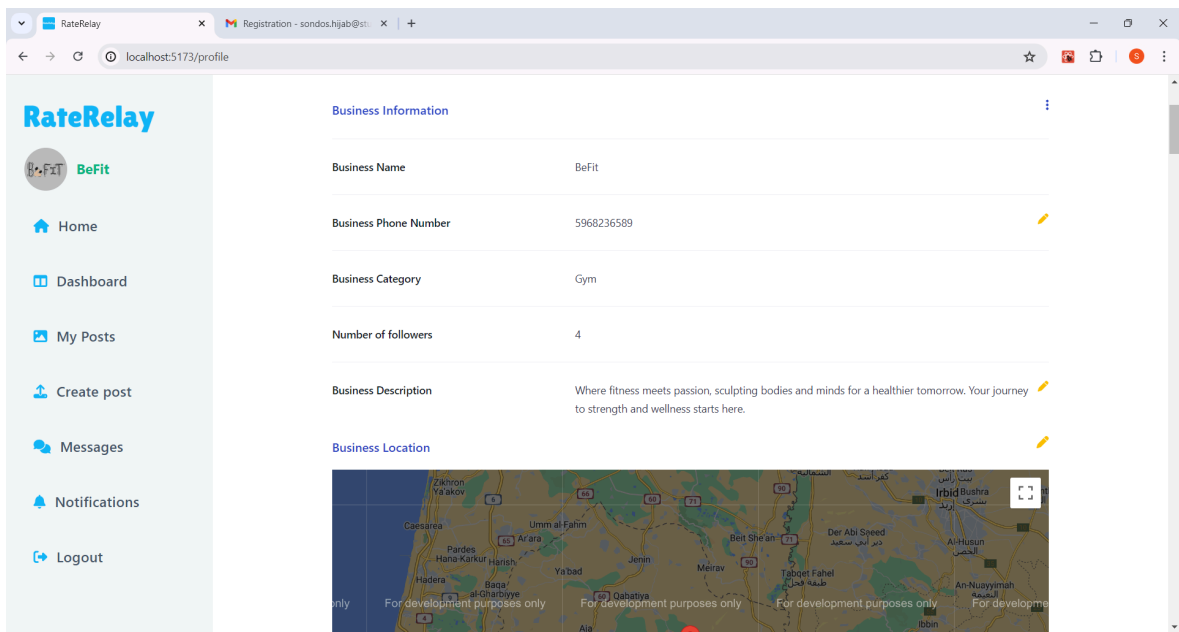


Figure 97: Website business administrator profile section.

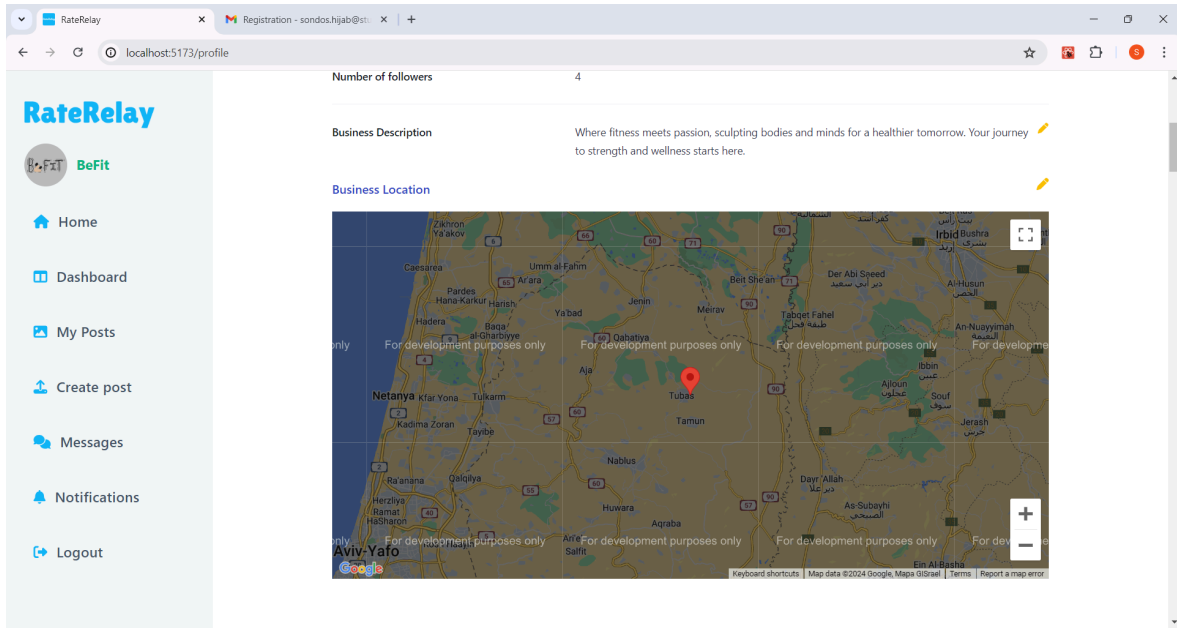


Figure 98: Website business administrator profile section.

When clicking on update profile picture:

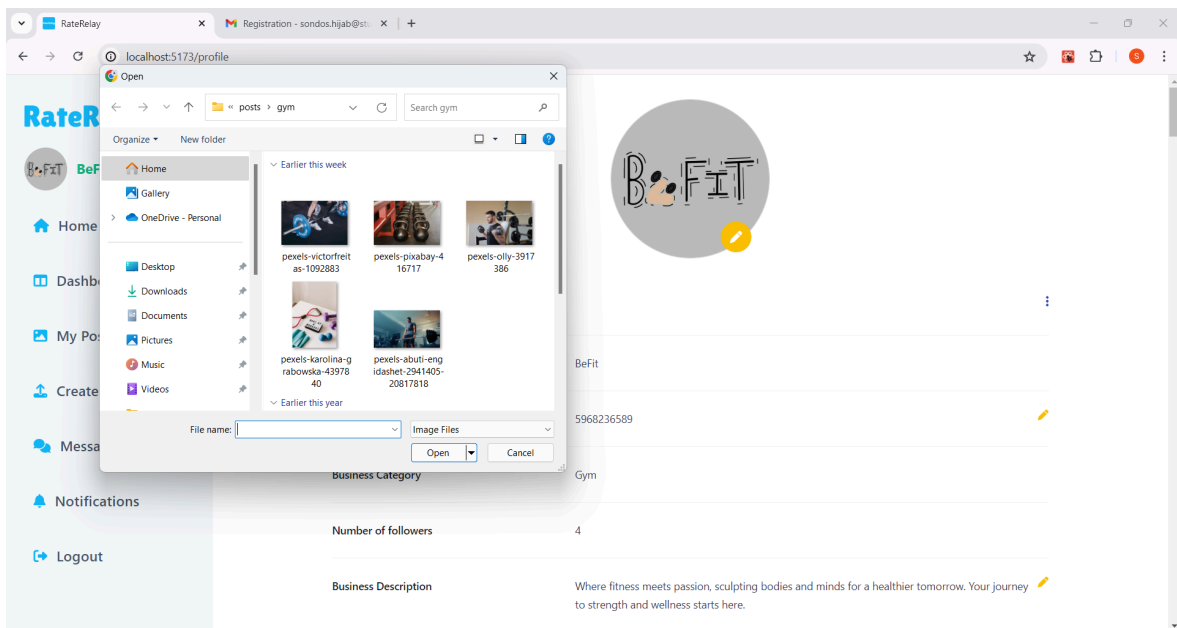


Figure 99: Website pick profile picture.

When clicking on update phone number:

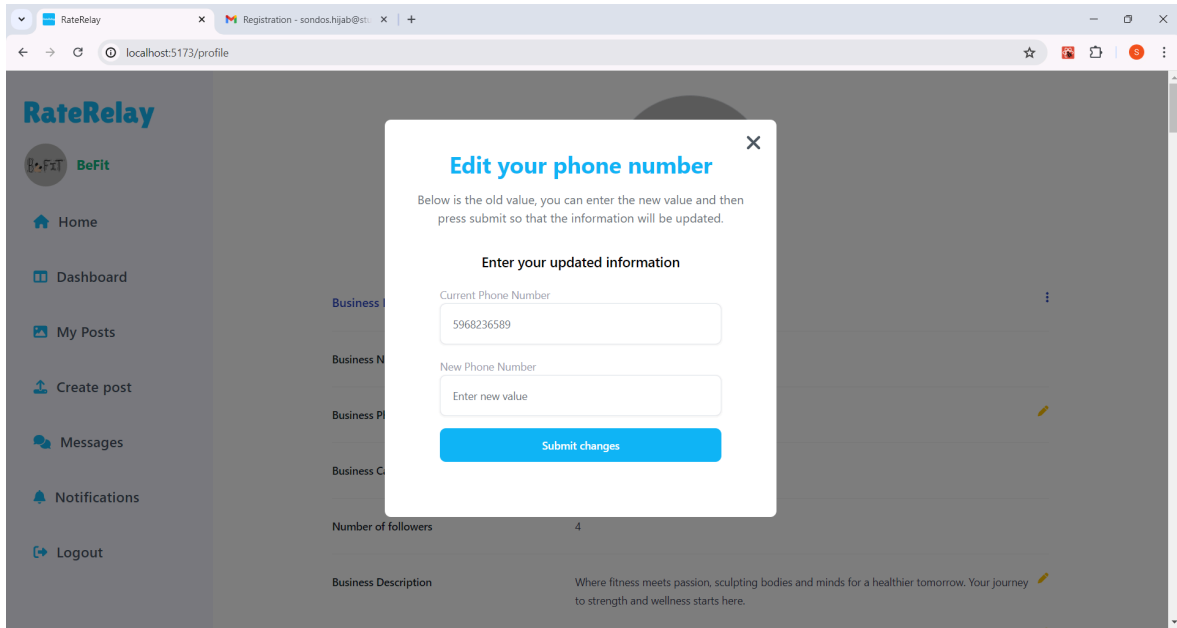


Figure 100: Website update phone number.

When clicking on update description:

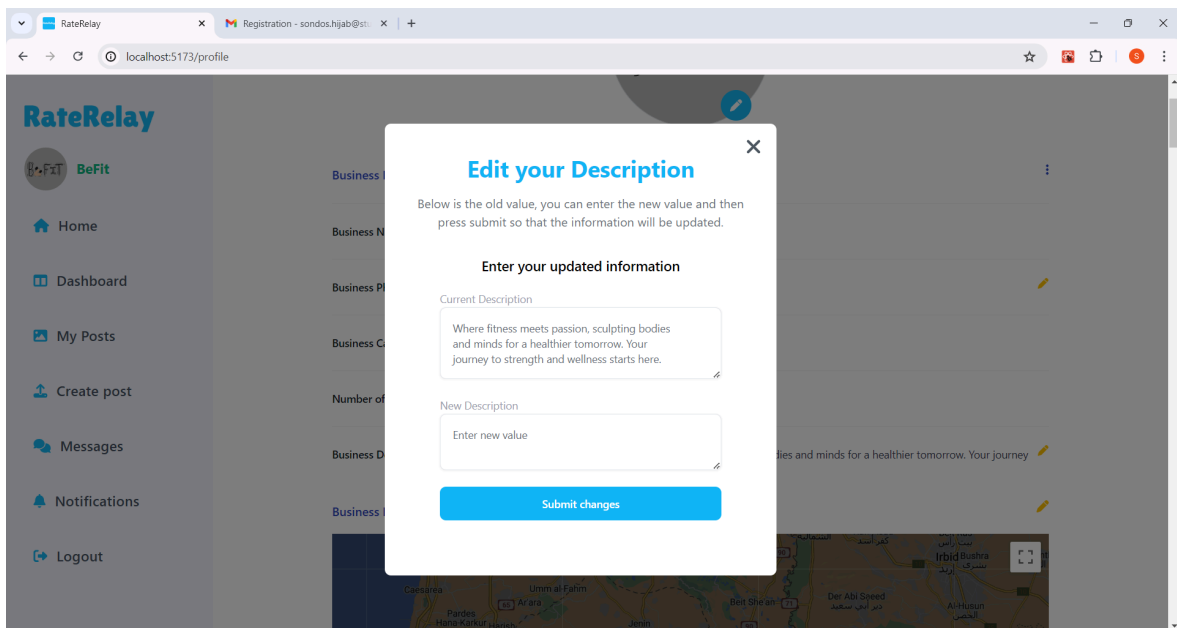


Figure 101: Website update description.

When clicking on update location:

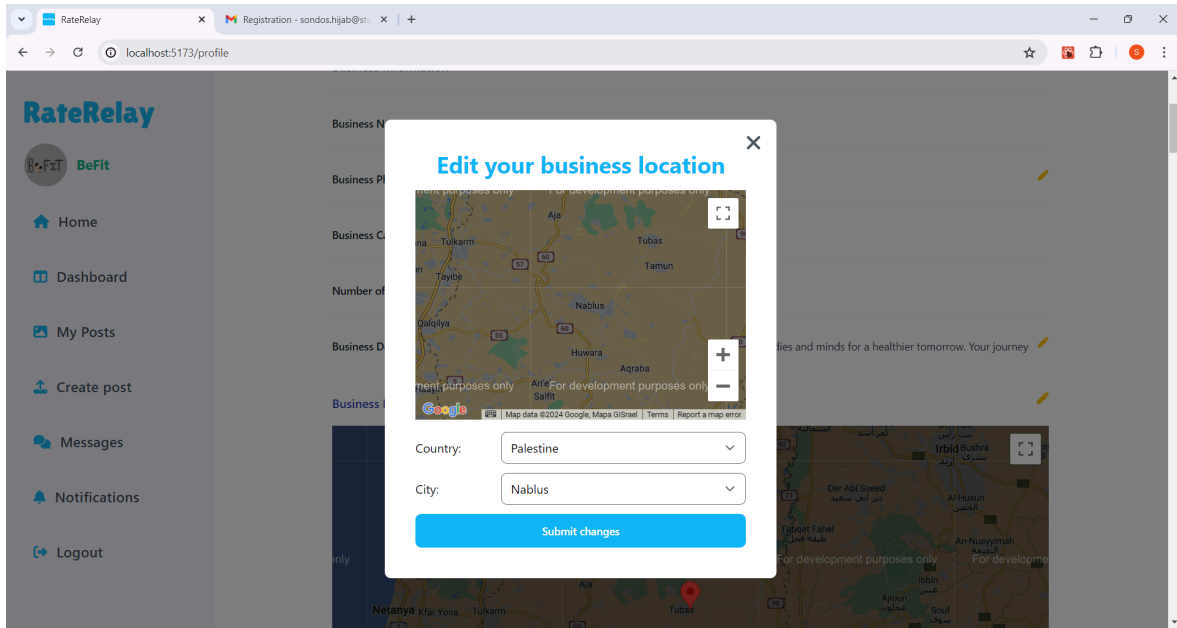


Figure 102: Website update location.

In the feedback received from users. They have the option to sort feedback from newest to oldest and vice versa. Additionally, they can filter feedback based on its sentiment (positive, negative, or neutral) and search for feedback by username.

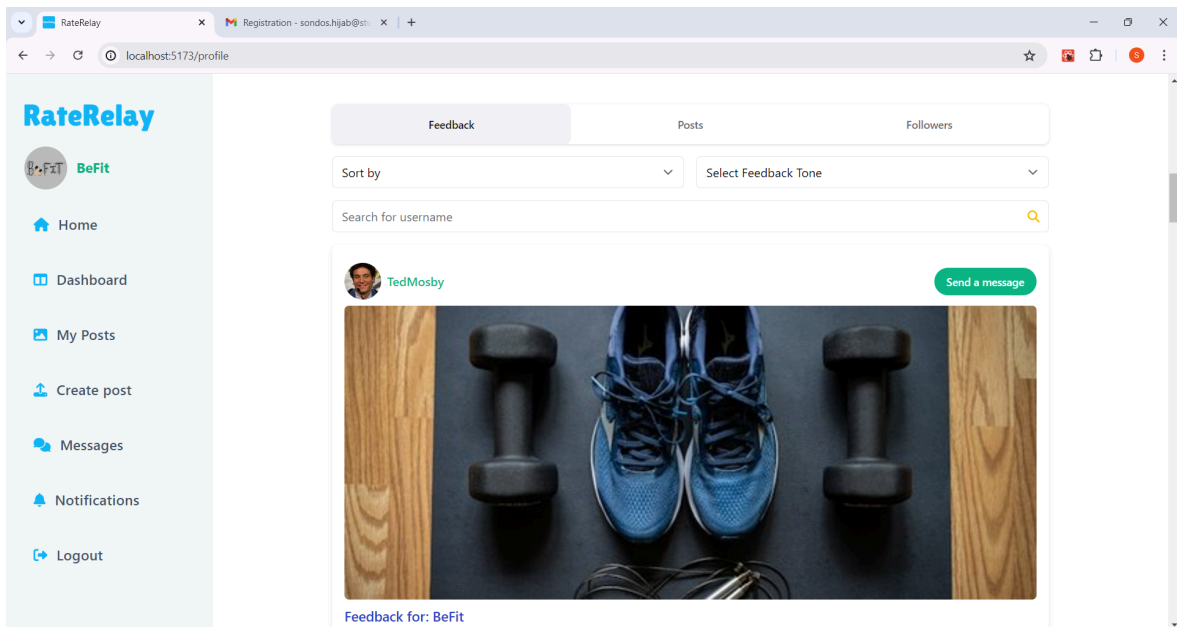


Figure 103: Website first business administrator feedback section.

In the posts published by business administrators, they have the option to sort them from newest to oldest and vice versa.

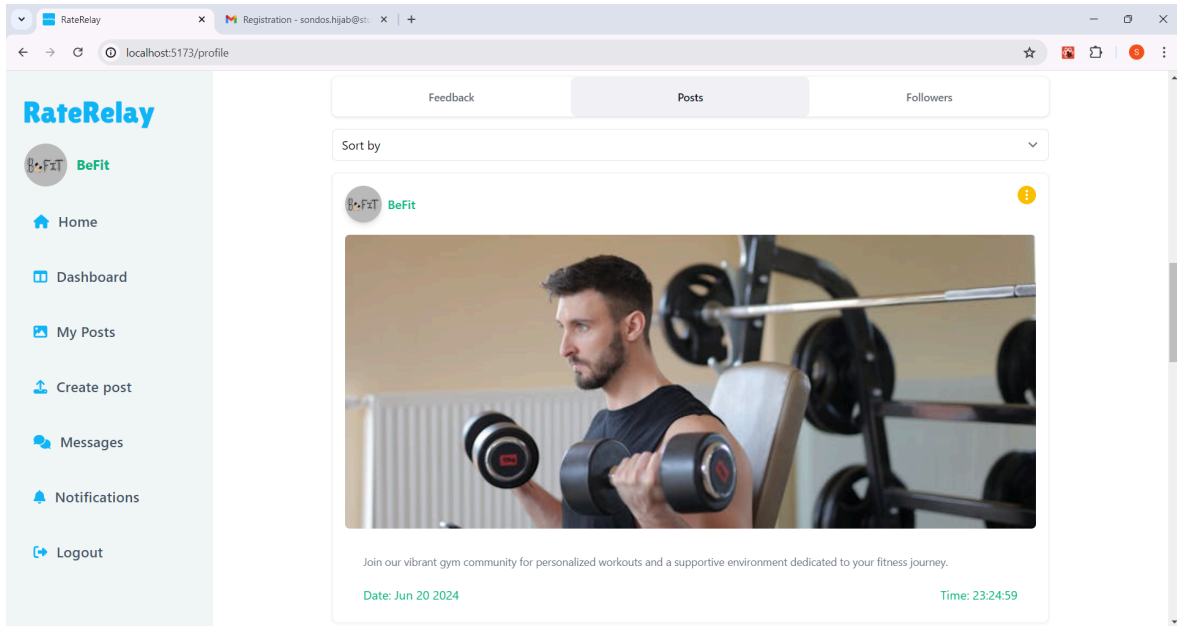


Figure 104: Website second business administrator posts section.

In the followers section, we can view a list of users who follow the business administrator.

