

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

An-Najah National University



Faculty of Engineering and Information Technology

Computer Engineering Department

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BRAIN BOX



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Dedication

وَأَخِرُ دَعْوَاهُمْ أَنِ الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ
الْحَمْدُ لِلَّهِ الَّذِي يَسِّرُ الْبَدَايَاتِ وَأَكْمِلُ النِّهَايَاتِ وَبَلِّغُنَا الْغَايَاتِ
إِلَى وَطَنِي الْحَبِيبِ
تَرَابُكُ الطَّاهِرِ هُوَ بَدَايَةُ الْحَلْمِ وَمُنْتَهَاهُ.

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Disclaimer

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Abstract

Students always face a problem in finding sources for their project ideas, finding sources for learning, and searching for partners. Also, the prices of parts are high in hardware projects. Brain Box is an innovative platform that aims to provide a great place to find ideas, talk to their owners, and discover their learning journey with all the details and information they need. You can log in easily or use your accounts such as Google. The platform provides the ability to see people's interaction with these projects and their opinions about them with ease, and to explore the pictures, videos, and files related to this project. The user can save these projects and interact with them as well, comment and like. He can also book a session that explains these ideas and their educational journeys with the owner of the idea. You can enter a meeting with the availability of the camera, sound, screen sharing, and others to provide a wonderful and easy-to-use experience. The platform also provides the ability to find partners for your university and non-university projects with the availability of special channels. For you and your partner with complete confidentiality to share your information and files. You can also chat with them or create groups with them through the platform's special chat system. After finishing, you can also share your project and spread the benefit. You can also buy previously used parts at competitive prices and provide a Stripe payment service via the Internet and direct payment is also possible, and you can also resell these pieces after using them, which saves you a lot. You can also publish and explore useful information and simple codes that have been shared on the platform with ease. With all this information, the platform provides a very fast search and filtering method that enables you to search for what you want in seconds. The platform cares about your interests and rearranges the appearance of lists and projects for you based on your interests. You can also befriend people and see their projects and achievements through their own pages. Finally, there is a notification feature that keeps the user constantly informed of new updates and changes.

Chapter 1

Introduction

1.1 Statement of the Problem

Students and graduates face problems in finding suitable ideas for their projects, with the availability of resources, details of the journey, exploring the experience of others, and getting partners for these projects and communicating with them in an effective and easy way. The high costs in hardware projects are also a burden. These problems highlight the need for a platform that addresses these issues comprehensively.

1.2 Project Objectives

The primary objectives of the Brain Box platform are:

- To provide a central point for users to discover ideas.
- To provide an easy environment to communicate and collaborate with partners using chat and channel systems.
- To connect users with the practical plans and resources needed to realize their ideas.
- To facilitate the purchase and sale of hardware parts at competitive prices.
- To provide an easy-to-use interactive sessions and meetings system.

1.3 Scope of the work

Brain Box will encompass the following features:

- An easy-to-use platform to share and explore ideas, projects, and learn from others' experiences.
- Interaction mechanisms such as likes, comments, and session bookings.
- Secure payment integration for the market to the hardware components.
- Chat, Group and Channels for communications tools between users.
- Advanced search and recommendation systems tailored to user interests.

1.4 Project Importance

The Brain Box platform is significant because it addresses the following needs:

- Encouraging innovation by providing access to diverse project ideas.
- Reducing the cost and effort required for hardware project components.
- Enhancing collaboration through secure and efficient communication tools.
- Simplifying the learning process by offering detailed educational resources.
- Empowering users to share knowledge and resources effectively.

Chapter 2

Constraints, Standards, and Frameworks

2.1 Constraints

During the development of the Brain Box platform, we encountered several constraints that influenced our workflow and decisions:

2.1.1 Time Constraints

As final-year students, balancing Brain Box with other courses, especially internships, was difficult because we were using different technologies than what we were training on, such as Spring boot and Angular. Learning Flutter in particular required our time to learn, along with third-party libraries for chat bots, recommendation algorithms, and payment gateways, which required a significant amount of time and effort. This constraint limited our ability to explore and implement advanced features in depth.

2.1.2 Technical Constraints

Below are some key technical issues we encountered while building the Brain Box:

- **Performance Optimization:** During the project, we faced challenges due to the size of the database and the large number of fields as we were working on the smart filter feature across all fields and even partial words.
- **Integration Issues:** Integrating the chat system and payment gateway (Stripe API) into the platform involved troubleshooting compatibility issues between the frontend and backend, as well as ensuring secure and efficient data handling.

- **Cross-Platform Consistency:** Ensuring a seamless user experience across different devices (desktop and mobile) required adjustments to the design and functionality of the platform.

2.1.3 Project Adjustments During Development

User feedback and guidance from our supervisor led to multiple adjustments during the development process. For example:

- Improving the search method to work efficiently based on all fields and even parts of them.
- Improving the home page and the way projects, partners and educational publications are divided.
- Improving the sessions and front-end in general as a whole.

2.2 Standards and Frameworks

The development of Brain Box adhered to several engineering standards and utilized modern frameworks to ensure the platform's reliability, scalability, and efficiency:

2.2.1 Flutter Framework

Flutter was chosen as the primary framework for the mobile frontend due to its ability to create cross-platform applications with a consistent user experience.

2.2.2 Model-View-Controller (MVC) Architecture

The MVC architectural pattern was adopted to organize the application into three layers:

- **Model:** Represents the database schema and business logic of the platform.
- **View:** Handles the user interface and interaction elements.
- **Controller:** Acts as the intermediary, managing data flow between the model and view.

This structure facilitated code maintainability and scalability.

2.2.3 Node.js RESTful API

The backend was built using Node.js, which enabled the creation of a scalable and efficient RESTful API. This API allowed seamless communication between the frontend and backend, handling data operations such as creating posts, managing chats, and processing payments.

2.2.4 Database Interaction with Sequelize

Sequelize was used as the Object-Relational Mapping (ORM) tool to interact with the database. This abstraction layer simplified model definition, query execution, and relationship management, ensuring efficient data handling.

2.2.5 Agile Development Process

We followed an Agile development approach, dividing our project into sprints to work on specific features in iterations of about two weeks. Weekly meetings with our mentor provided progress updates and allowed for guidance. This iterative process ensured adaptability, collaboration, and efficient development of our app.

Chapter 3

Literature Review

3.1 Introduction

The literature review explores the current platforms, tools, and technologies that inspired us to create and develop Brain Box. This section describes current technologies and how Brain Box fills the gap that students need.

3.2 Existing Platforms and Solutions

LinkedIn is a widely used professional networking platform that allows users to connect, share achievements, and explore opportunities. However, it is primarily designed for professional networking and lacks features tailored for academic collaboration, such as sharing project ideas or exploring detailed educational journeys. Similarly, GitHub, a popular platform for sharing and collaborating on software projects, provides robust tools for version control and collaboration, making it invaluable for developers. However, it does not cater to non-technical users or hardware-focused projects. Brain Box bridges these gaps by offering a platform suitable for both hardware and software projects, including features like hardware sales, session bookings, and advanced recommendation systems. On the other hand, EdTech platforms like Coursera and Udemy provide a wide range of educational resources and courses but lack interactive and collaborative tools for real-time project development and partner matching. Brain Box integrates these features by offering interactive learning through sessions and collaborative tools, such as chat systems and group channels, providing a more comprehensive solution.

3.3 Technologies and Frameworks

3.3.1 Recommendation Systems

Recommendation systems play a crucial role in personalizing user experiences. Platforms like YouTube and Netflix use collaborative filtering and content-based filtering algorithms to suggest content based on user preferences. Brain Box employs similar algorithms to recommend relevant projects, partners, and educational resources to users based on their interactions and interests.

3.3.2 Payment Gateways

Stripe and PayPal are commonly used payment gateways in modern platforms. Stripe was selected for Brain Box due to its robust API, secure payment handling, and support for multiple payment methods, ensuring seamless transactions for users purchasing hardware components or booking sessions.

3.3.3 Real-Time Communication Tools

Real-time communication is an essential feature of collaborative platforms. Tools such as Socket.IO enable real-time chat and group messaging. Brain Box integrates such tools to facilitate efficient communication between users, whether through private messages, group chats, or session discussions.

3.4 Gaps in Existing Solutions

The platforms and technologies reviewed above offer valuable features but lack a unified solution tailored specifically for students and professionals working on academic and practical projects. The gaps include:

- Limited support for hardware projects and their sales.
- Lack of integration between project sharing, educational resources, and partner matching.
- Absence of advanced filtering and recommendation features tailored to user interests.
- Minimal emphasis on collaborative tools for session bookings, chats, and group discussions.

3.5 How Brain Box Addresses These Gaps

Brain Box addresses the identified gaps by offering:

- A unified platform for both hardware and software projects.
- Advanced search and filtering capabilities for finding projects, partners, and resources.
- Real-time communication tools, including chat systems and group channels.
- Integration of recommendation systems to personalize user experiences.
- A seamless user interface for booking sessions, purchasing components, and sharing projects.

3.6 Conclusion

The literature review provides a foundation for understanding the design and development of Brain Box. By analyzing existing platforms and technologies, we identified critical gaps that Brain Box addresses, ensuring it stands out as a unique and comprehensive solution for students and professionals.

Chapter 4

Methodology

4.1 Technical Preference

4.1.1 Framework

The Brain Box platform uses modern frameworks to ensure scalability, reliability, and user-friendliness:

- **Flutter:** Used for the frontend to create a cross-platform application with a consistent user experience on mobile and web.
- **Node.js:** The backend is built using Node.js for its non-blocking, event-driven architecture, which supports high scalability.
- **Sequelize:** An Object-Relational Mapping (ORM) library for Node.js, used for interacting with the MySQL database efficiently.

4.1.2 Design

The system follows a modular design to ensure maintainability and scalability:

- **Frontend:** - Flutter provides a reactive UI with dynamic components like `ListView` and `GridView`. - The design adheres to Material Design principles for consistency and usability. - State management is handled using `GetX` for reactive programming and simplified navigation.
- **Backend:** - Implements a RESTful API to handle CRUD operations and user interactions. - Follows a layered architecture with routes, controllers, services, and models.
- **Database:** - The schema is normalized to reduce redundancy and ensure efficient queries. - Relationships are modeled using `Sequelize` to handle associations (one-to-many, many-to-many).

4.1.3 Backend

The backend handles business logic, API endpoints, and real-time communication:

- **Express.js:** Used as a framework to define API routes and middleware.
- **Socket.IO:** Provides real-time capabilities for the chat system and notifications.
- **Security:** JSON Web Tokens (JWT) are used for authentication and session management, ensuring secure access to APIs.
- **Integration:** The backend integrates third-party services such as Stripe for payments and uses RESTful principles for API design.

Chapter 5

System Features Implementation

5.1 Welcome Screen

The Welcome screen is the starting point for the project and entry into it, as it provides the user with the ability to log in or create a new account. It also includes a brief legal disclaimer regarding the Terms of Service and Privacy Policy. This is made clear by the text: By continuing, you agree to the Terms of Service and confirm that you have read our Privacy Policy.