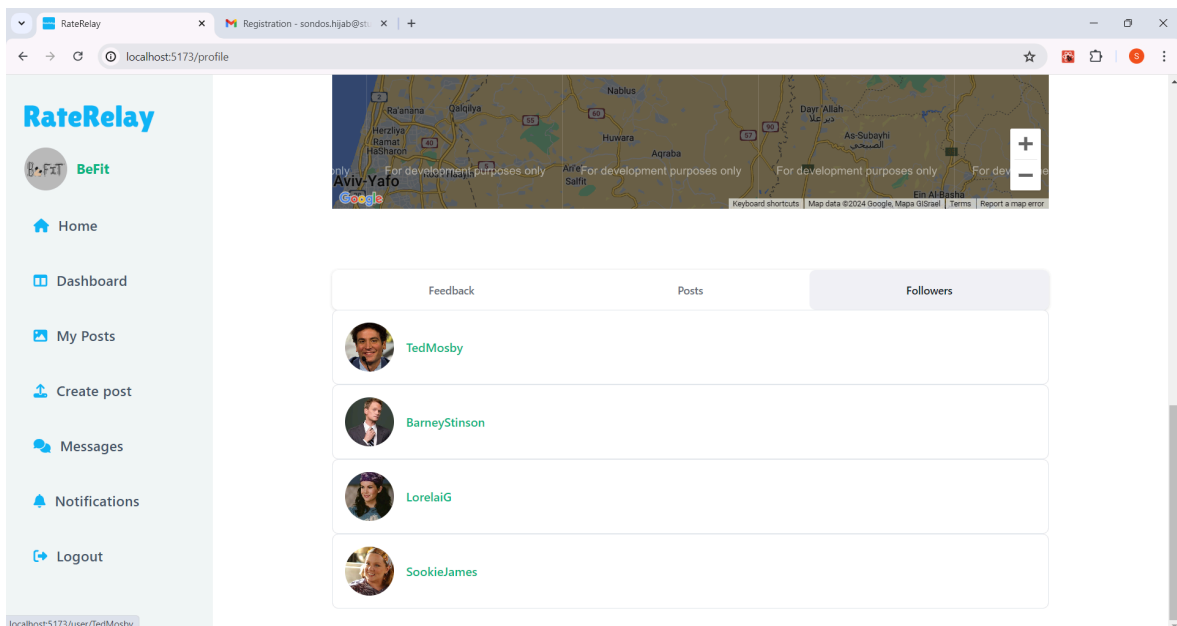


Figure 105: Website third business administrator followers section.

Here, the business administrator can reset their password and log out, just like in the user application.

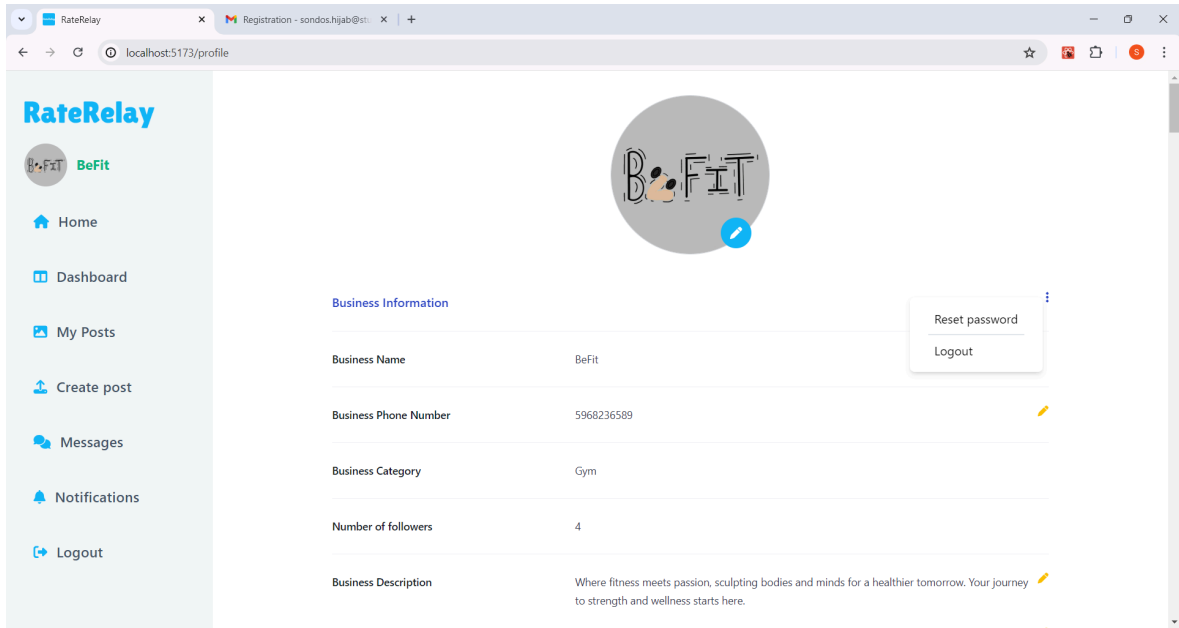


Figure 106: Website actions button on the profile screen

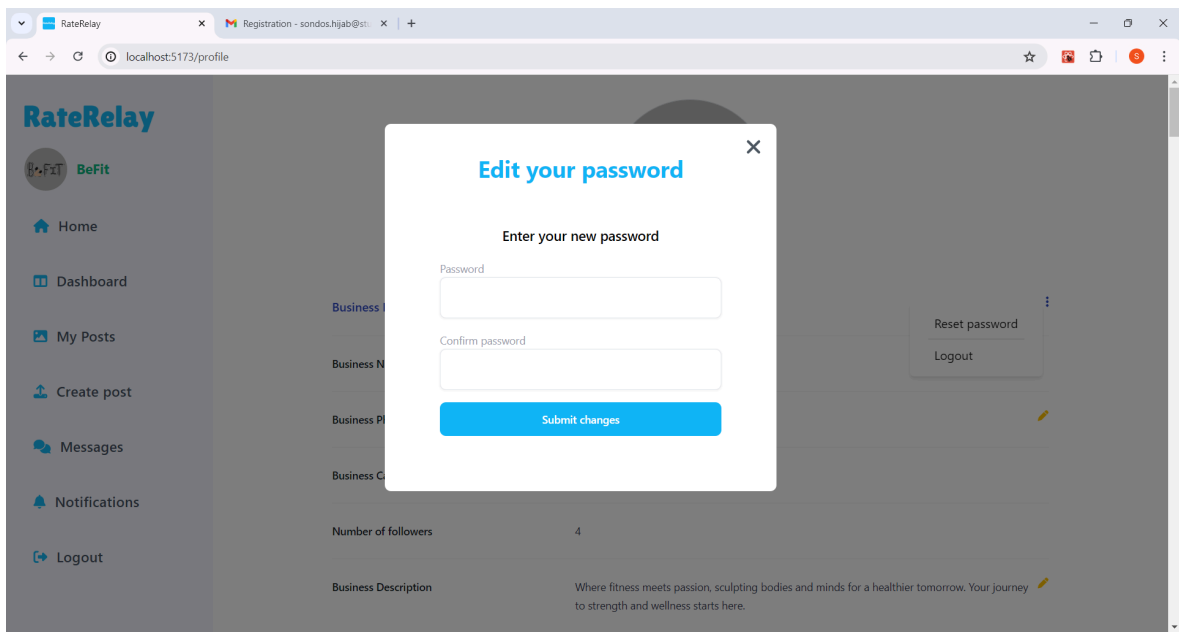


Figure 107: Website reset password screen

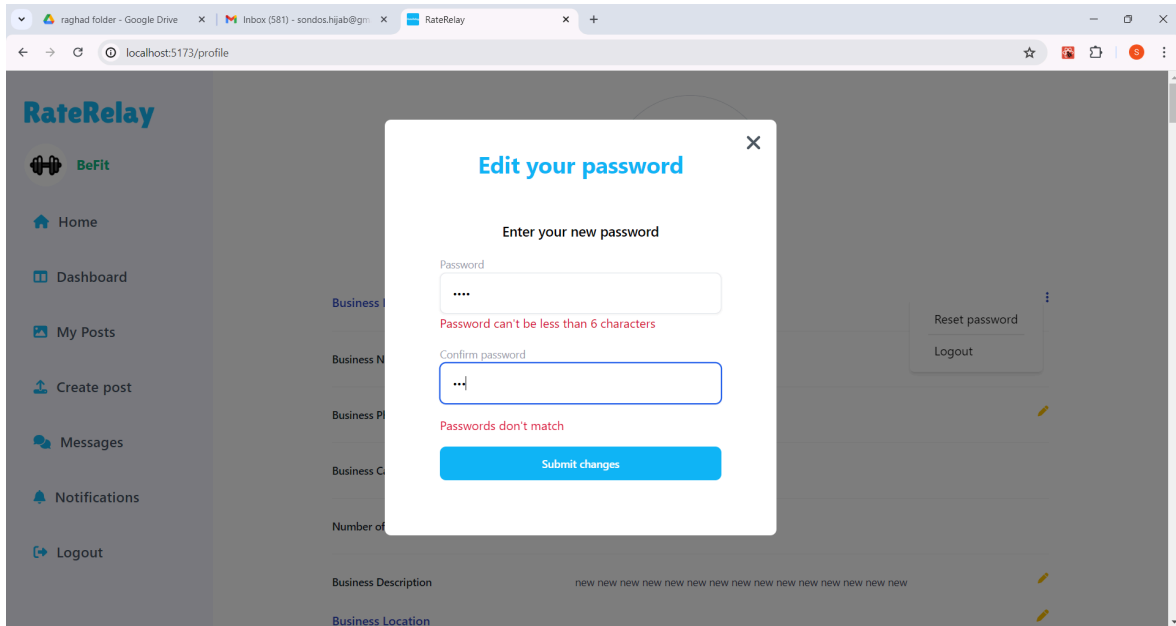


Figure 108: Website reset password screen validations

4. Dashboard

In the Dashboard section, accessible exclusively to the business administrator, the primary advantage lies in analyzing the feedback received by the business and understanding user interactions. This helps in gaining insights into user needs and improving the products/services offered to cater better to the target audience.

Here, administrators can view metrics such as the number of followers, customer service rating, value for money rating, product/service quality rating, the total number of feedback received, and the breakdown of positive, negative, and neutral feedback received within the current year.

Additionally, administrators can select start and end dates to generate charts depicting average ratings across different categories (customer service, value for money, product/service quality), age distribution of followers and feedback writers, gender distribution among feedback writers and followers, ratio of feedback written by age group and gender, and distribution of feedback statuses (positive, negative, neutral).

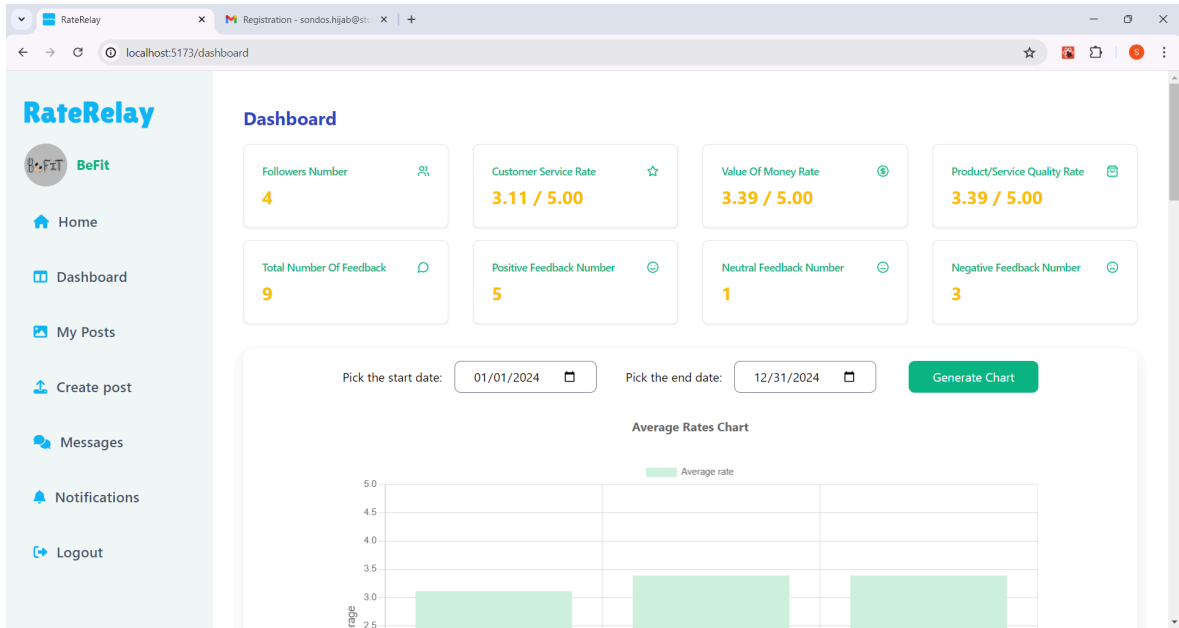


Figure 109: Website dashboard section.

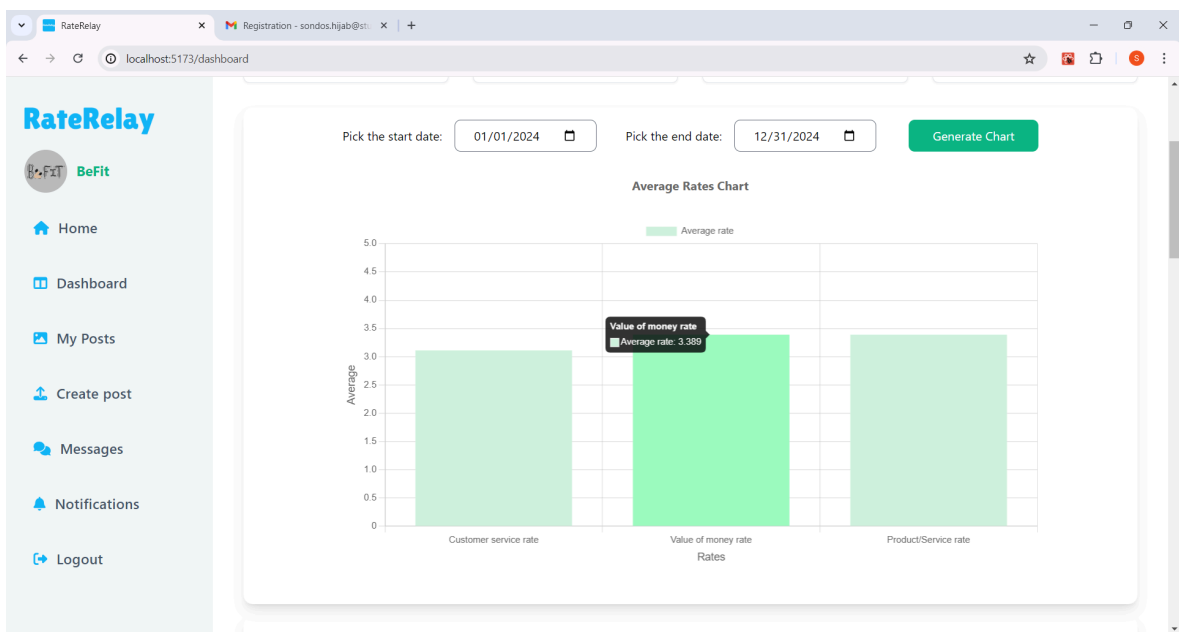


Figure 110: Website dashboard section - average rates chart.

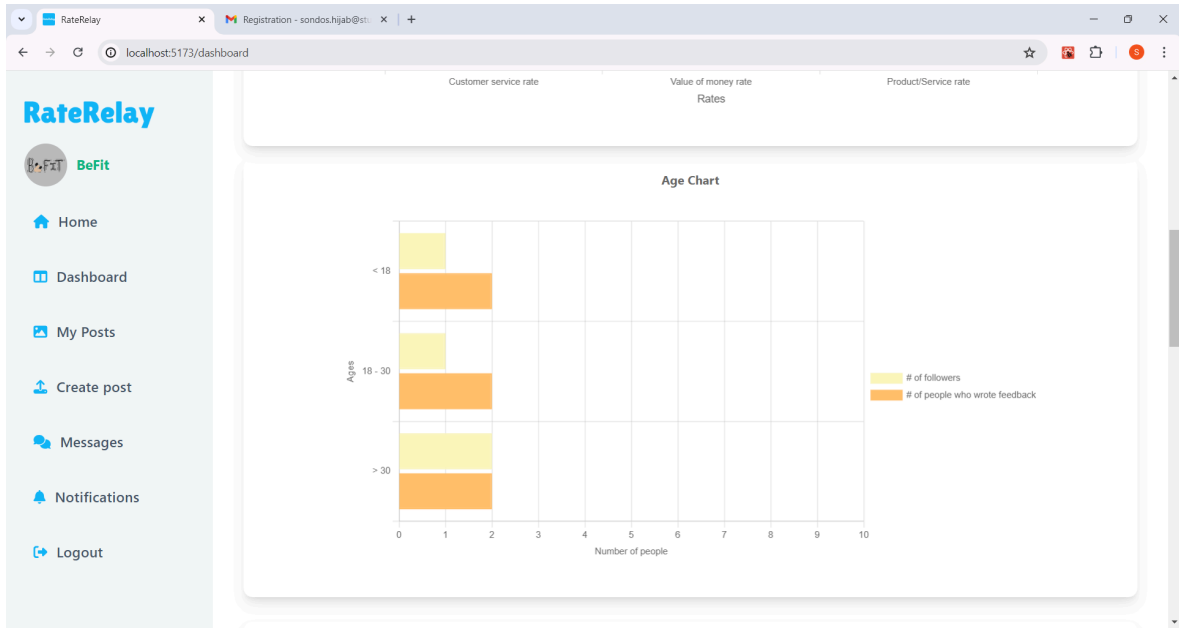


Figure 111: Website dashboard section - age chart.

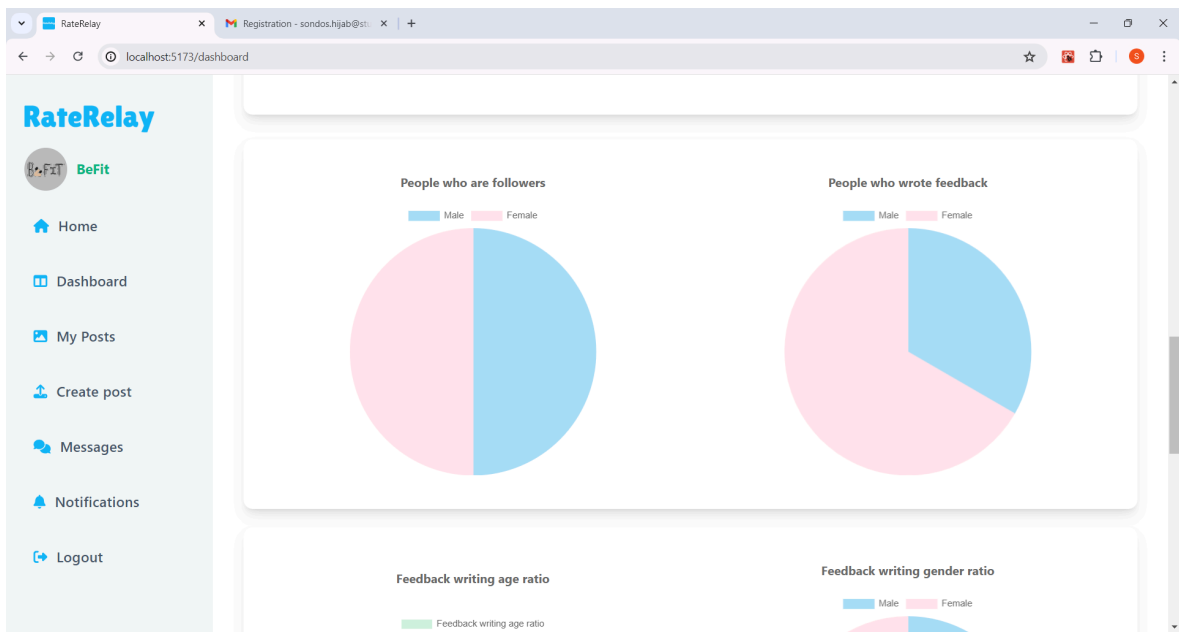


Figure 112: Website dashboard section - followers and feedback writers charts

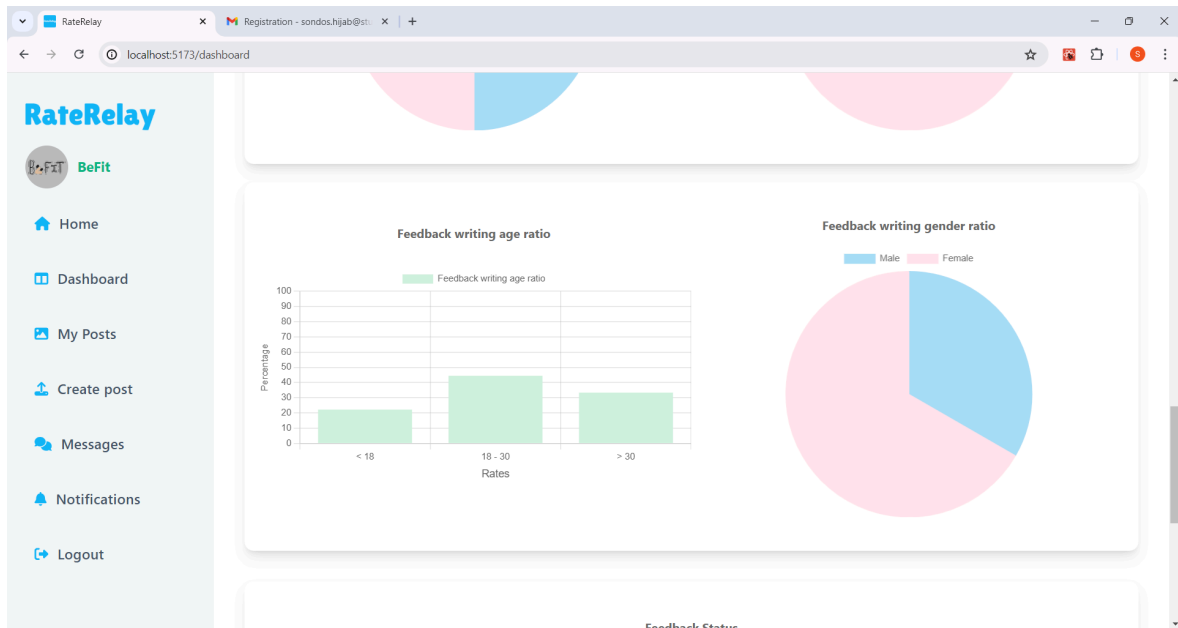


Figure 113: Website dashboard section - feedback age ratio and gender ratio charts.

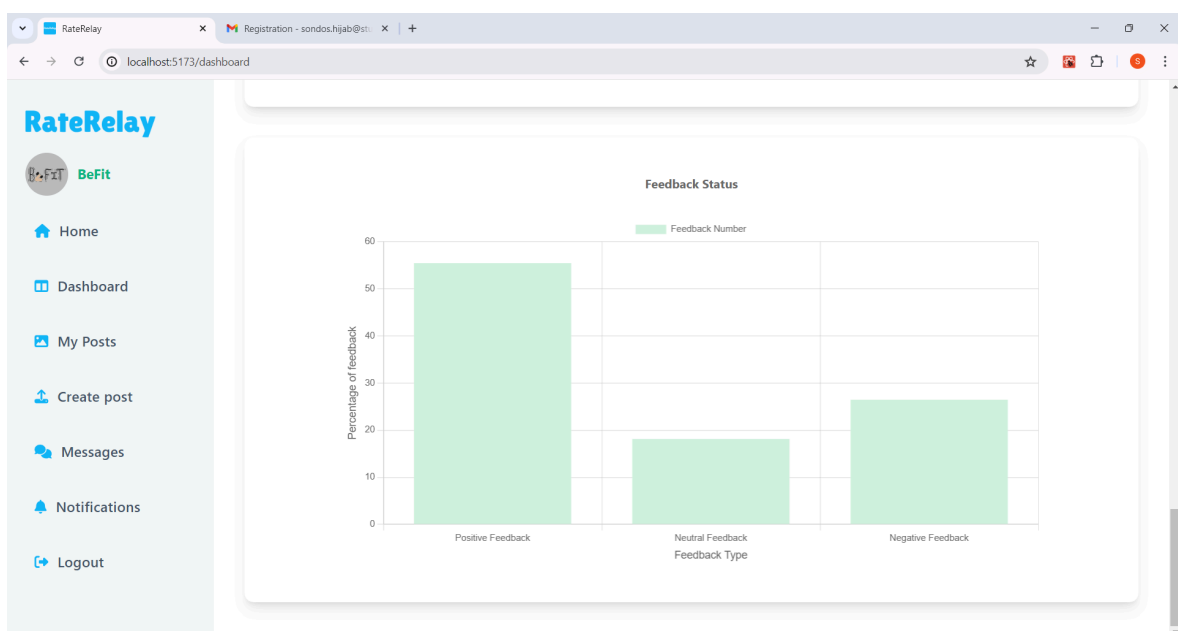


Figure 114: Website dashboard section - feedback status chart.

5. My posts

In the section displaying posts published by the business administrator, we can view the posts they have shared. There is an option to sort these posts from newest to oldest and vice versa.

Each post includes an icon visible only to the business owner. Clicking on this icon provides two choices: delete post and edit. When selecting delete post, a pop-up

screen confirms if the business owner wants to proceed with deletion. They can choose 'Yes' to delete the post or 'Cancel' to retain it. The edit option allows the business owner to modify the post's description. Upon submitting the changes, the post is updated both visually and in the database.

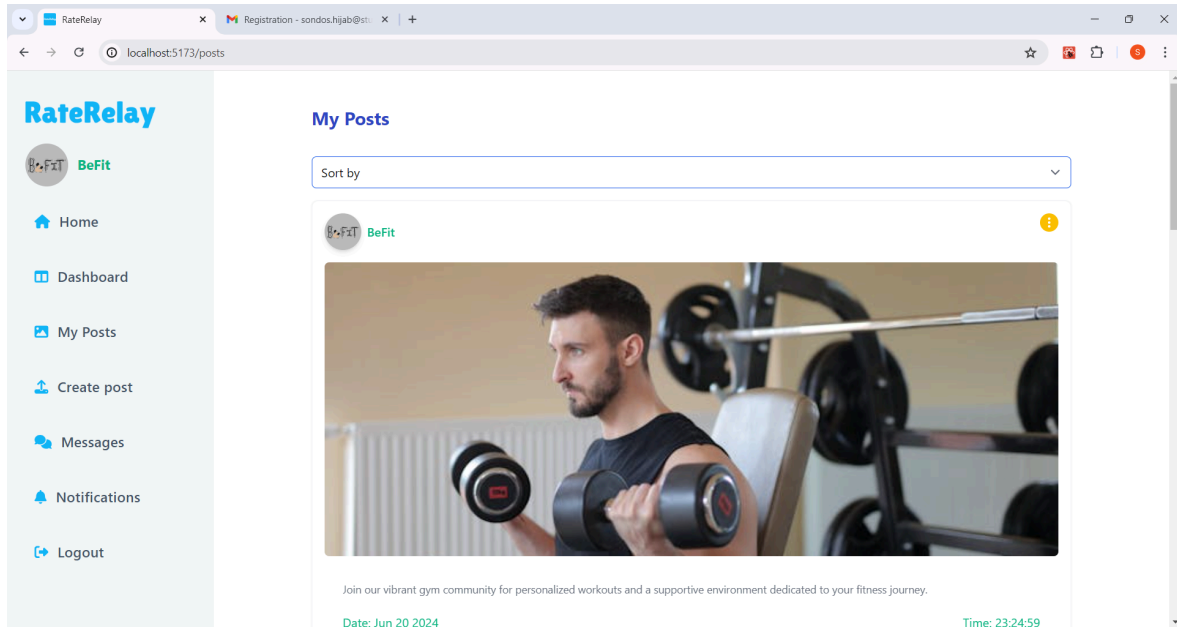


Figure 115: Website my posts section.

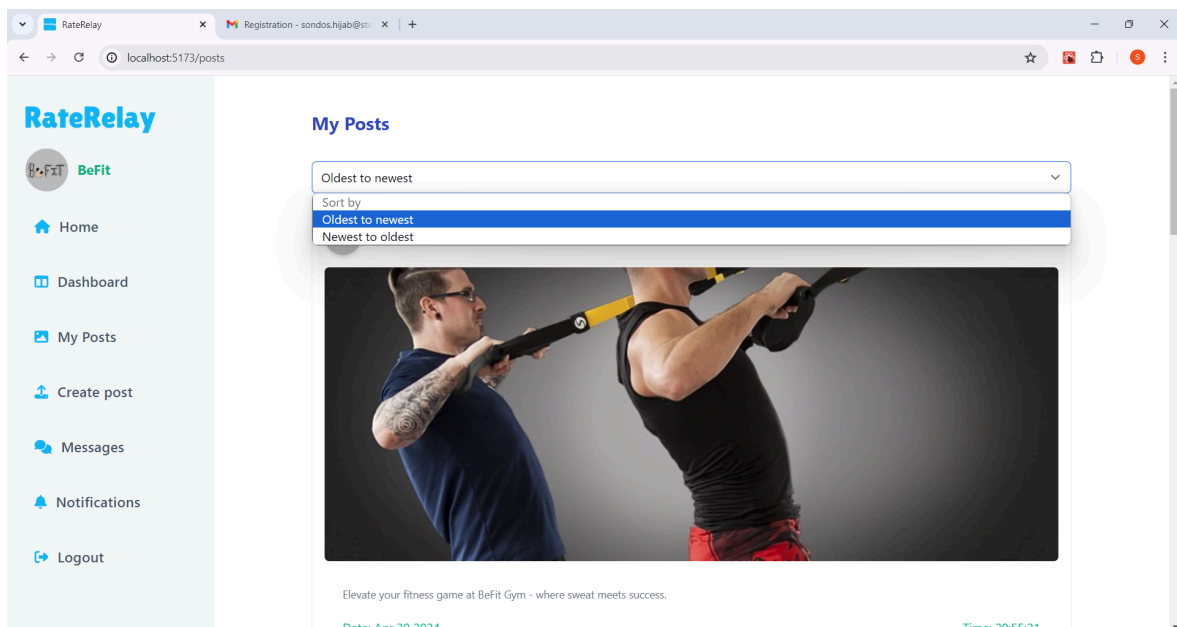


Figure 116: Website sort my posts in either chronological order or reverse chronological order.

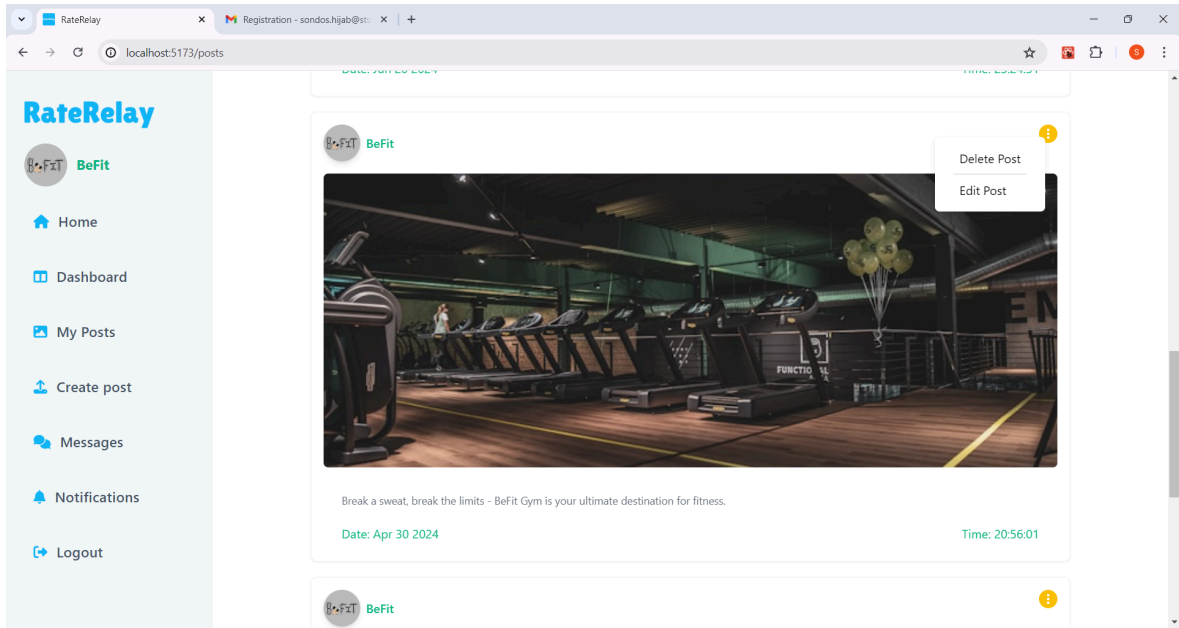


Figure 117: Website post viewed as the business owner see.

When clicking on Edit Post:

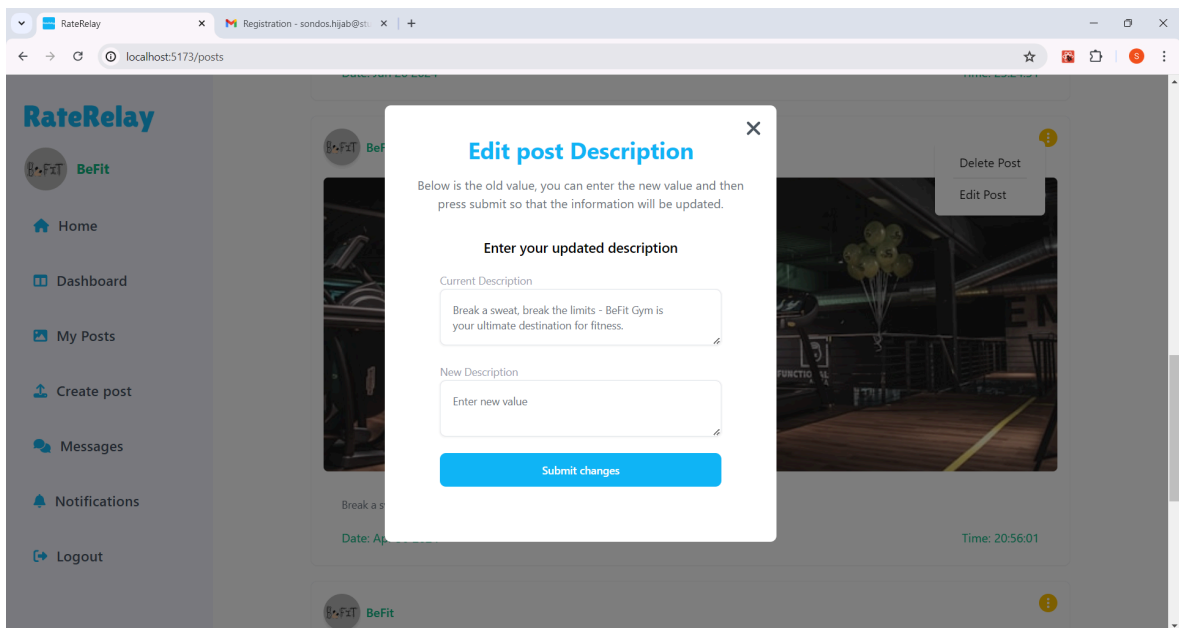


Figure 118: Website edit post screen.

When clicking on Delete Post:

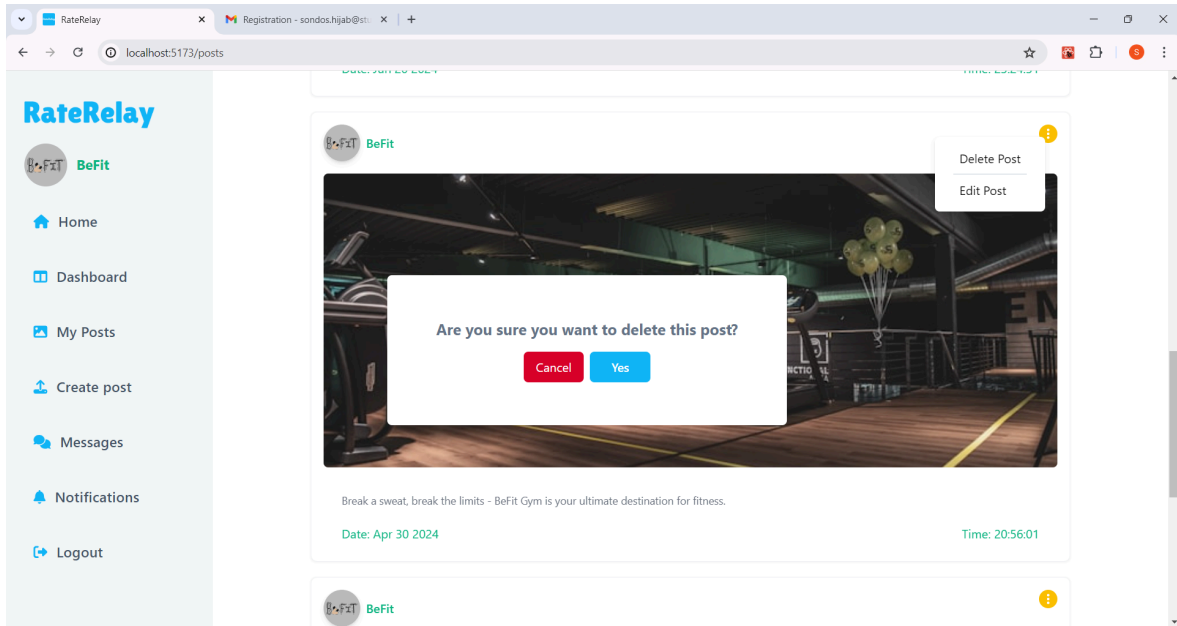


Figure 119: Website delete post screen.

6. Create Post

In the Create Post section, exclusively available to business administrators, owners can add a post description and optionally upload a photo. They can then choose to publish the post by clicking 'Send' or clear the fields by clicking 'Reset'.

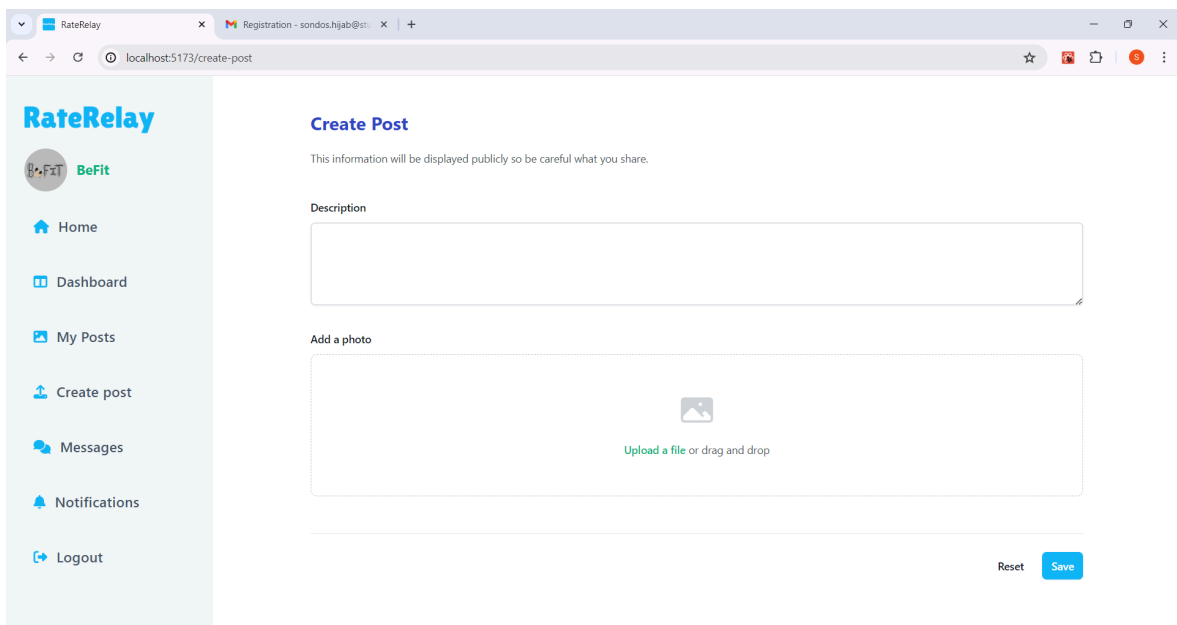


Figure 120: Website create post section.

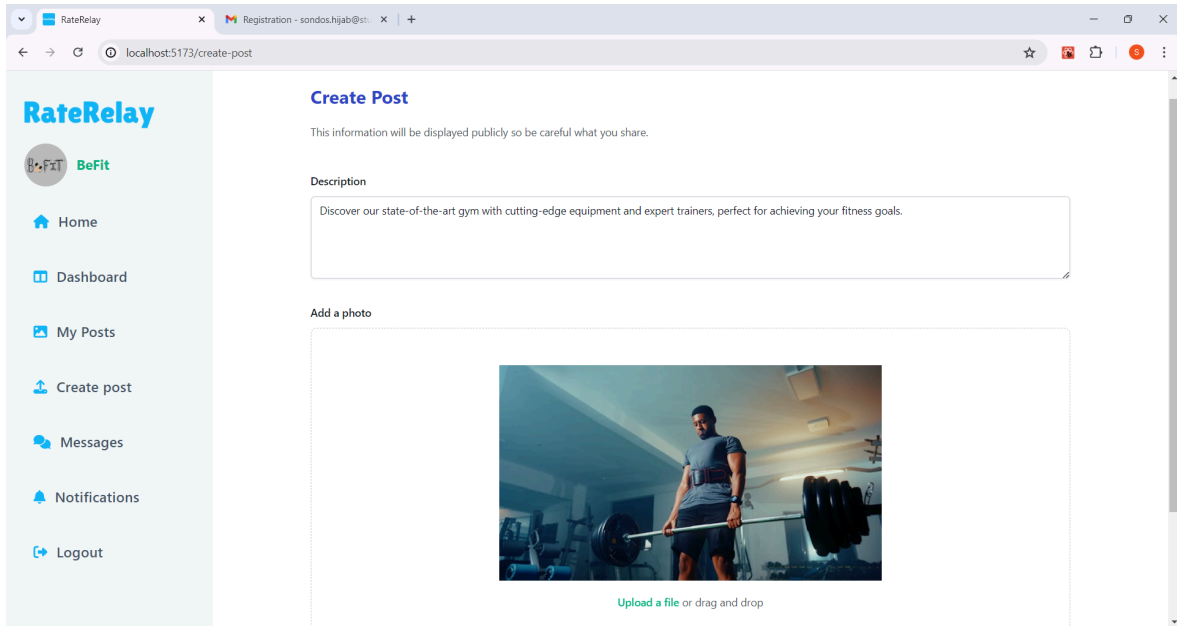


Figure 120: Website create post section after adding description and photo.