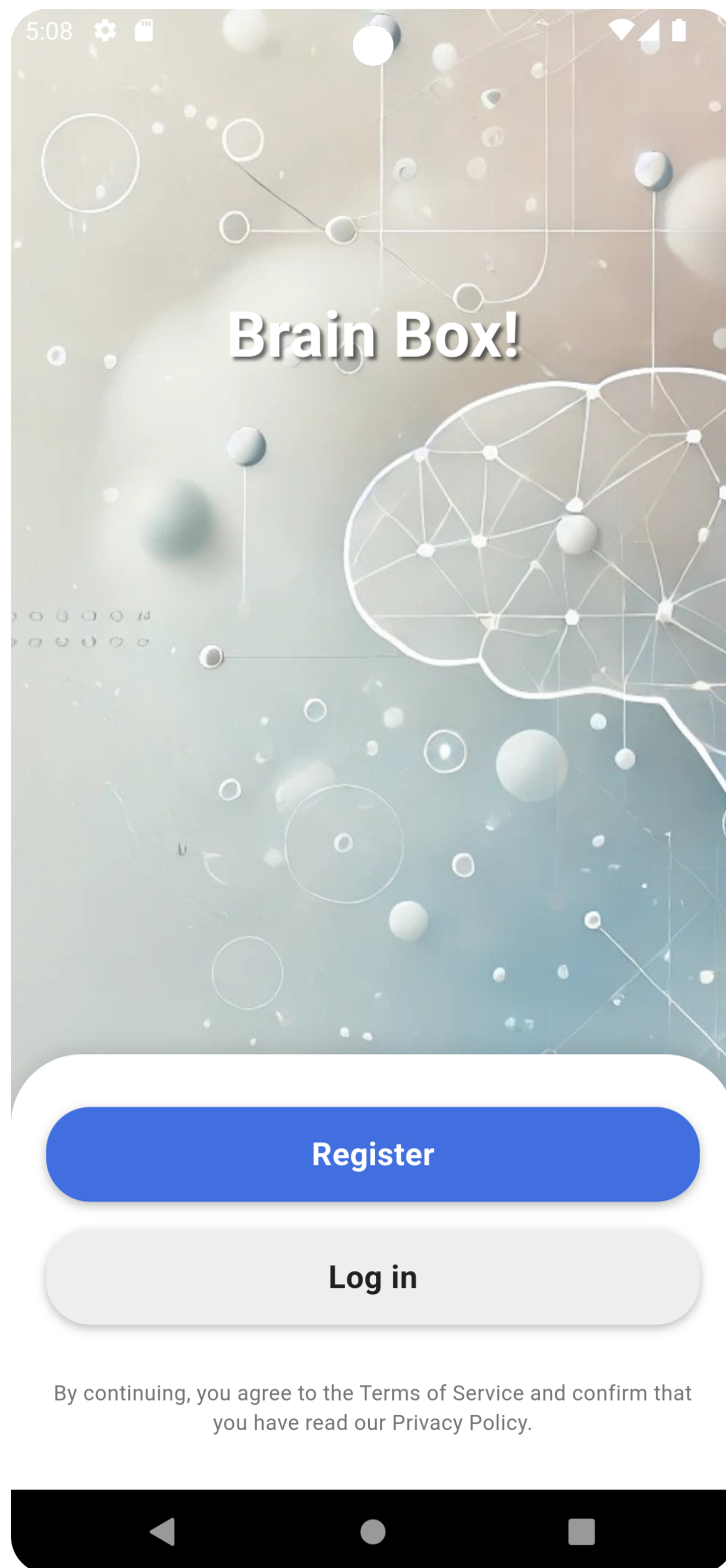


Figure 5.1: Welcome Screen of the Brain Box Application.

5.2 Sign Up Screen

The Sign-Up Screen allows the user to create a new account on the platform and basically requires a username, email, and password. This is an easy login process for the user and does not require accounts or restrictions. We

also created an API to validate the user to ensure they have a valid name (not less than 3 characters), a real email, and a strong password containing lowercase and uppercase characters, numbers, and special characters.

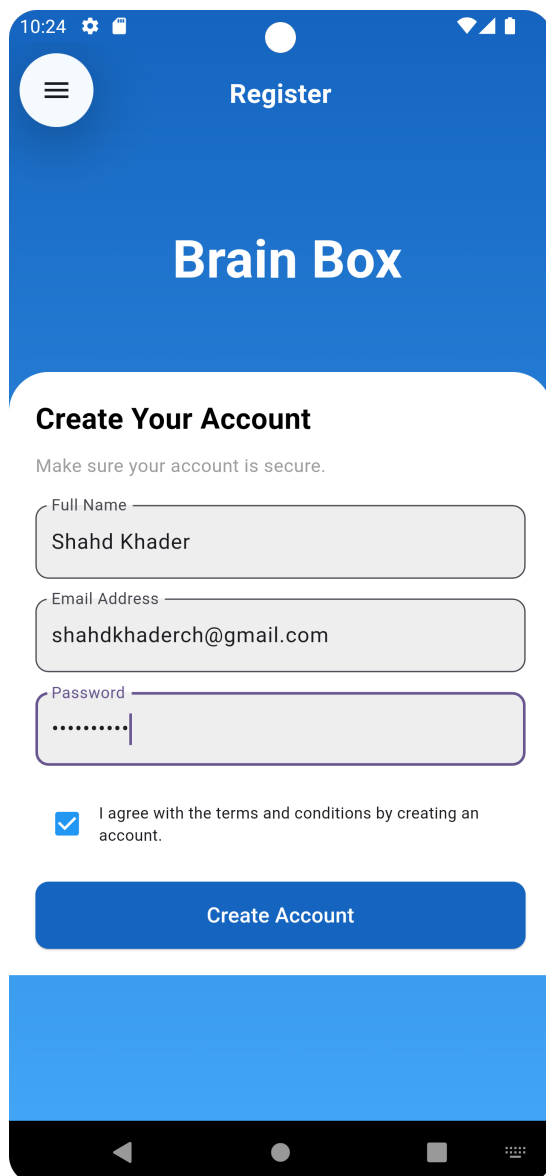


Figure 5.2: Sign Up Screen of the Brain Box Application.

```
1 exports.validateRegistration = {
2   check('username')
3     .notEmpty().withMessage('Username is required')
4     .isLength({ min: 3 }).withMessage('Username must be at least 3 characters long'),
5   check('email')
6     .isEmail().withMessage('Please provide a valid email address'),
7   check('password')
8     .isLength({ min: 8 }).withMessage('Password must be at least 8 characters long')
9     .matches(/[a-z]/).withMessage('Password must contain at least one lowercase letter')
10    .matches(/[A-Z]/).withMessage('Password must contain at least one uppercase letter')
11    .matches(/[0-9]/).withMessage('Password must contain at least one number')
12    .matches(/[!@_]/).withMessage('Password must contain at least one special character'),
13  (req, res, next) => {
14    const errors = validationResult(req);
15    if (!errors.isEmpty()) {
16      return res.status(400).json({ errors: errors.array() });
17    }
18    next();
19  }
20 };
```

Figure 5.3: API to Validate User.

5.3 Login Screen

The login screen allows users to access the platform using the account they created by entering their email and password. Additionally, the platform provides the option to log in using Google or Facebook accounts, streamlining the login process for users. The figure below illustrates the login screen:

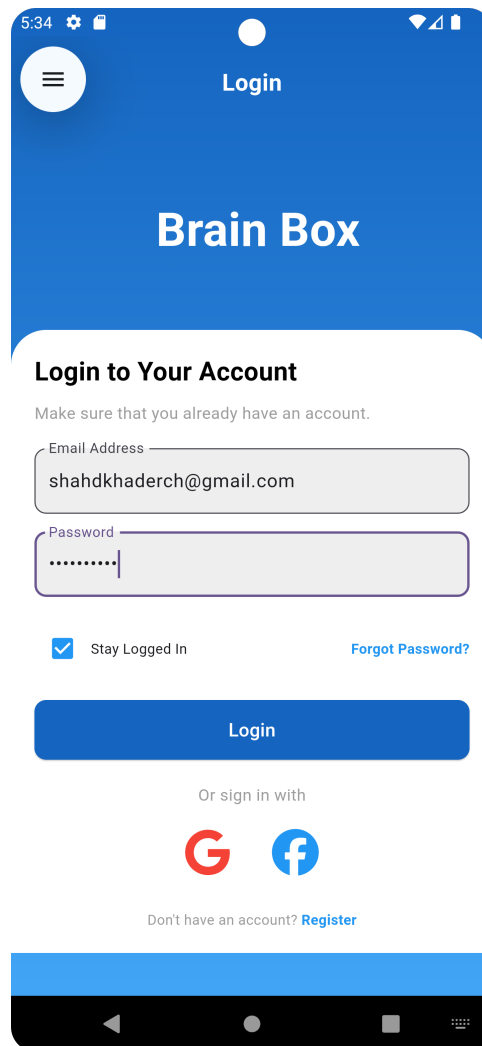


Figure 5.4: Login Screen of the Brain Box Application.

5.3.1 Login Using Google Account

The Brain Box platform integrates Google Login to enhance user convenience and security. The process involves the following steps:

1. **Step 1:** Click on the "Continue as Shahd" button to log in using your Google account. **Figure 5.5** illustrates this step.

2. **Step 2:** Click on the "Yes, I'm in" button to confirm synchronization and proceed. **Figure 5.6** illustrates this step.
3. **Step 3:** Select or confirm your email address to continue to Brain Box using your Google account. **Figure 5.7** illustrates this step.
4. **Step 4:** Click on "Continue" to finalize the login process and access the platform. **Figure 5.8** illustrates this step.

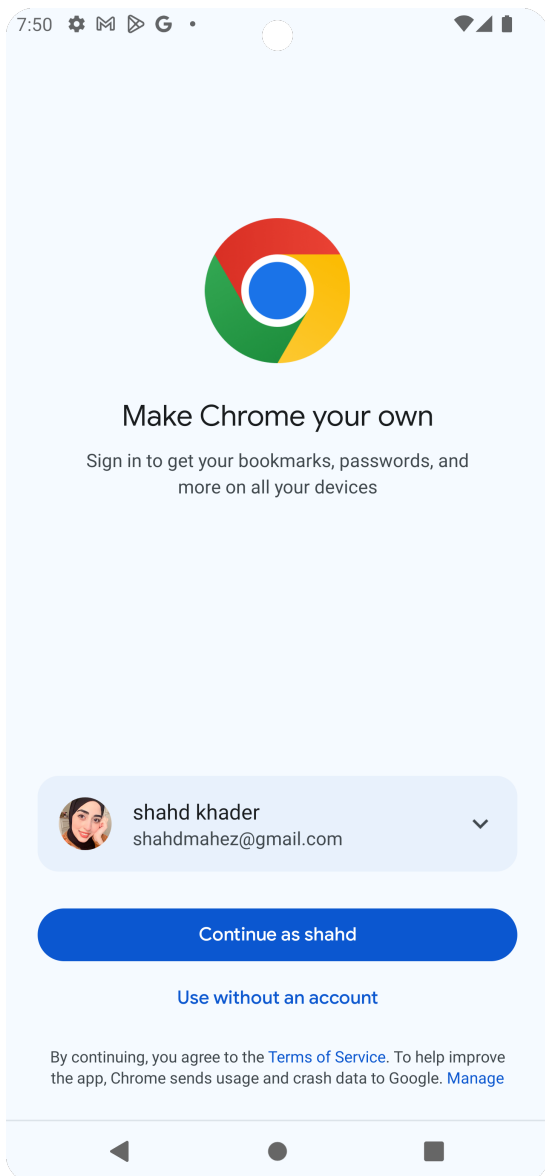


Figure 5.5: Step 1: Click "Continue as Shahd".

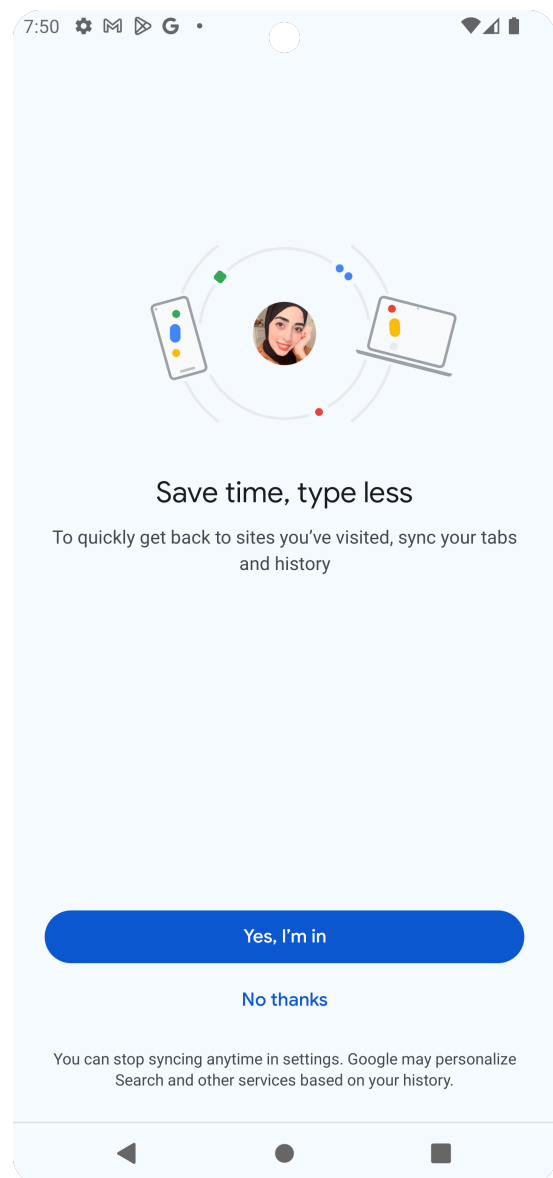


Figure 5.6: Step 2: Click "Yes, I'm in".