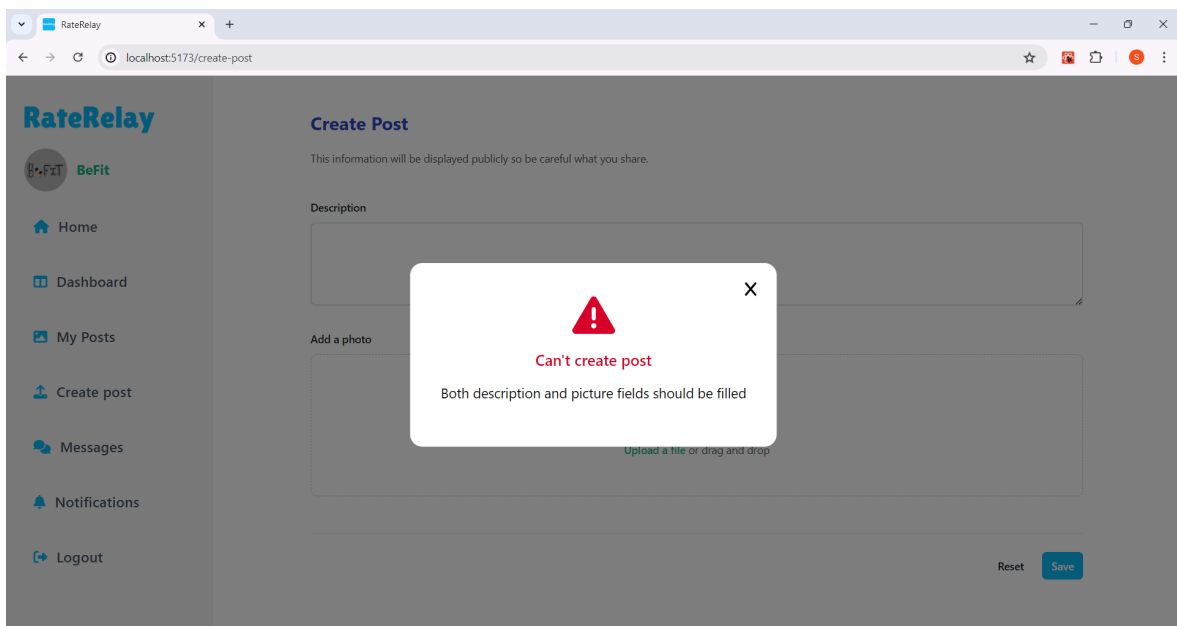


Figure 121: Website create post warning

7. Messages

The Messages section lists all users with whom the business has conversed. Each user card displays a badge showing the number of unread messages, if any. Clicking on a chat redirects the business administrator to a real-time messaging chat page powered by socket.io. Here, administrators can send text and pictures, facilitating detailed communication such as providing answers to questions about product quality with

visual evidence. This feature enables businesses to promptly address and meet customer needs, similar to the functionality in the user application with some distinctions.

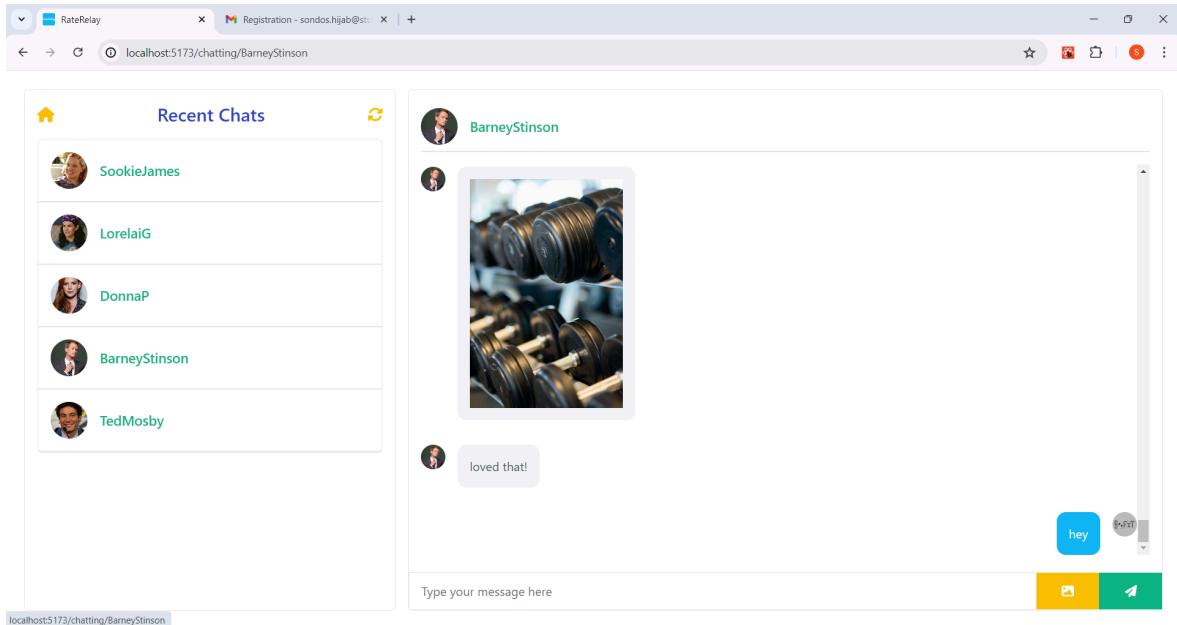


Figure 122: Website messages section.

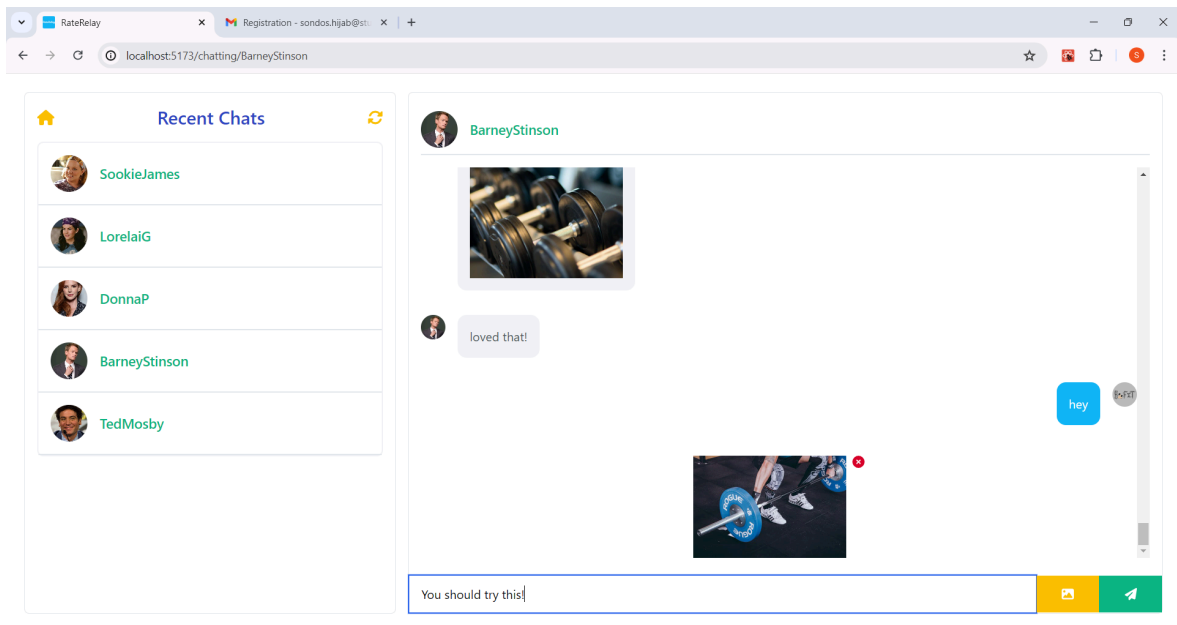


Figure 123: Website chat with user section - give the user a recommendation.

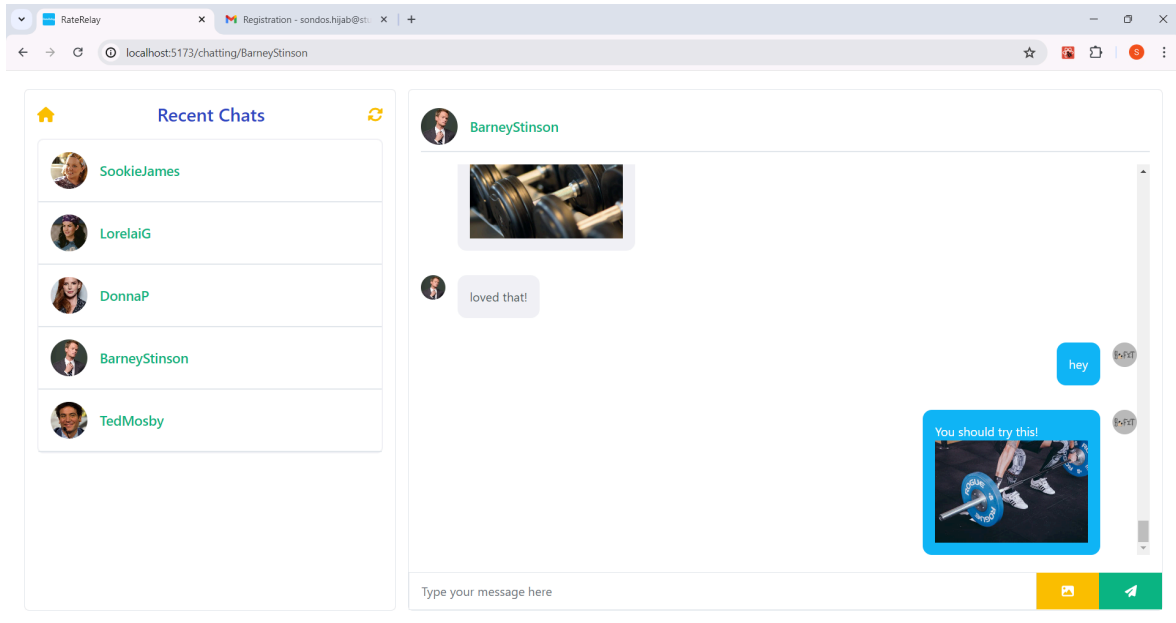


Figure 124: Website chat with user section - give the user a recommendation.

8. Notifications screen / feedback screen

In the Notifications section, business administrators can view all notifications received from users who have provided feedback. Clicking on a specific notification redirects the administrator to the Feedback section, where they can access detailed information such as feedback pictures, usernames, descriptions, ratings, feedback status, and the creation date and time. This functionality resembles that in the user application, albeit with some differences.

Additionally, there is a "Send Message" button that, when clicked, redirects administrators to the Messages section, allowing them to send a message to the respective user.

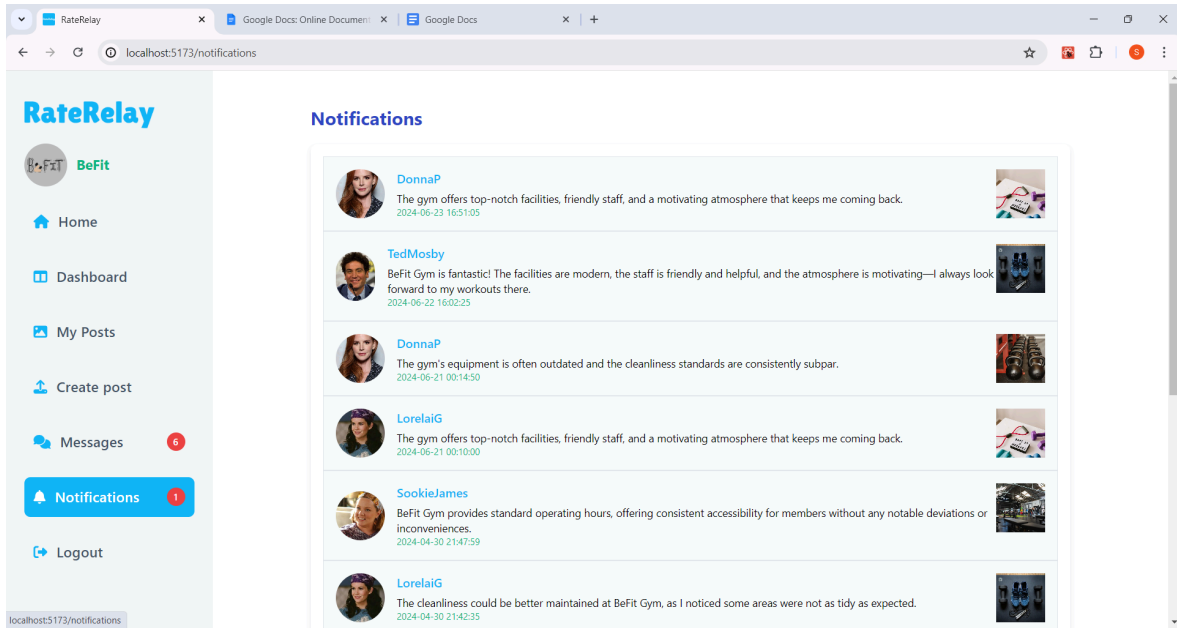


Figure 125: Website notifications section.

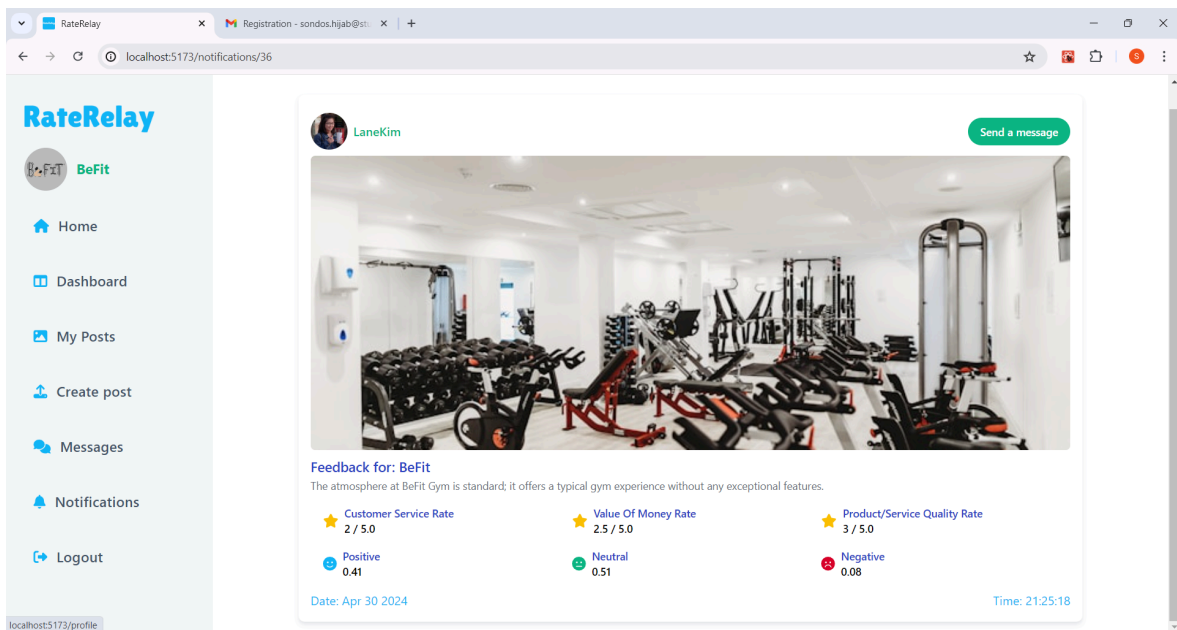


Figure 126: Website post section.

9. User

Clicking on a specific user redirects the business administrator to the user section, which resembles what we explained in the user application but lacks the ability to delete or edit any content.

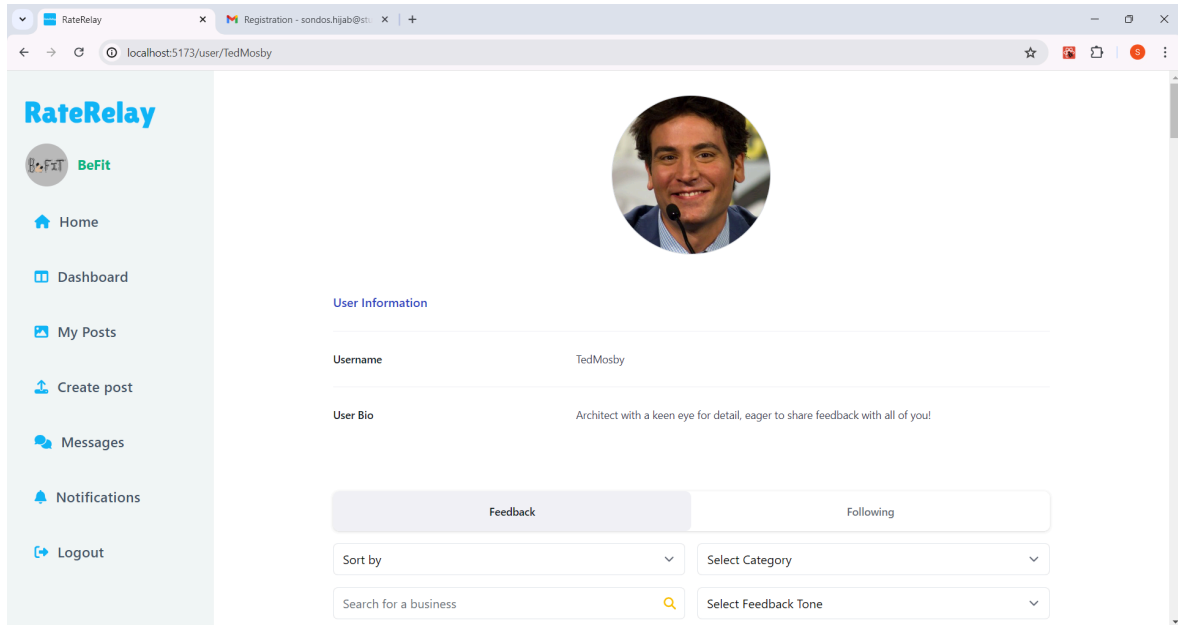


Figure 127: Website other user profile section.

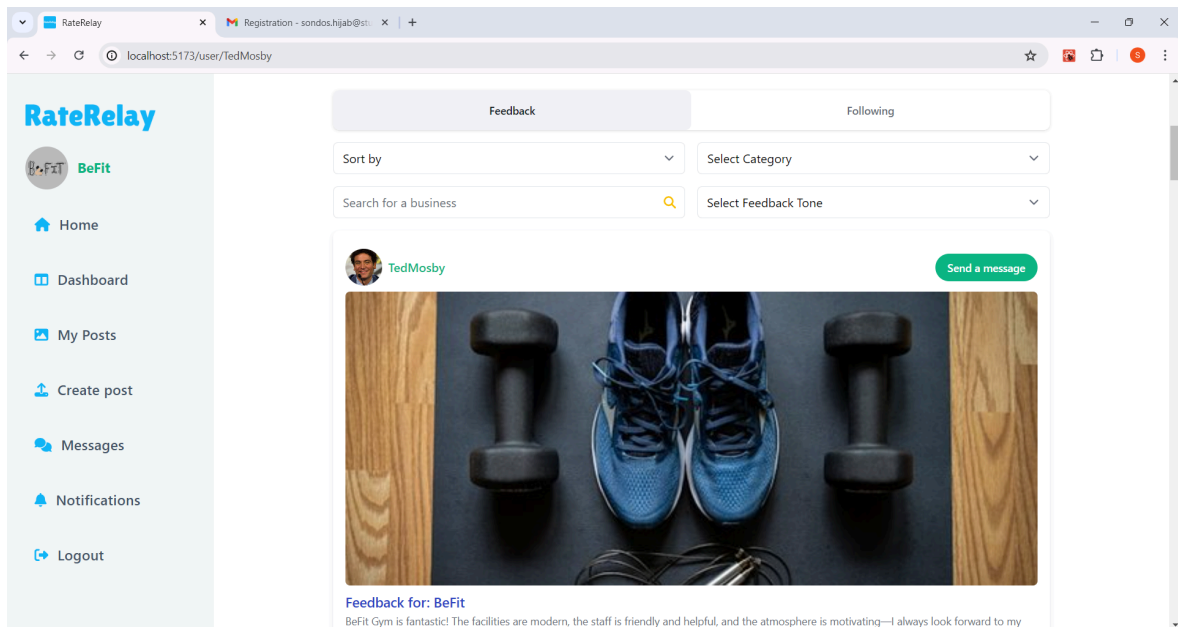


Figure 128: Website other user feedback section.

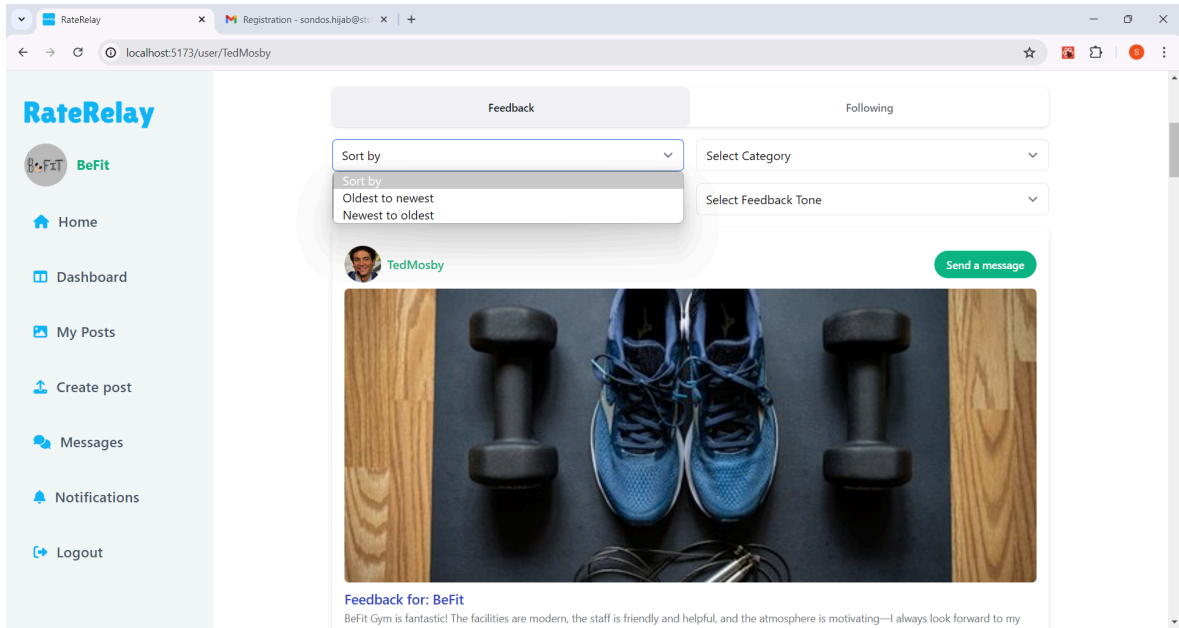


Figure 129: Website sort feedback in either chronological order or reverse chronological order.

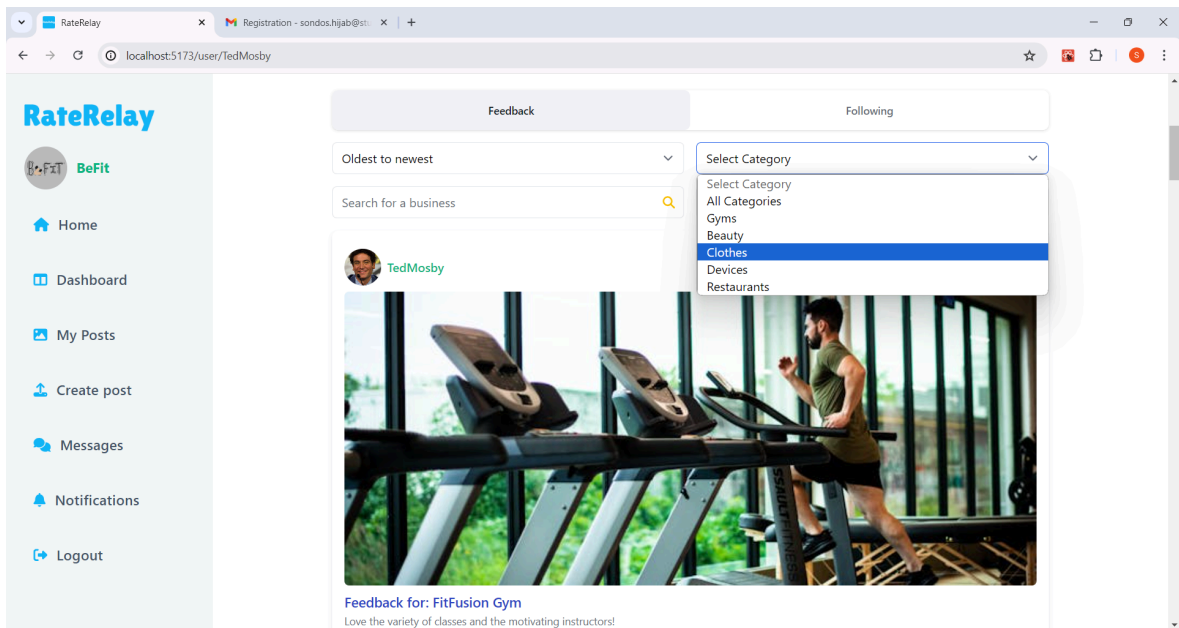


Figure 130: Website feedback filtering by category.

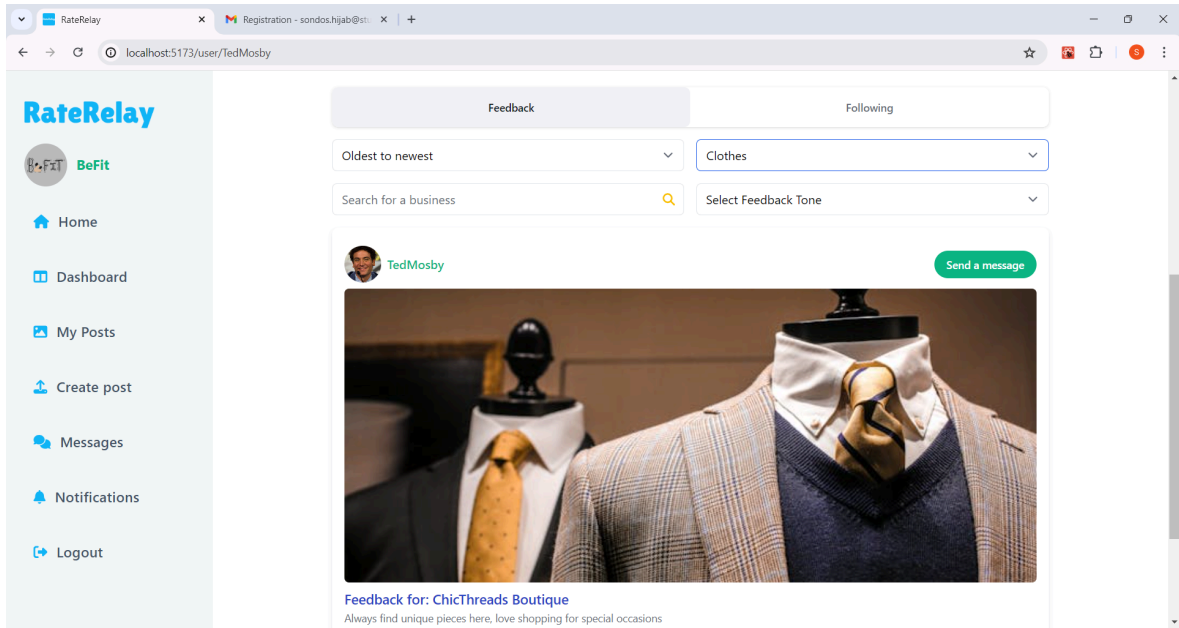


Figure 131: Website feedback filtering by category.

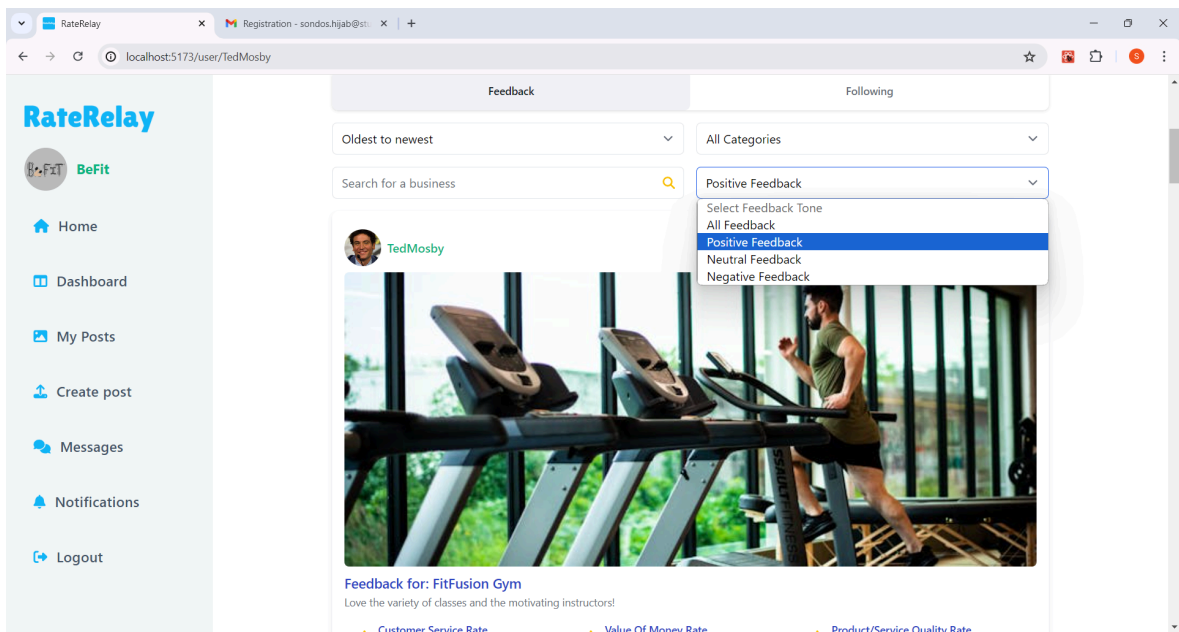


Figure 132: Website feedback filtering by feedback status.

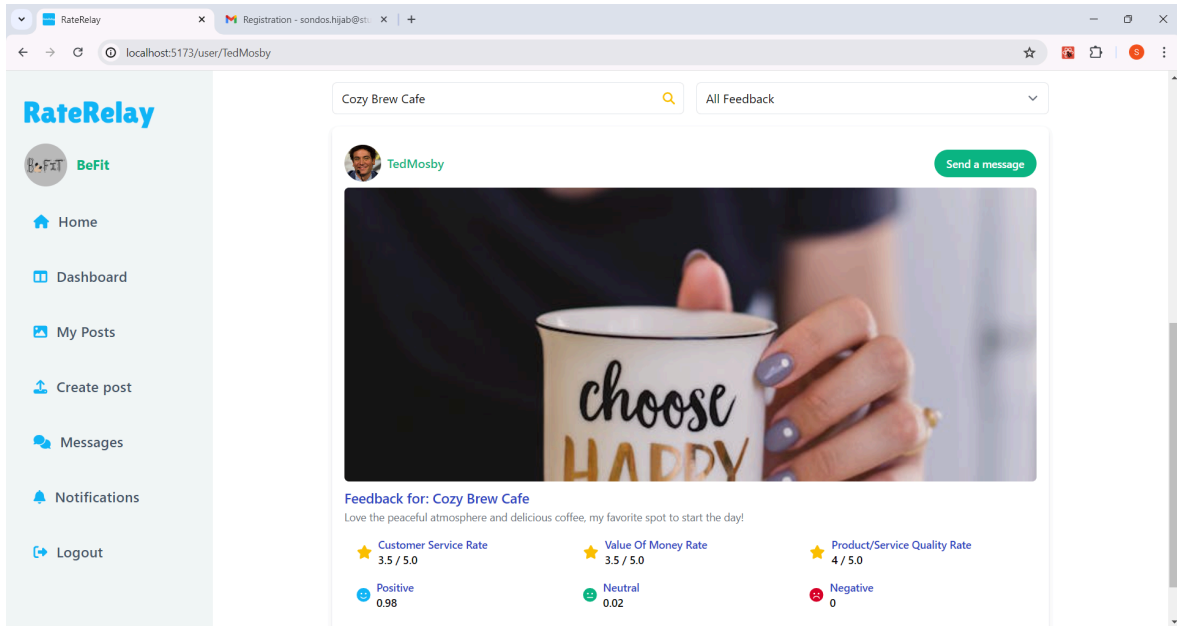


Figure 133: Website Feedback Filtering by business name.

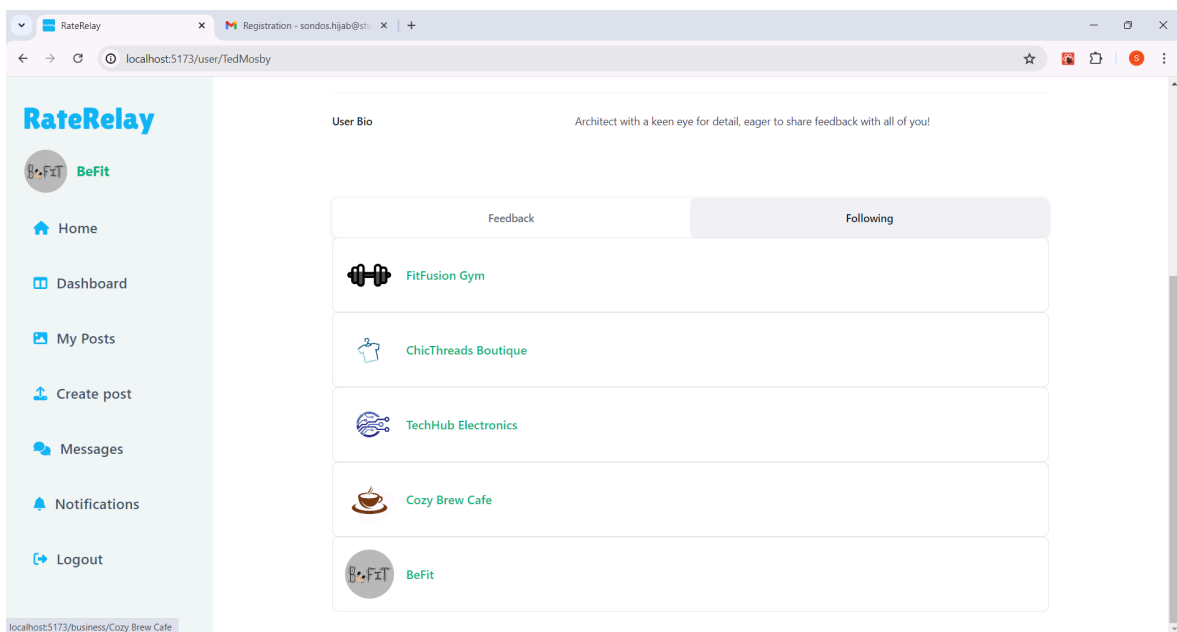


Figure 134: Website other user followed businesses section.

10. Other Business

Clicking on a specific business redirects the business administrator to that business's profile section, which resembles what we explained in the business profile but does not allow for deletion or editing of any content.

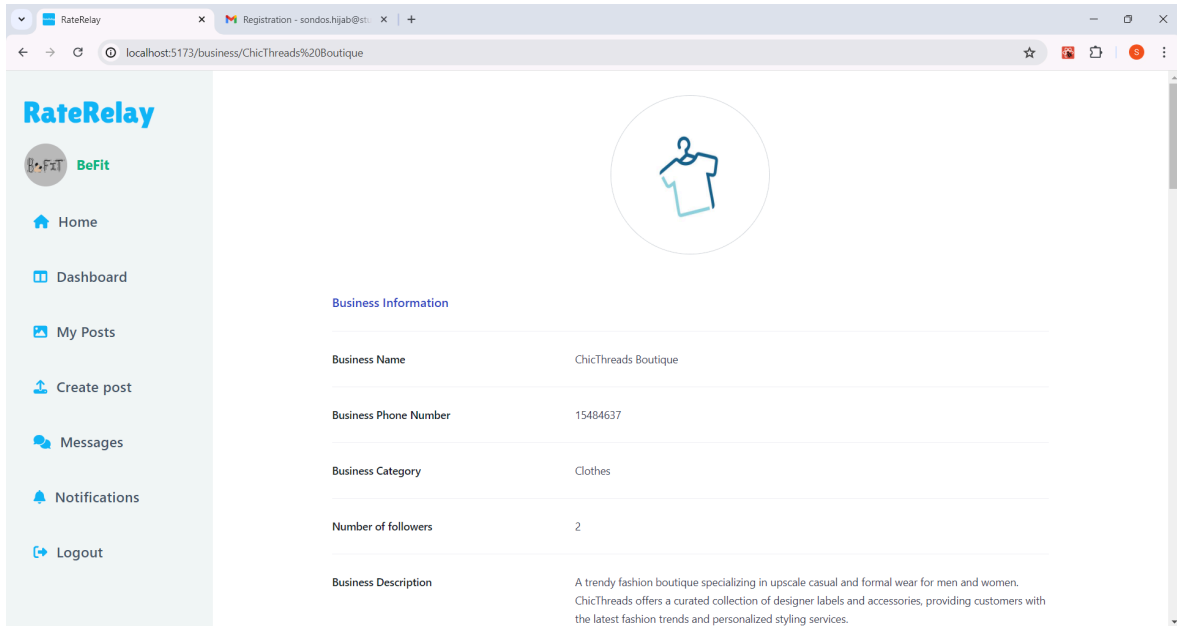


Figure 135: Website business profile section.

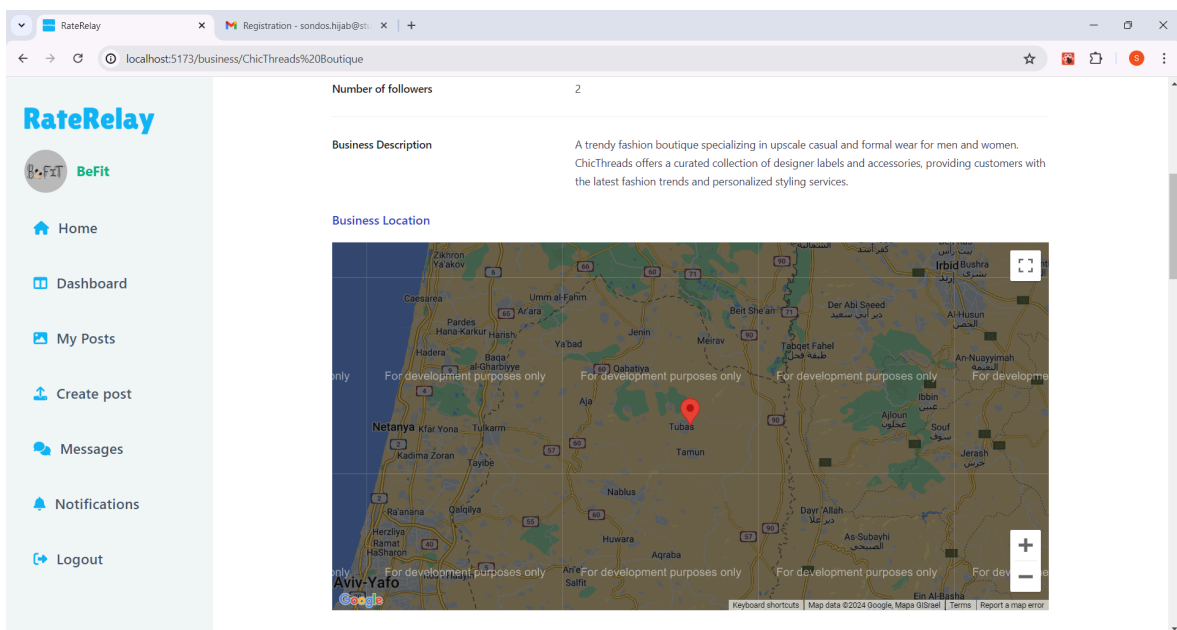


Figure 136: Website business profile section.