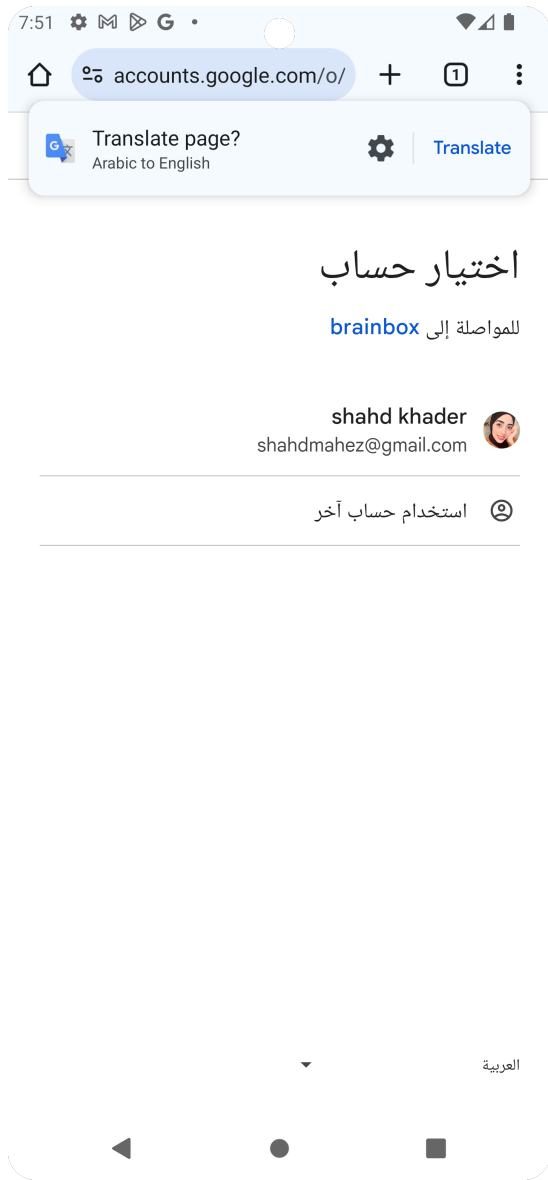


Figure 5.7: Step 3: Continue to Brain Box using your email.

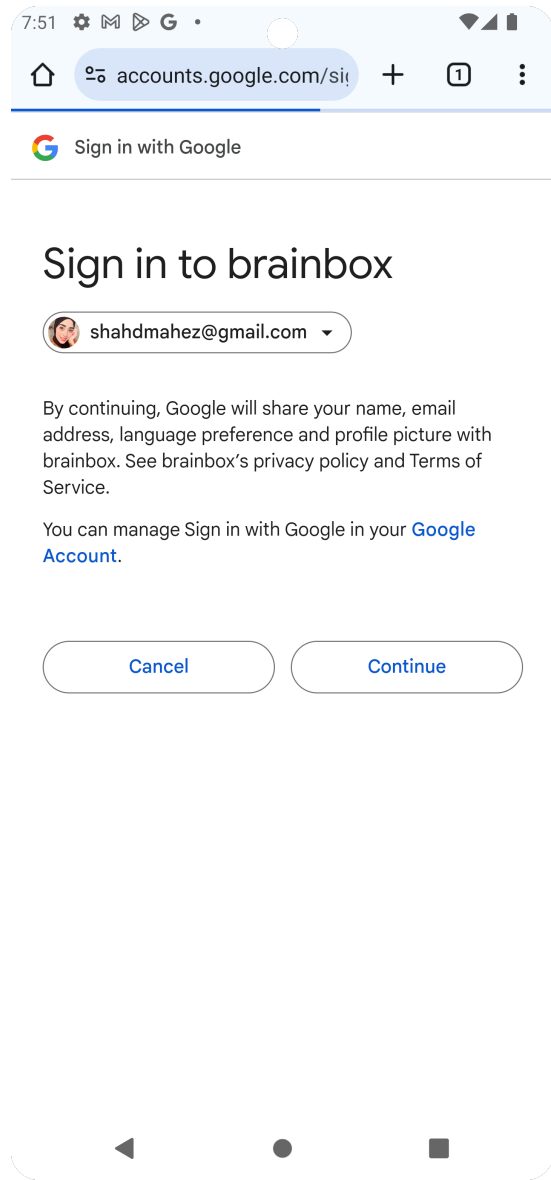


Figure 5.8: Step 4: Click "Continue" to access the platform.

5.4 Interest Page

When user create new account to the platform it will enter the interest page this page provide multiple type of interests, the user will choose whatever he want , then based on these values the contant of the main page will be rearranged based on the user interest from the most to the least .

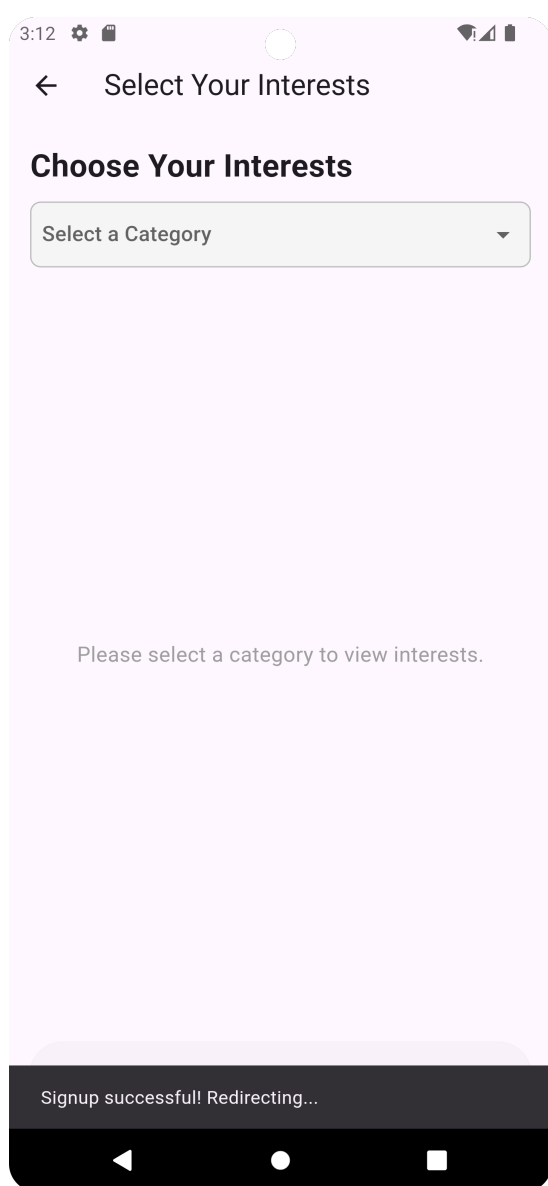


Figure 5.9: Step 1: The user should click on Select a Category drop down list.