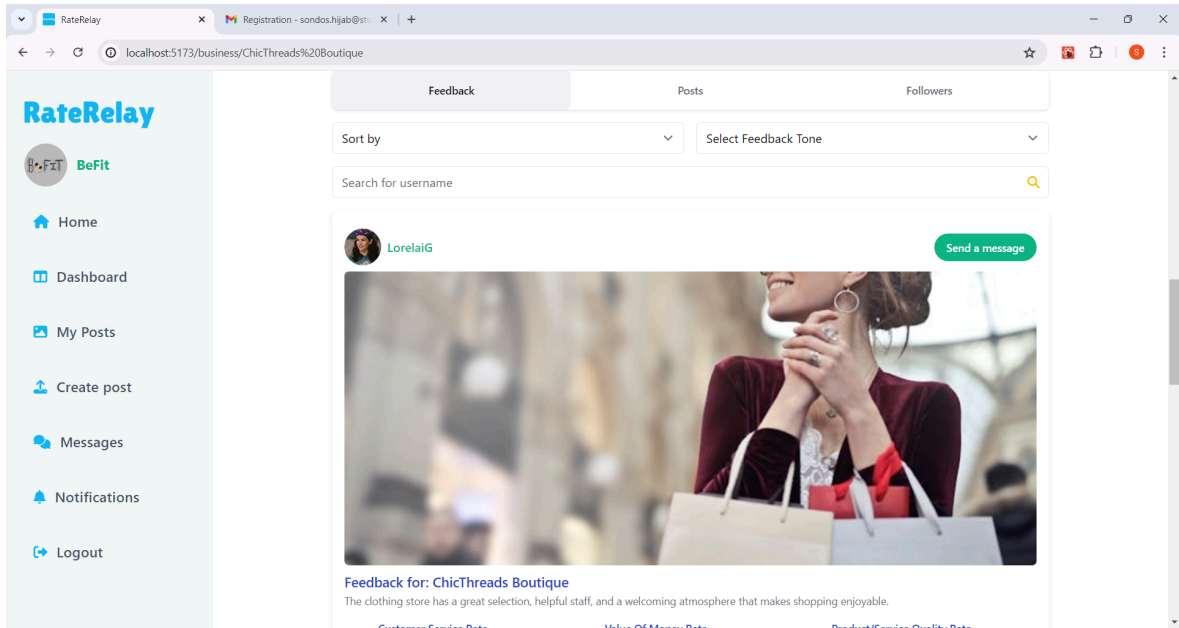


Figure 137: Website first business administrator feedback section.

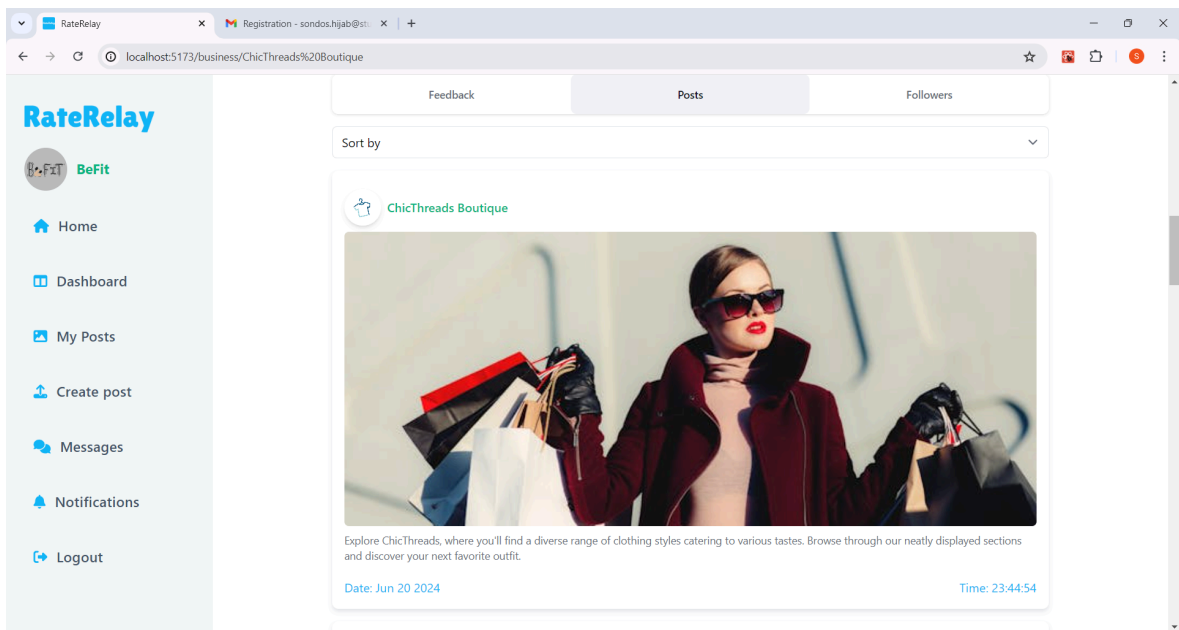


Figure 138: Website first business administrator posts section.

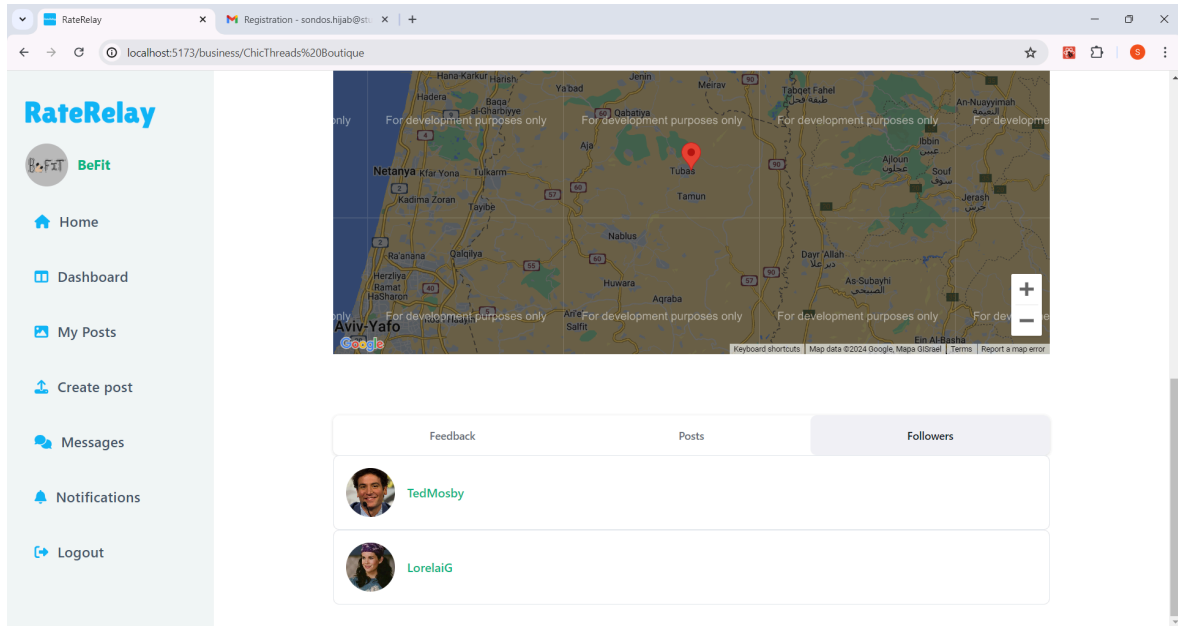


Figure 139: Website first business administrator followers section.

4.3 RateRelay Website on Tablet and Mobile

As a final note, our website is fully responsive, ensuring optimal functionality across tablet and mobile screens.

Tablet screens:

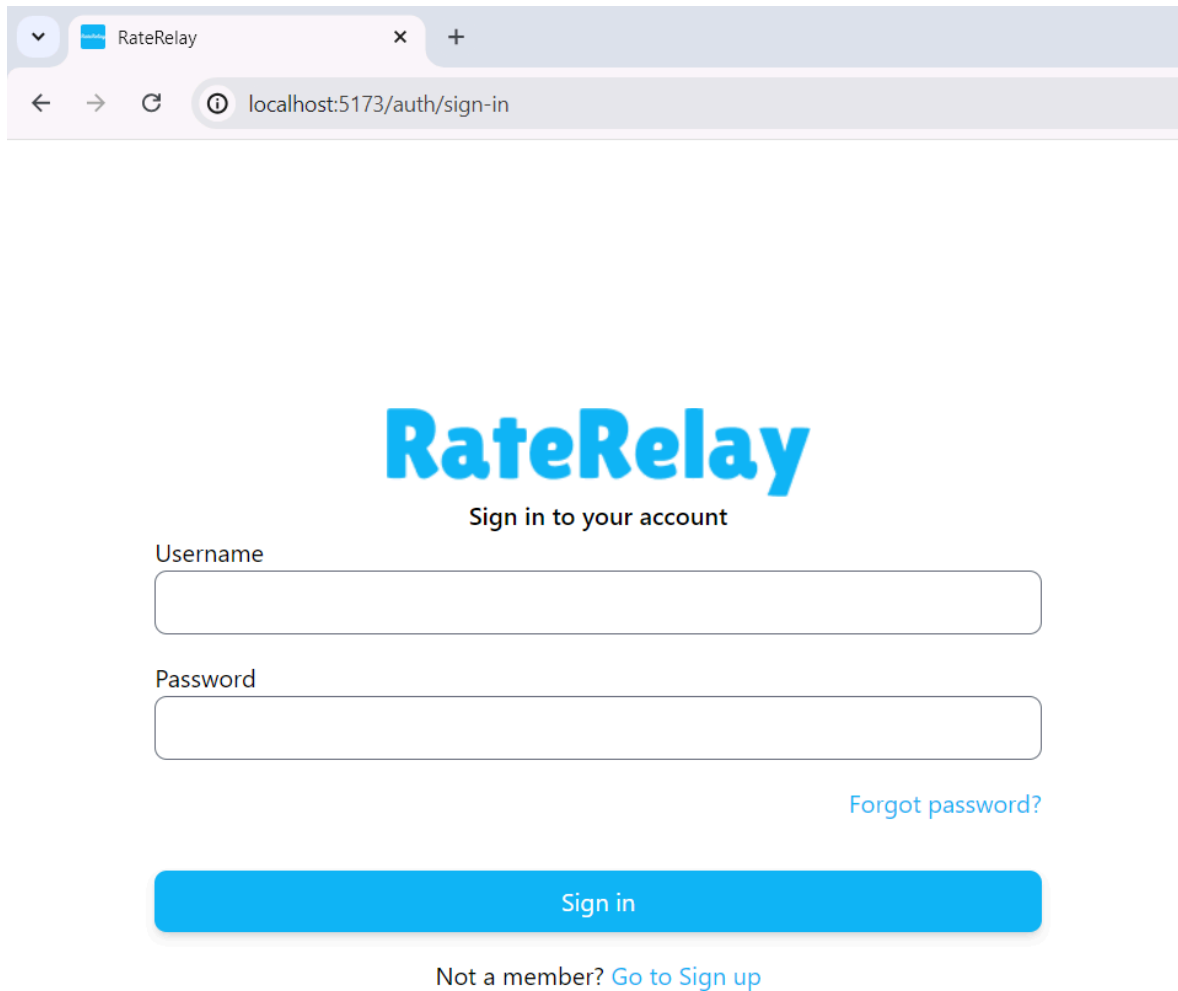


Figure 140: Website sign-in tablet screen

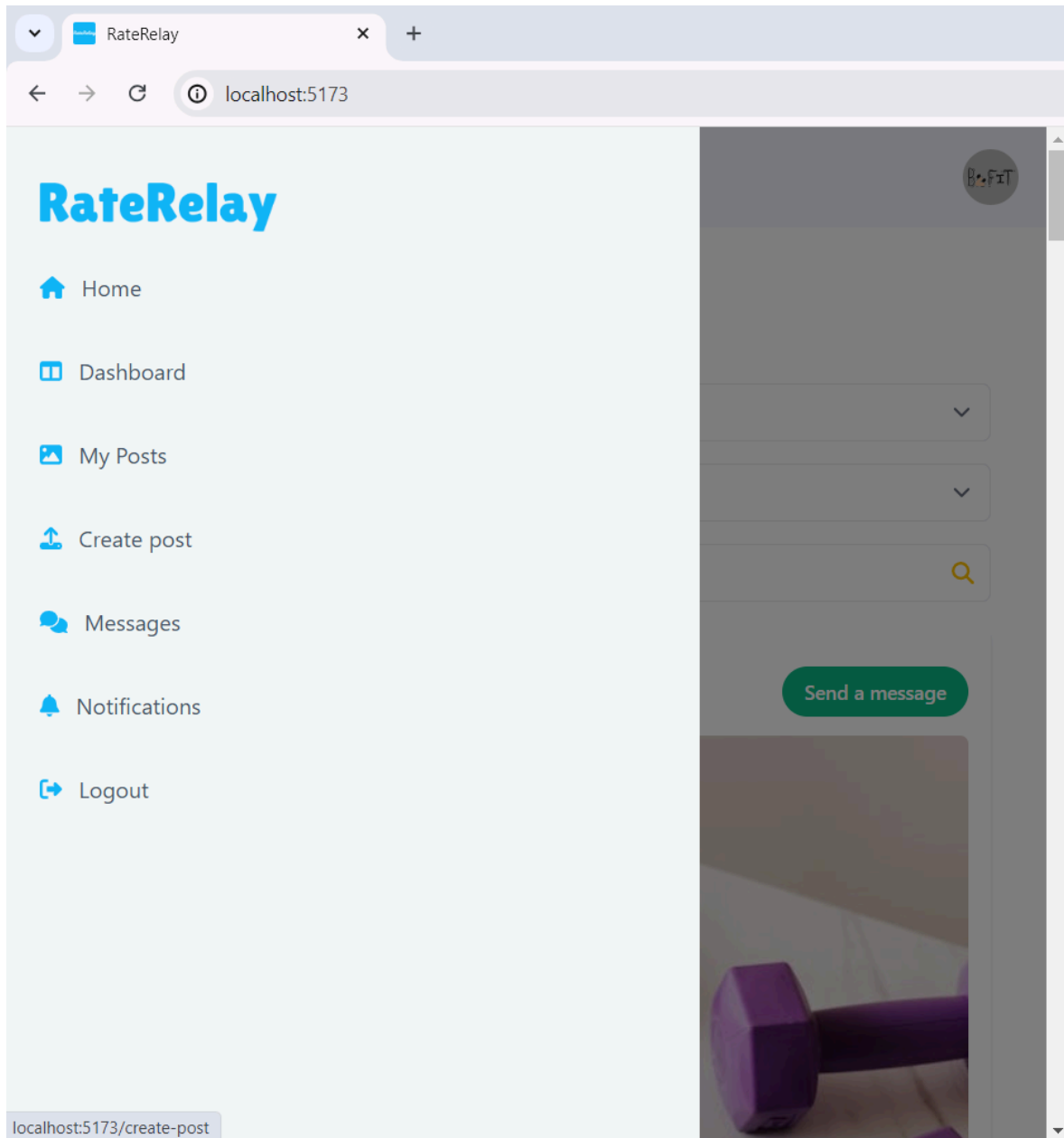


Figure 141: Website tablet left sidebar screen

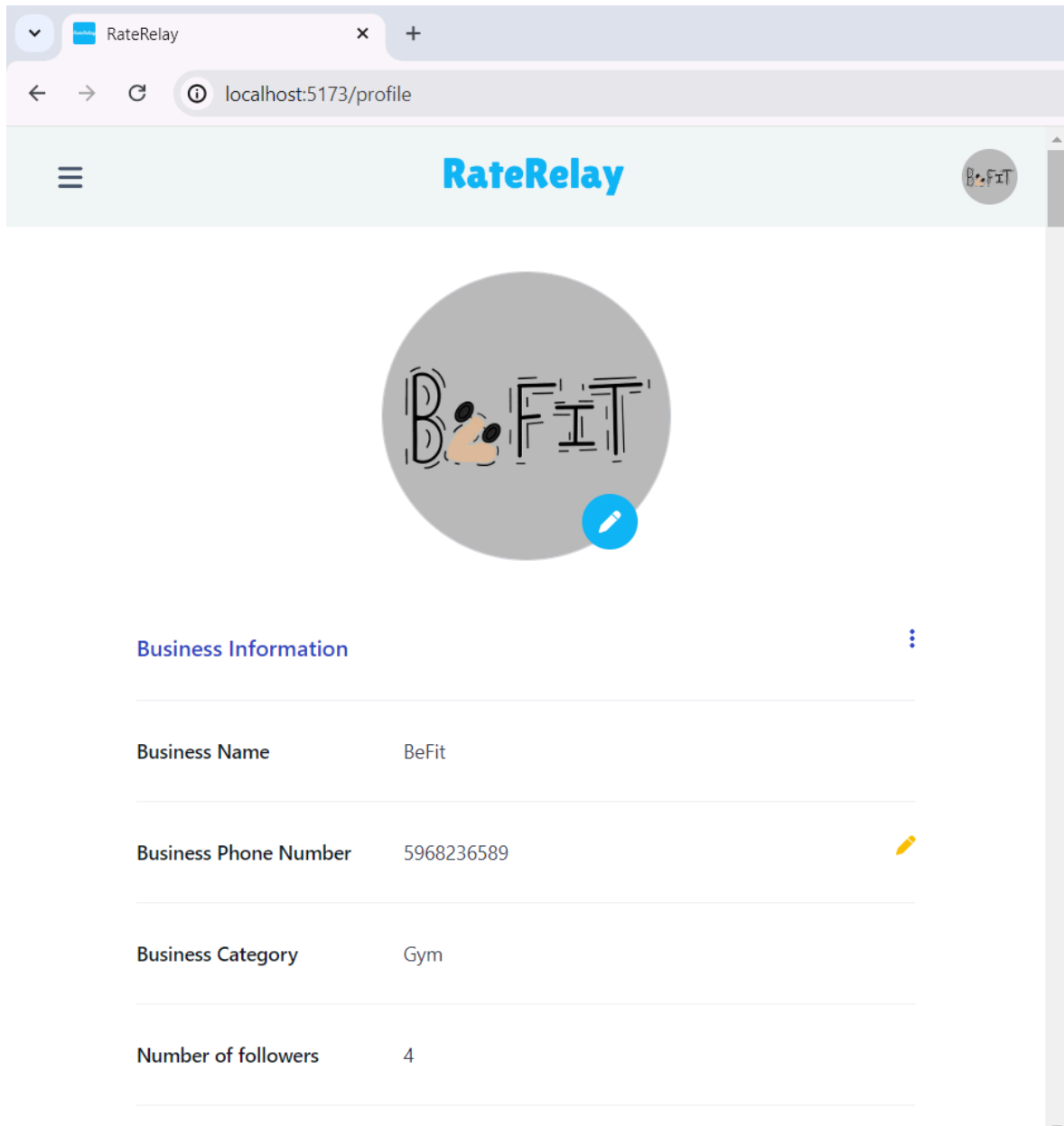


Figure 142: Website tablet profile screen - basic information

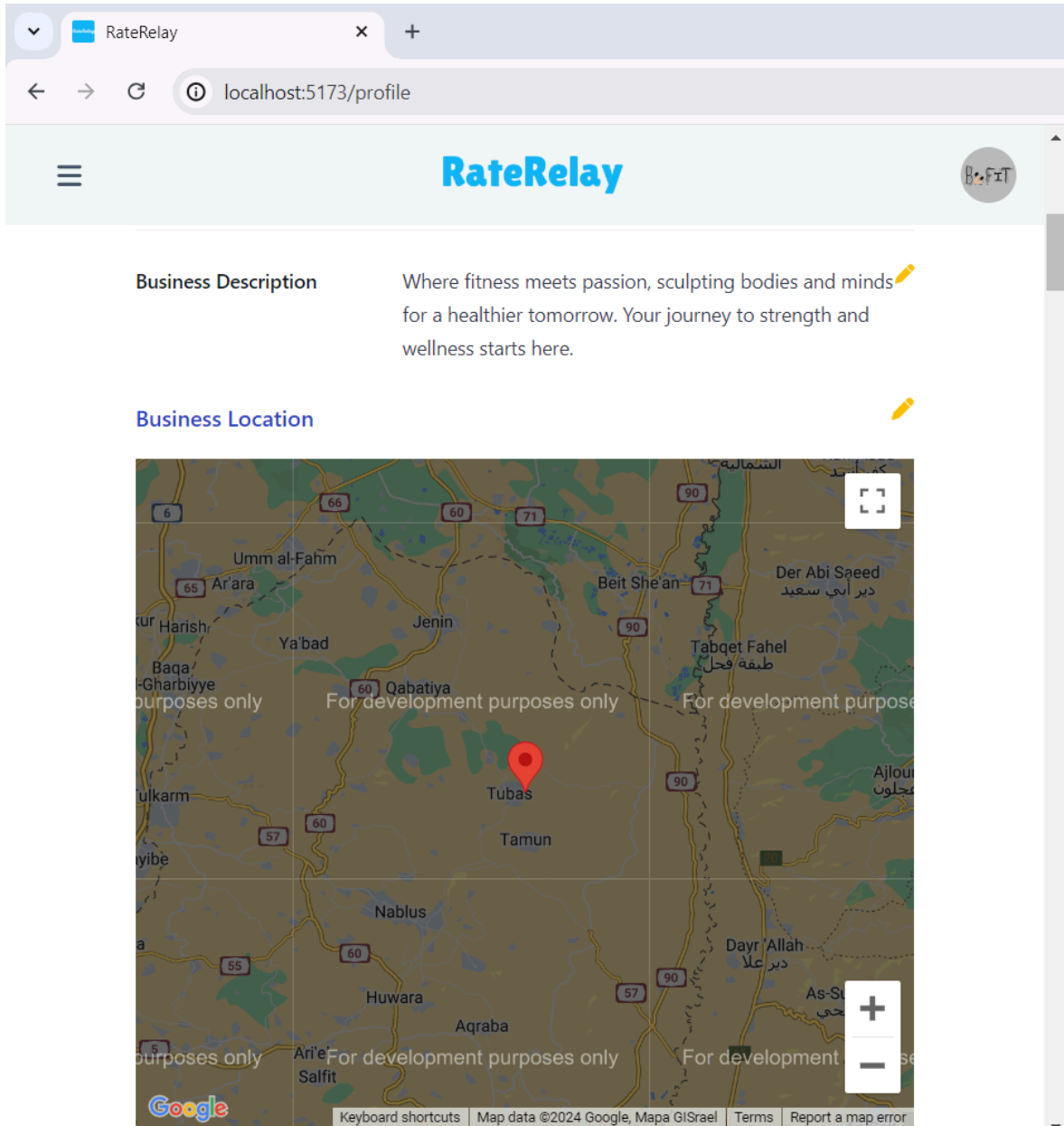


Figure 143: Website tablet profile screen - description and location

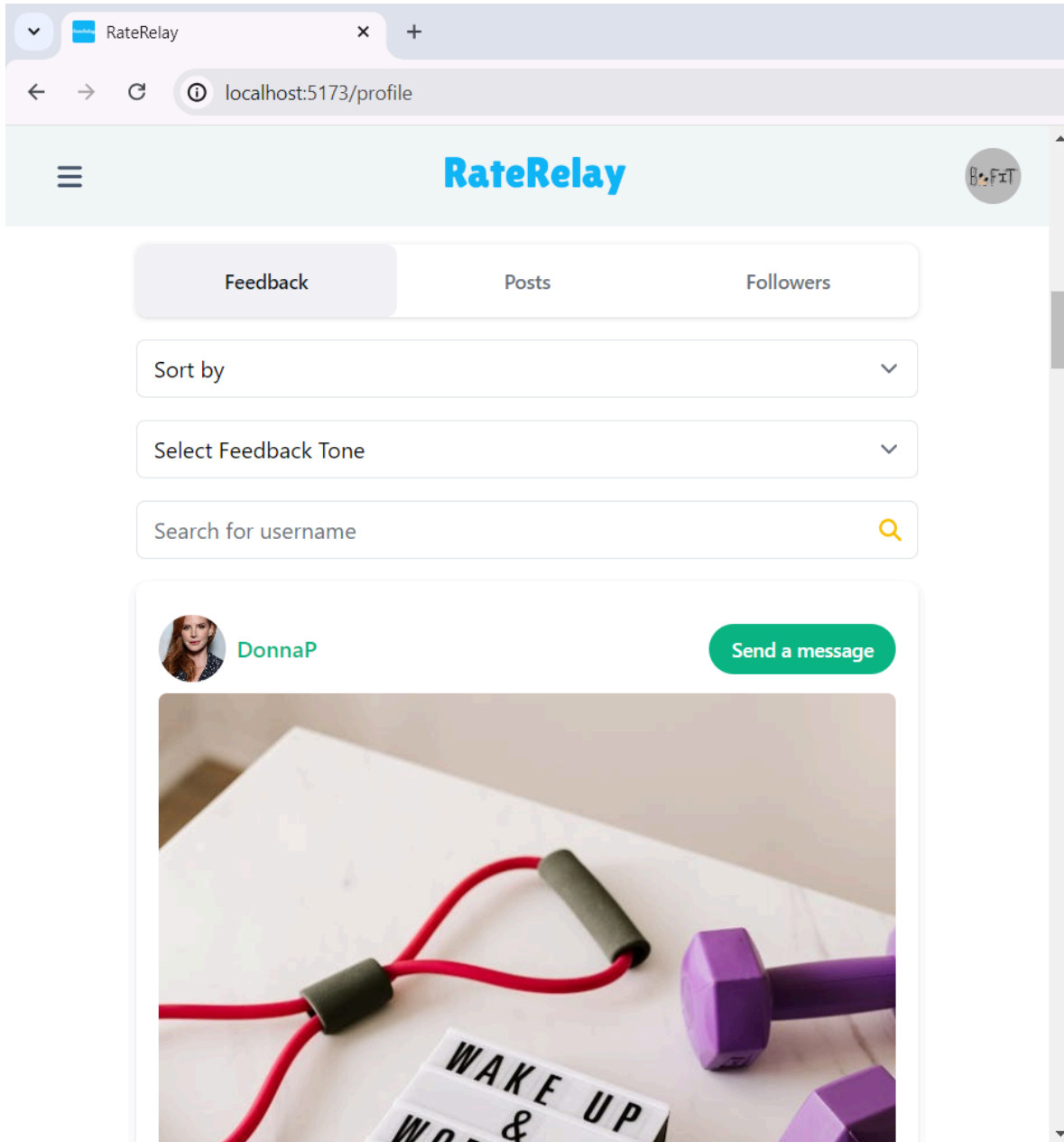


Figure 144: Website tablet profile screen - feedback, posts, followers

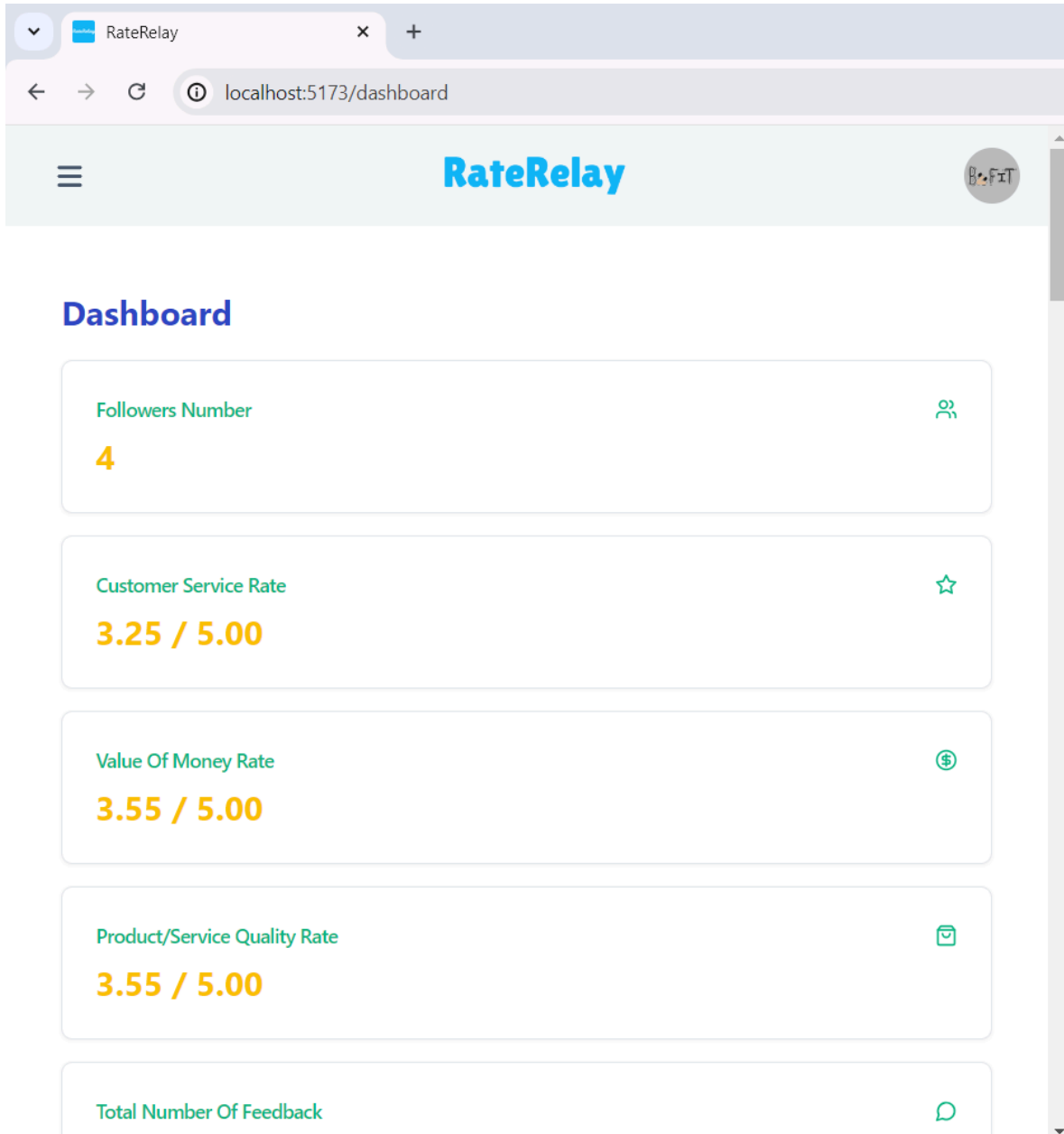


Figure 145: Website tablet dashboard screen - numbers and rates

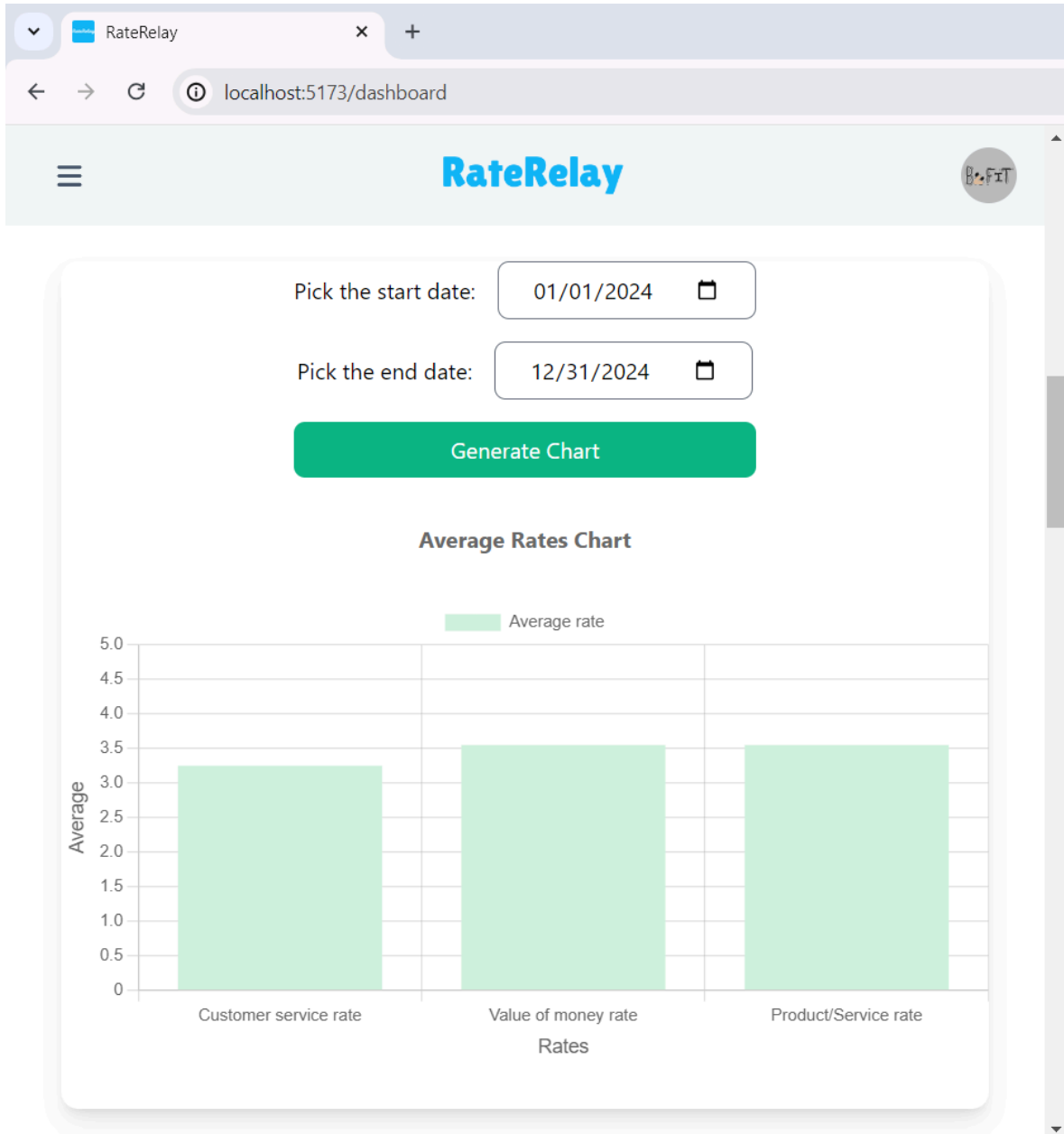


Figure 146: Website tablet dashboard screen - charts

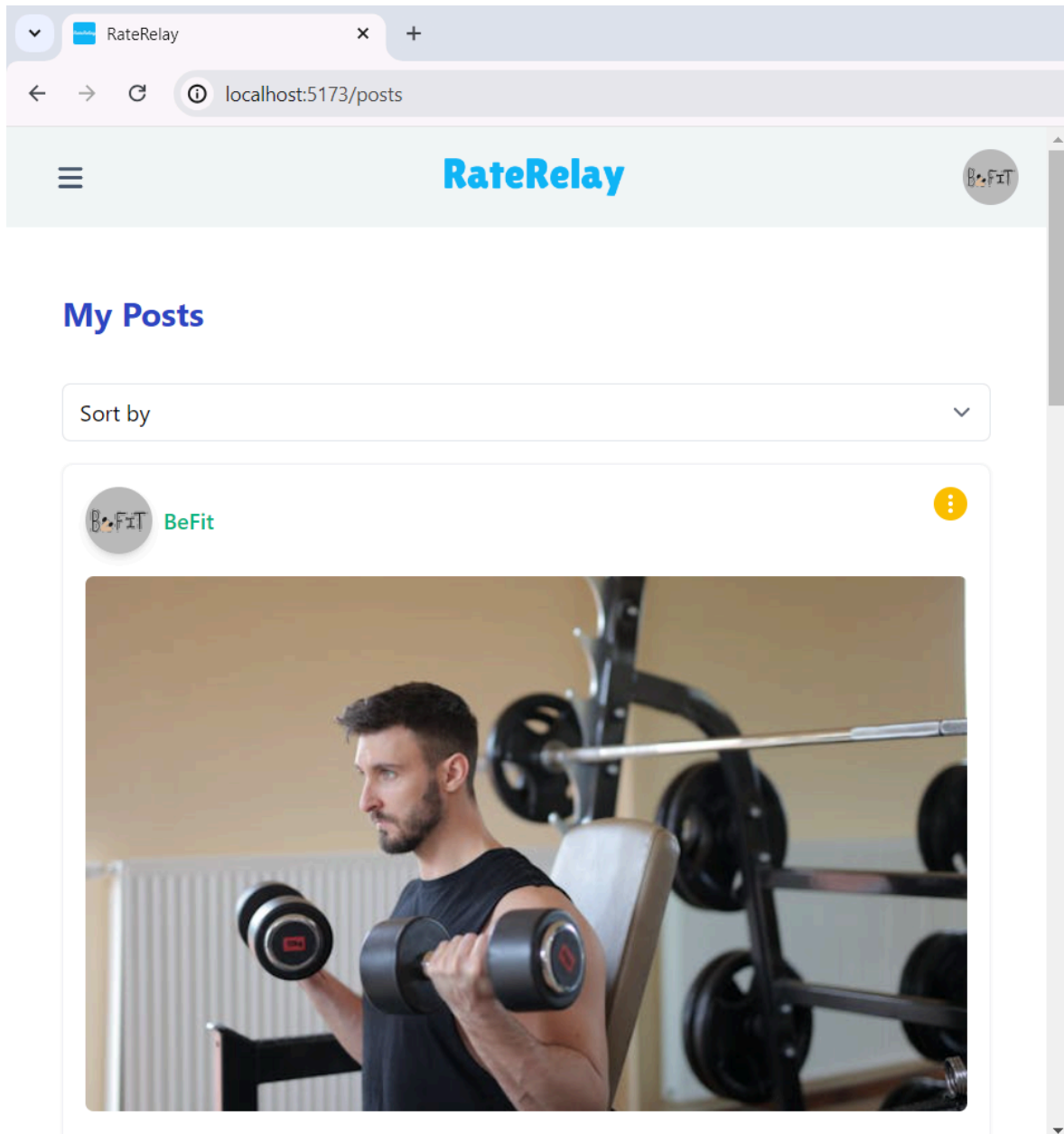


Figure 147: Website tablet posts screen

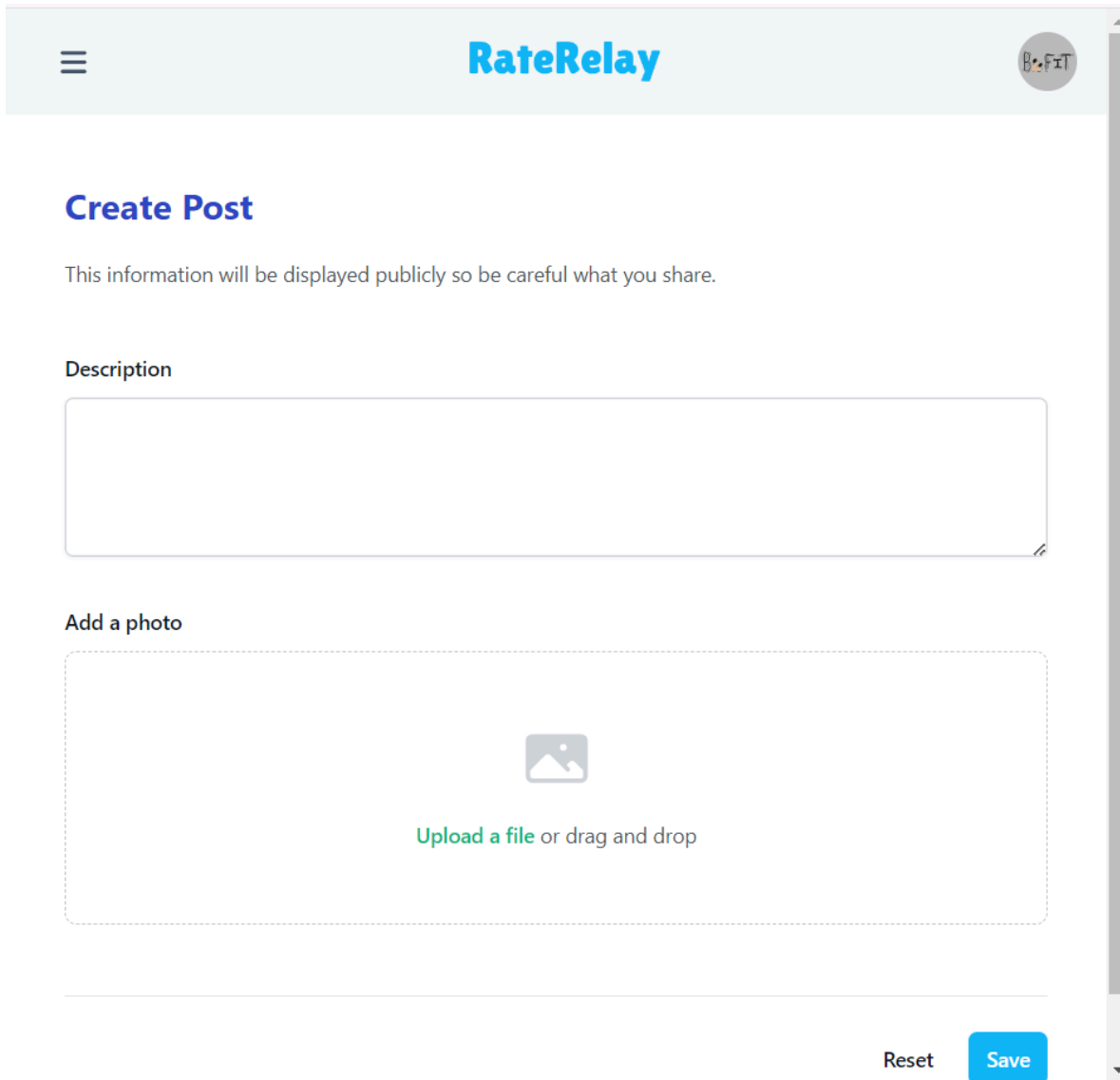


Figure 148: Website tablet post-creation screen

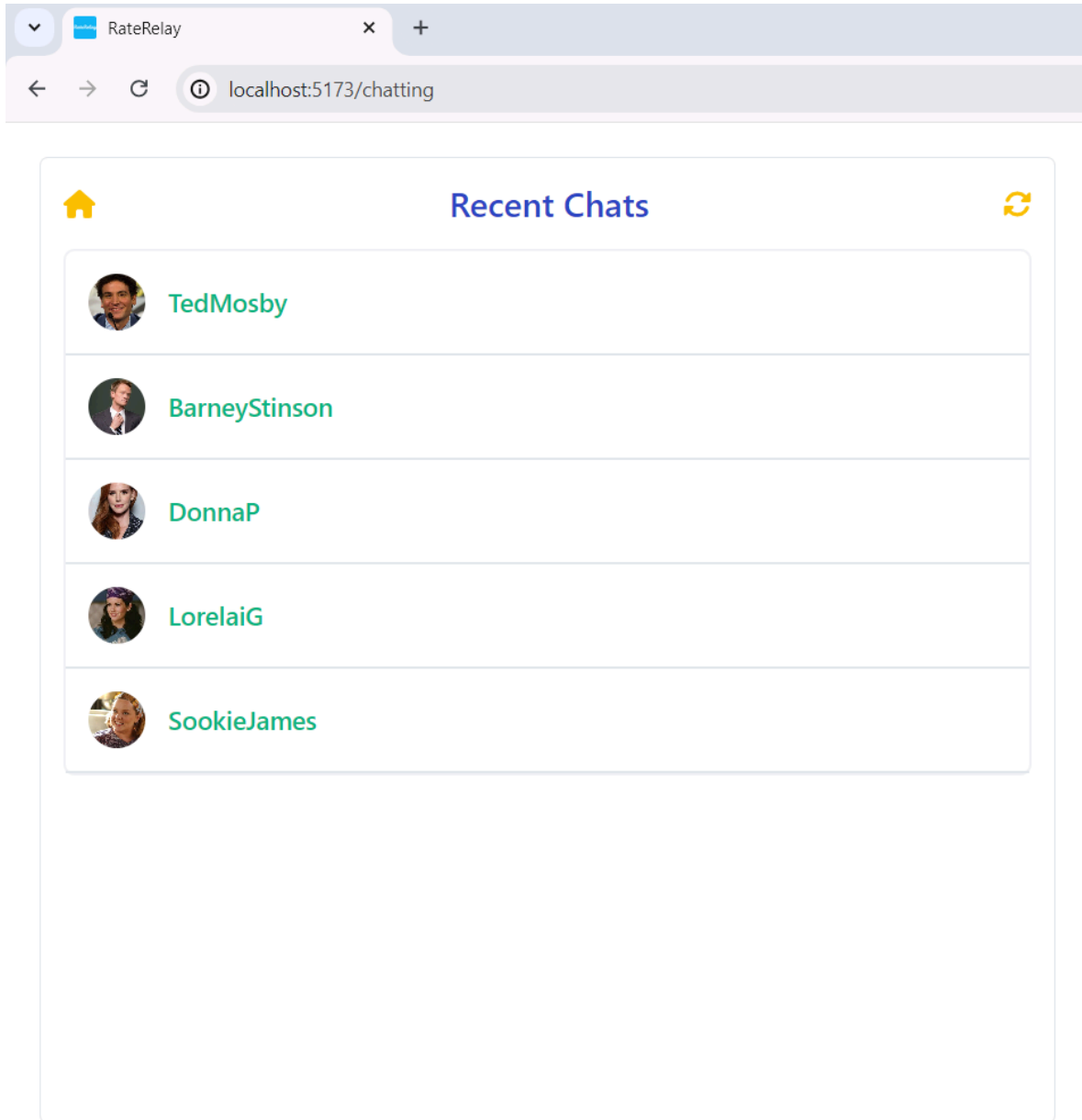


Figure 149: Website tablet messages screen

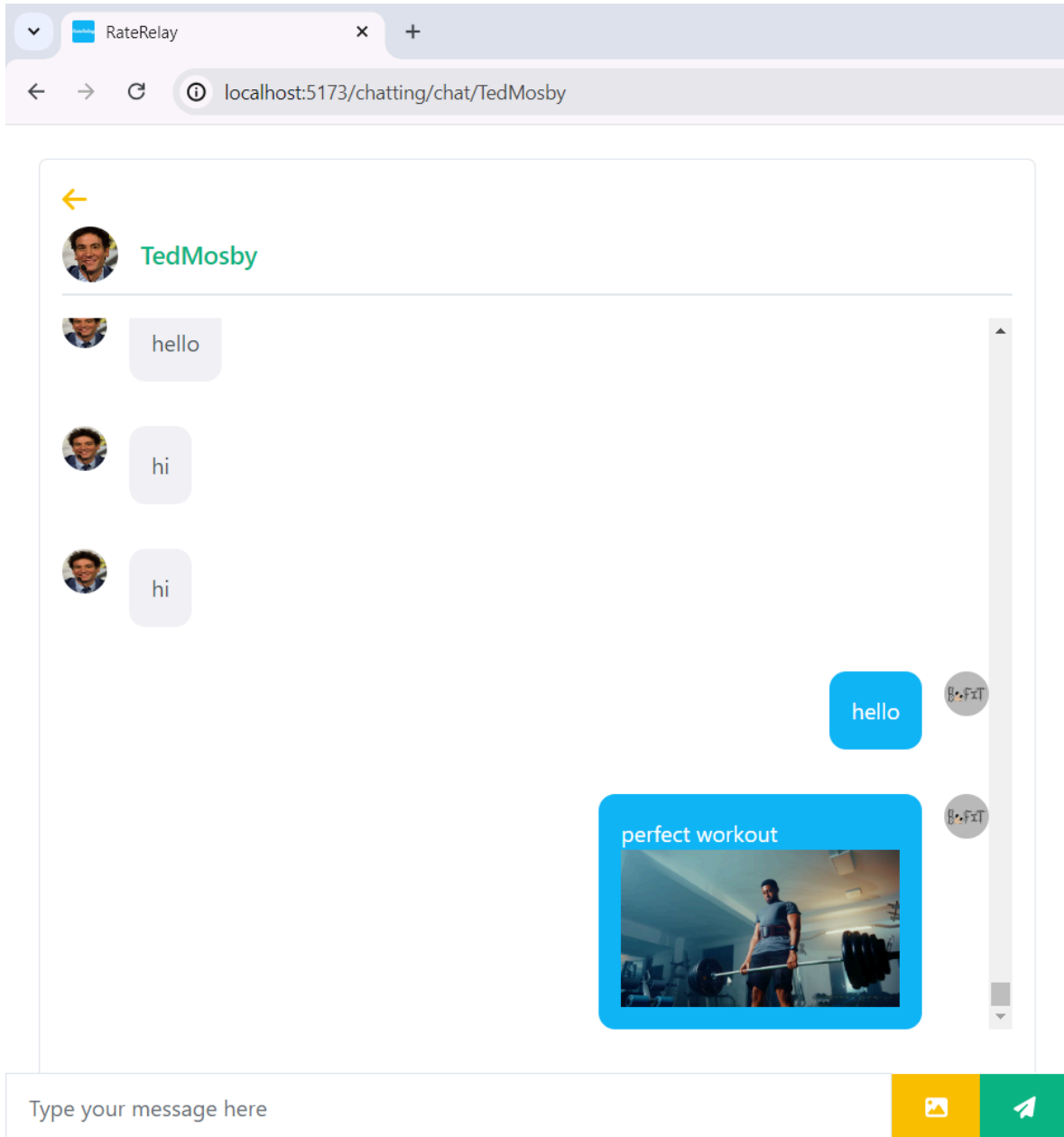


Figure 150: Website tablet chat screen

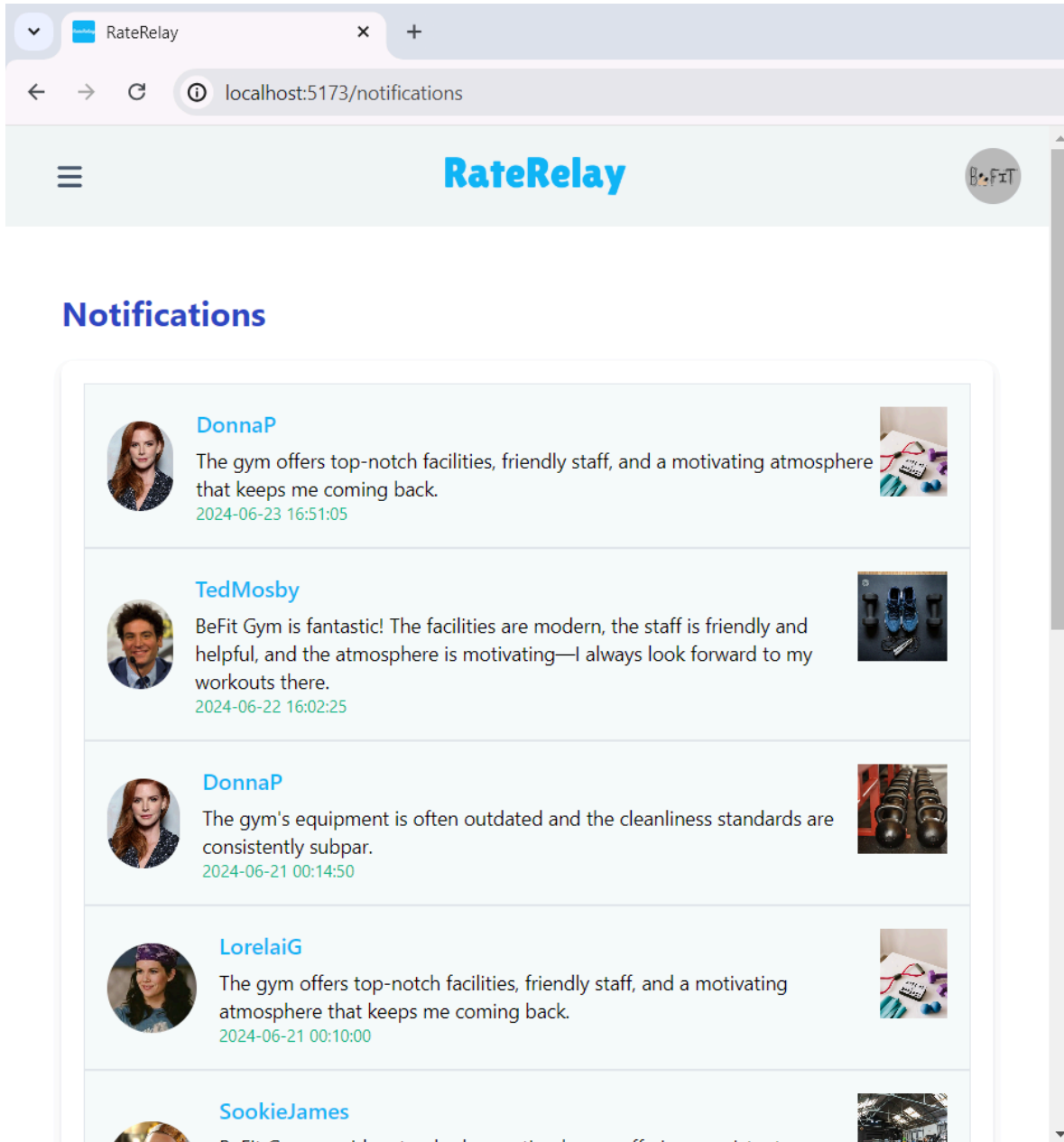


Figure 151: Website tablet notifications screen

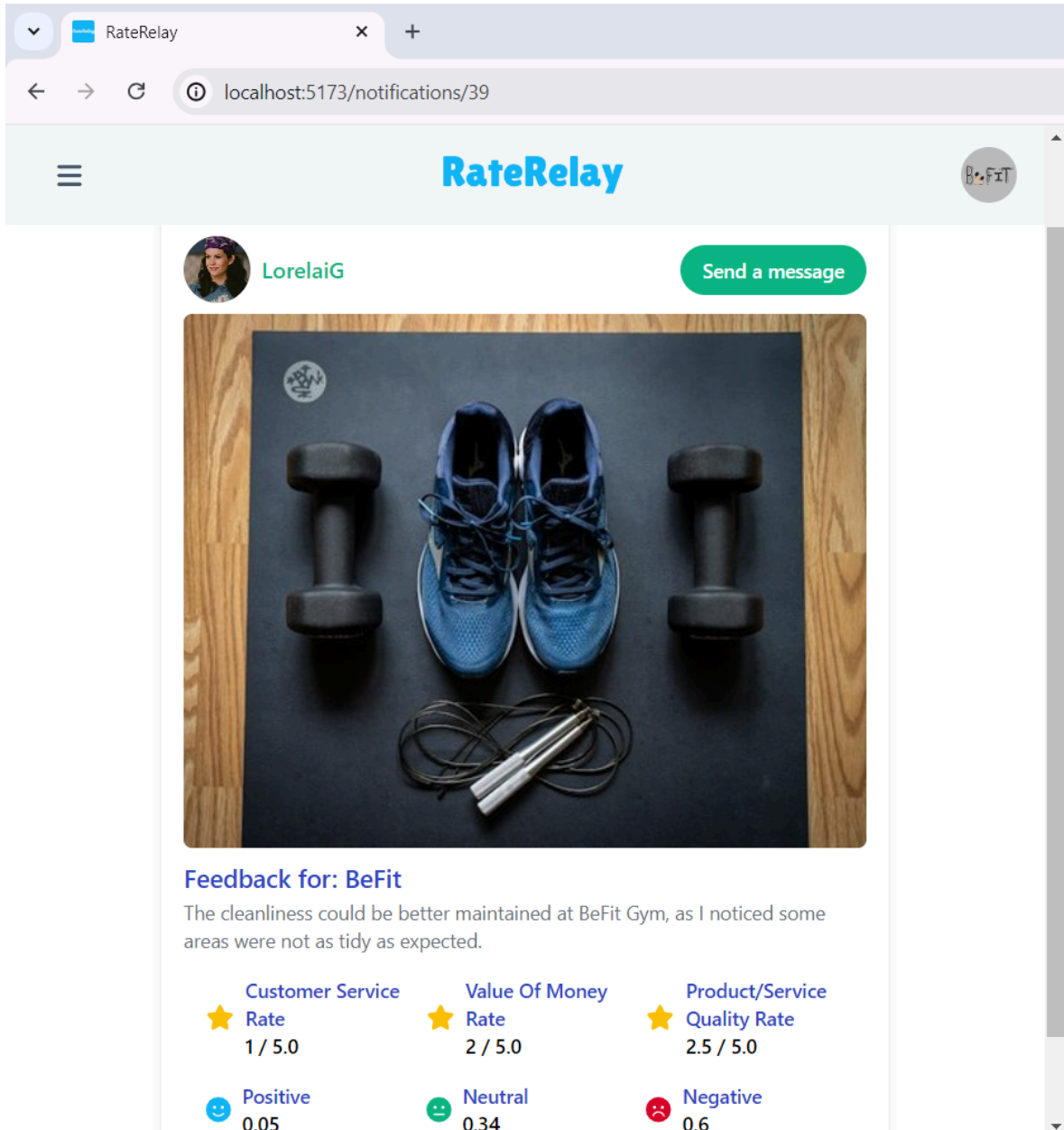


Figure 152: Website tablet feedback screen

Mobile screens are similar to tablet screens, here are some examples:

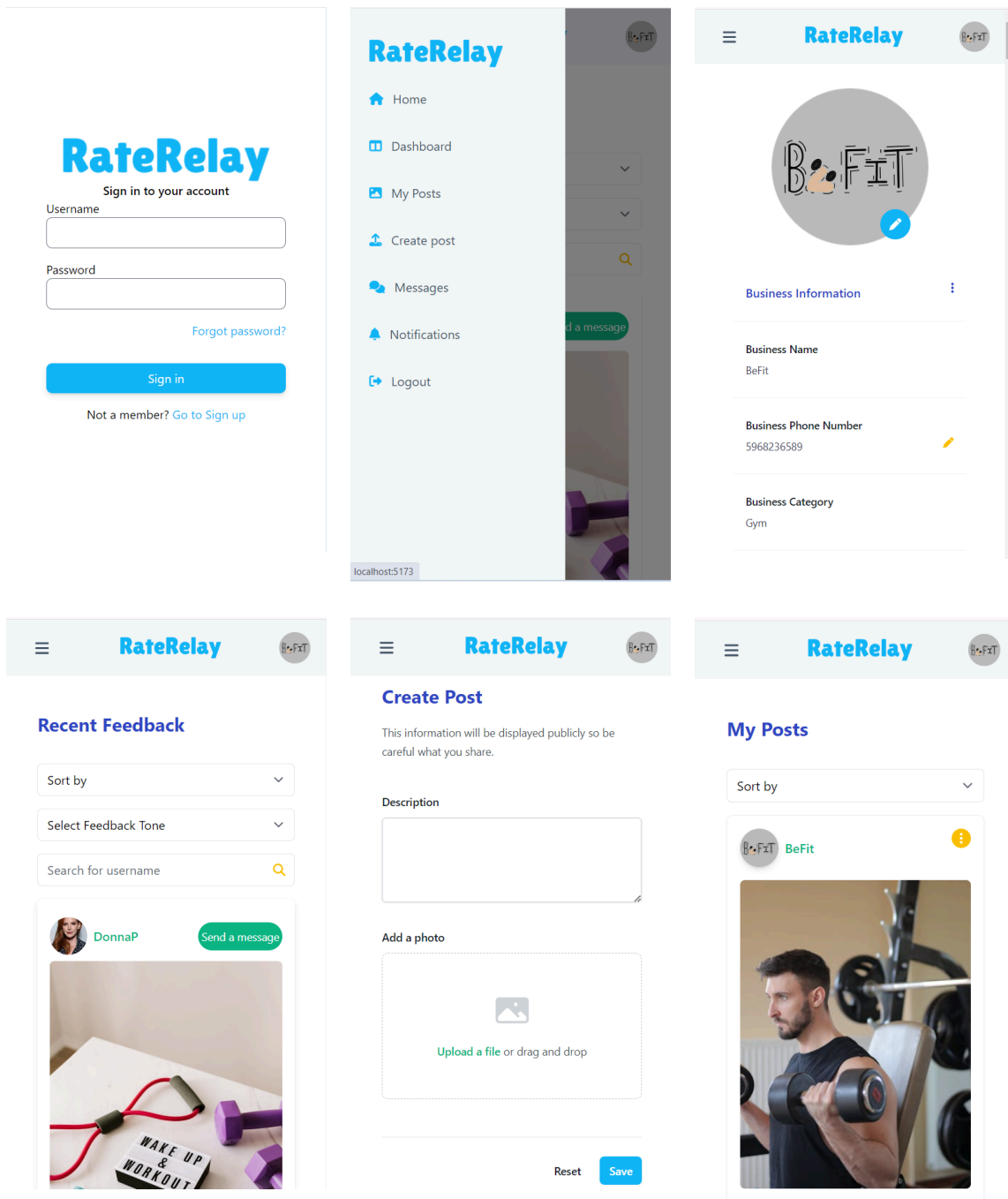


Figure 153: Website mobile screens

4.4 Sentiment Analysis AI model

We employed the Twitter-roBERTa-base model for sentiment analysis to categorize feedback as negative, positive, or neutral. This model fine-tuned on approximately 58 million tweets using the TweetEval benchmark, specializes in English sentiment analysis.

Chapter 5: Results and Analysis

In summary, we have successfully developed a mobile application that achieves its primary goal of facilitating interaction between users and business owners. Users can search for specific businesses using filters based on business information, view business posts, provide feedback, follow businesses, send messages, and receive notifications for new posts.

Additionally, we have created a website tailored for business admins. This platform allows admins to add posts, send messages, receive notifications for new user feedback, filter and analyze feedback, and track user interactions. These features enable admins to better understand their target audience and improve their services and products.

Our research indicates a strong interest in this application, suggesting it will attract a substantial user base upon release. Users are likely to benefit from significant time and cost savings. Moreover, the website will help business owners better understand the market and respond to customer needs effectively.

Chapter 6: Conclusion

In conclusion, the RateRelay project represents a significant leap forward in enhancing customer-business relationships globally. By focusing on delivering insightful feedback and fostering direct engagement, it aims to elevate customer satisfaction and empower businesses to refine their offerings effectively. With a commitment to inclusivity, particularly in regions where similar platforms are limited, RateRelay not only fills a crucial gap but also promises to redefine how businesses connect with their clientele. As we move forward, the project's potential to reshape market dynamics and customer experiences is both promising and exciting, offering tangible benefits for businesses and customers alike in diverse international markets.

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