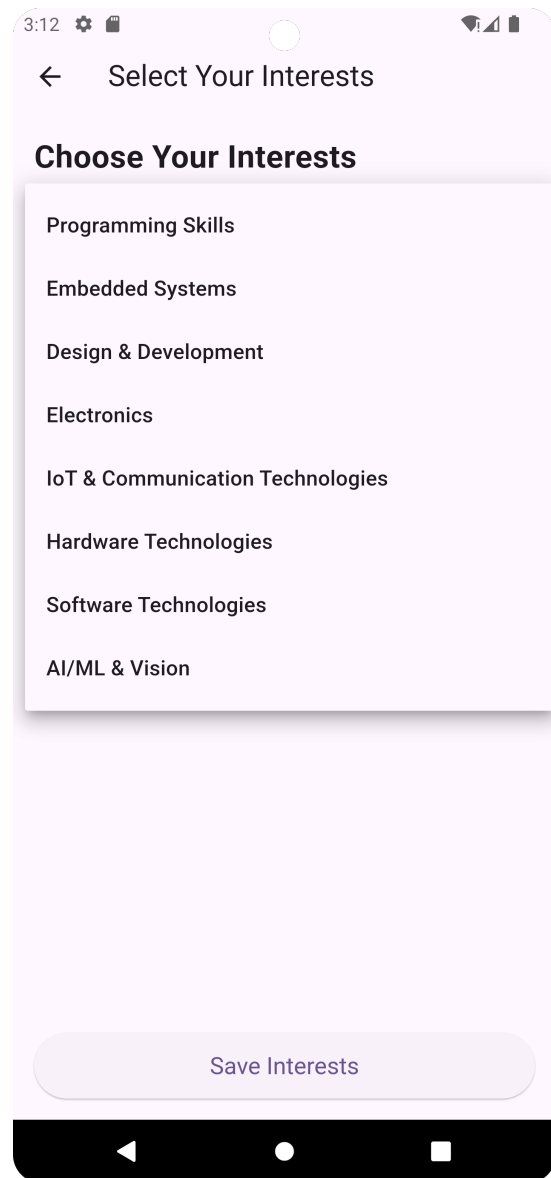


Figure 5.10: Step 2: Here the types are displayed he can choose whatever he want.

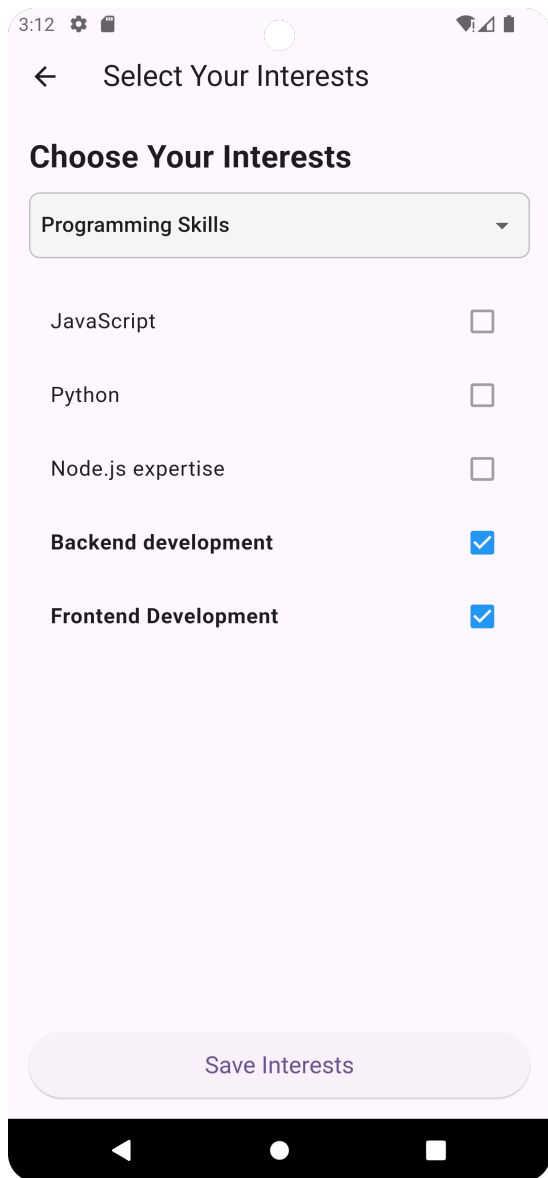


Figure 5.11: Step 3: Users can repeat the process for another categories and select more interests.

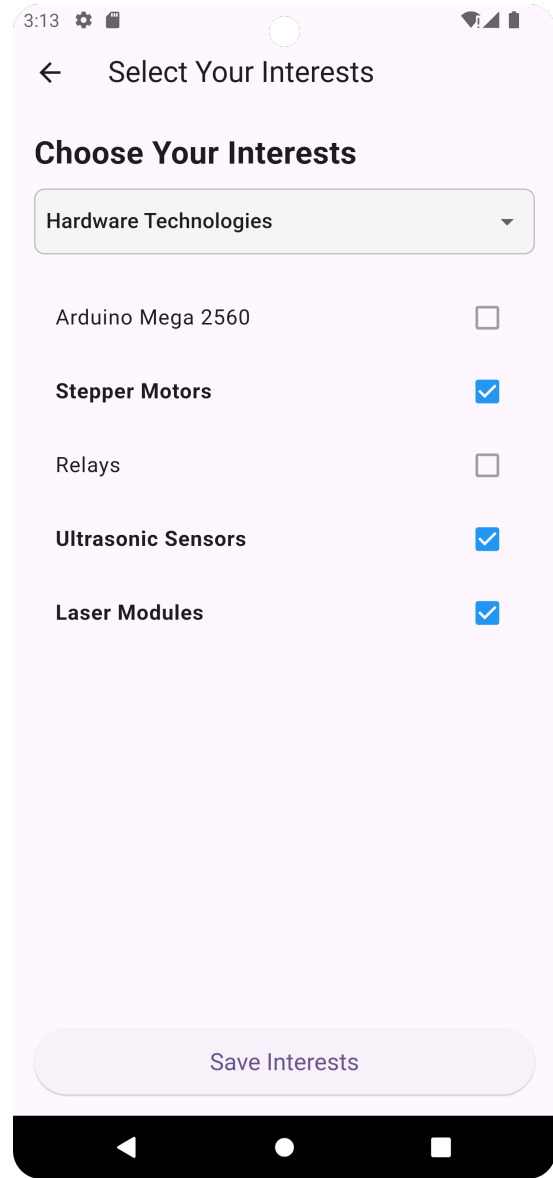


Figure 5.12: Step 4: Click "Save Interests" to confirm the selections and proceed.

5.5 Main Page

After logging in or signing up successfully, the main page is divided into three primary types: **Projects**, **Partners**, and **Normal Posts**.

5.5.1 Projects

1.1 Project Posts

These projects are sorted based on the user's selected interests, ensuring a personalized experience. Users can interact with projects by liking them, viewing who liked them, and saving projects to their profiles for easy access.

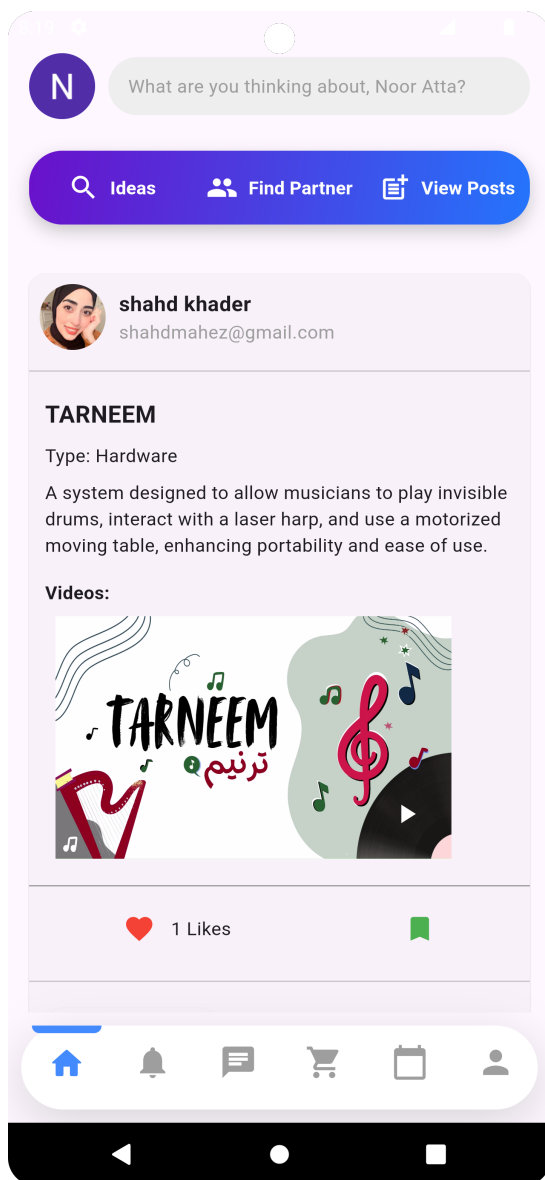


Figure 5.13: Example of a project on the main page.

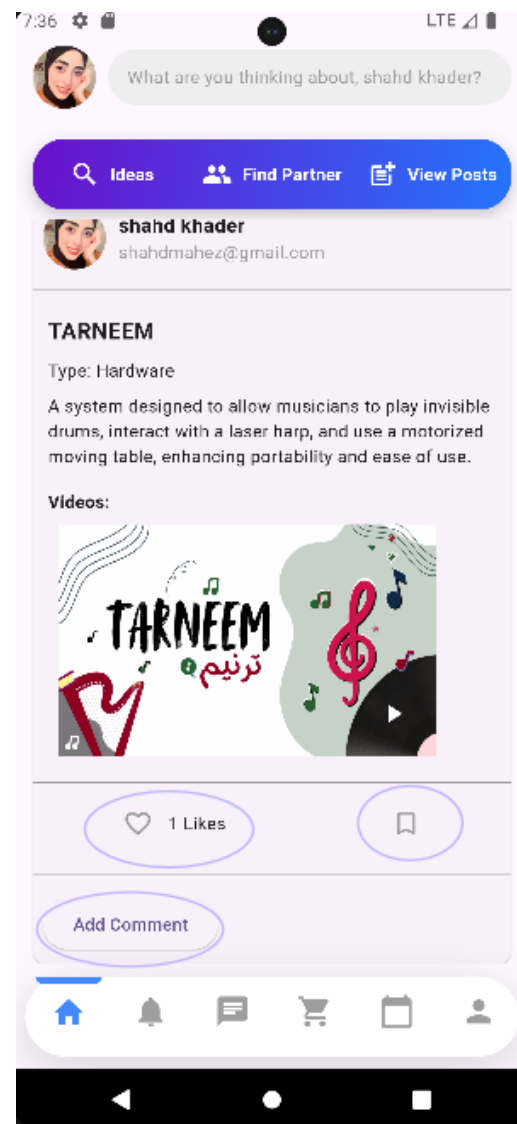


Figure 5.14: Interaction with a project on the main page.

1.2 Project Details

Each project on the Brain Box platform has a dedicated details page that provides comprehensive information about the project. This page allows users to view the project's description, technologies used, and any related media such as images or videos. Additionally, users can interact with the project by liking it, saving it to their profiles, or leaving comments to share their thoughts.

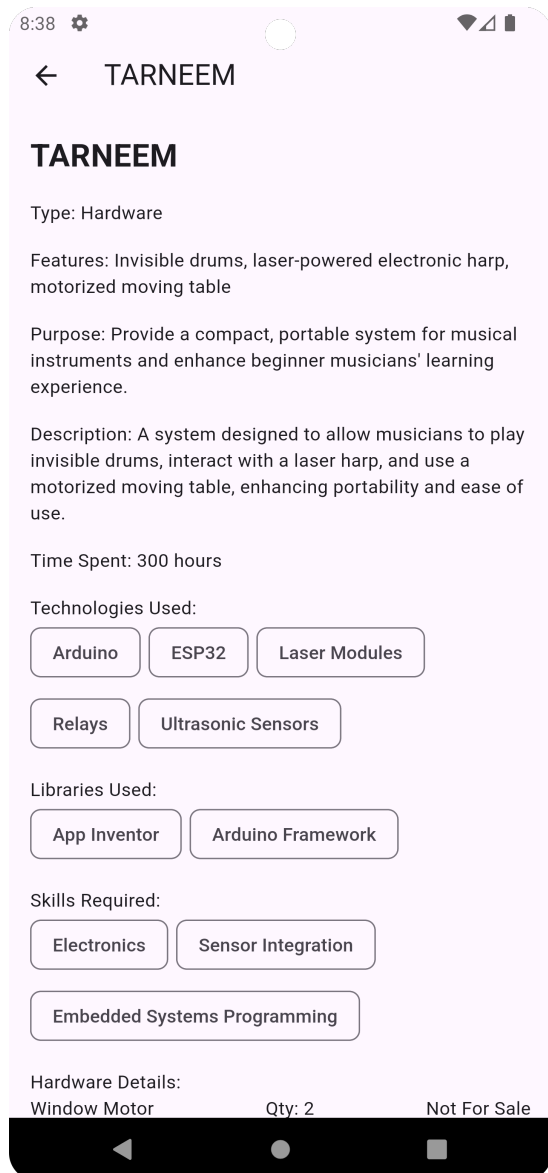


Figure 5.15: Project details page showing description and interaction options.

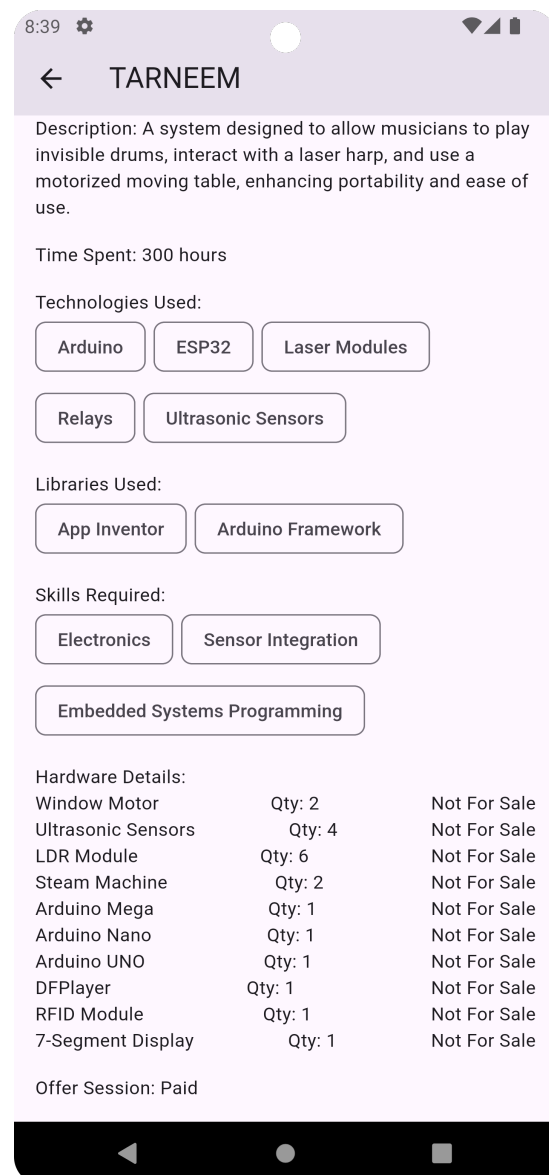


Figure 5.16: Technologies used and related media on the details page.

1.3 Comments

The platform allows users to engage with projects through comments. Users can add comments, reply to other comments, edit their own comments, and delete their own comments. However, users cannot edit or delete comments made by others unless they own the project. The nested comment structure enables meaningful discussions and interactions.

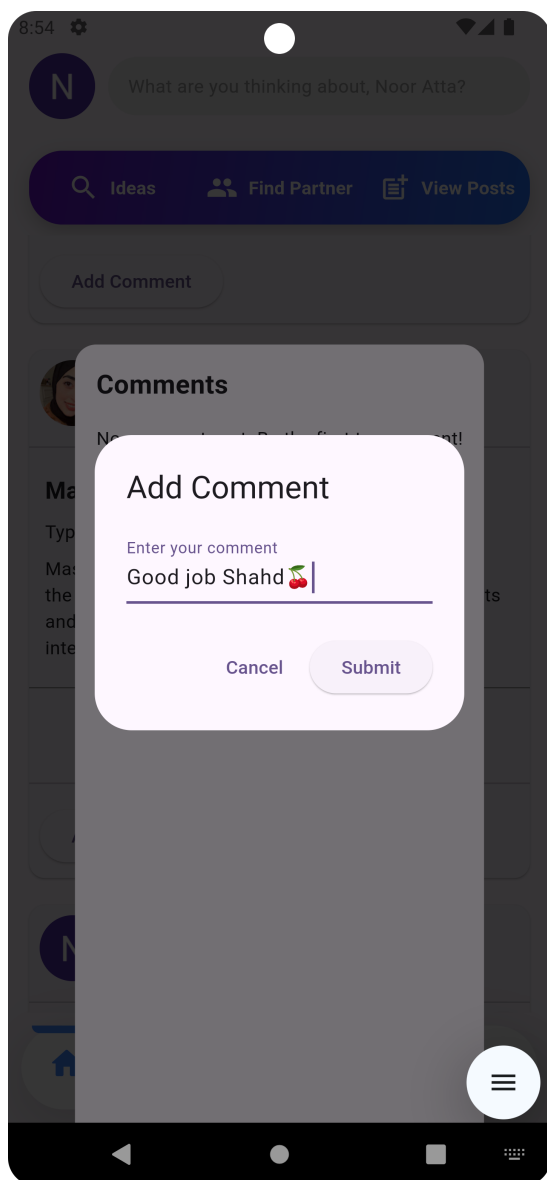


Figure 5.17: Adding a new comment.

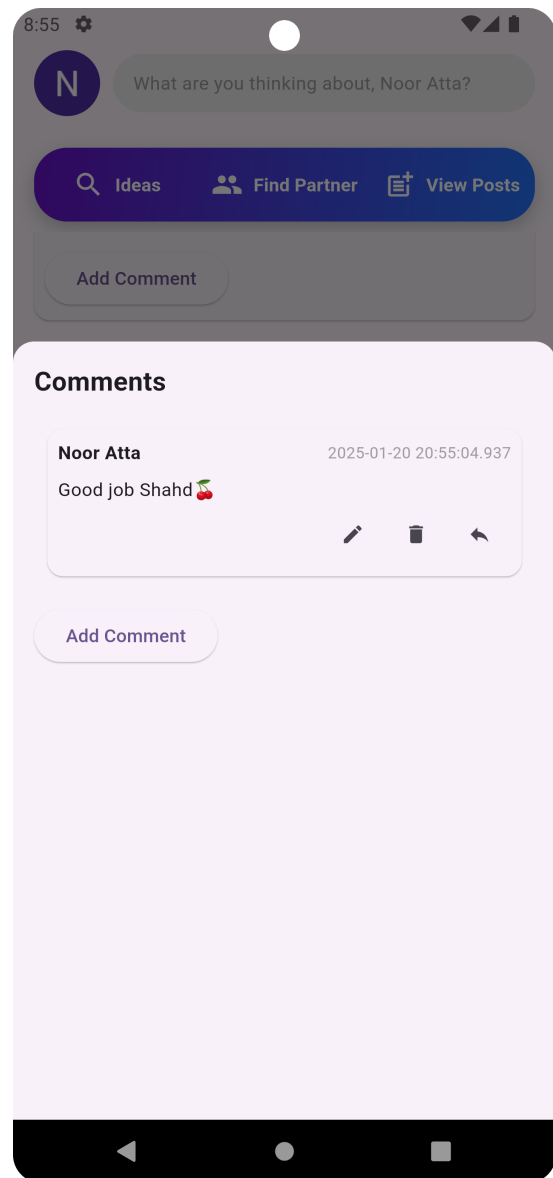


Figure 5.18: Viewing the added comment.

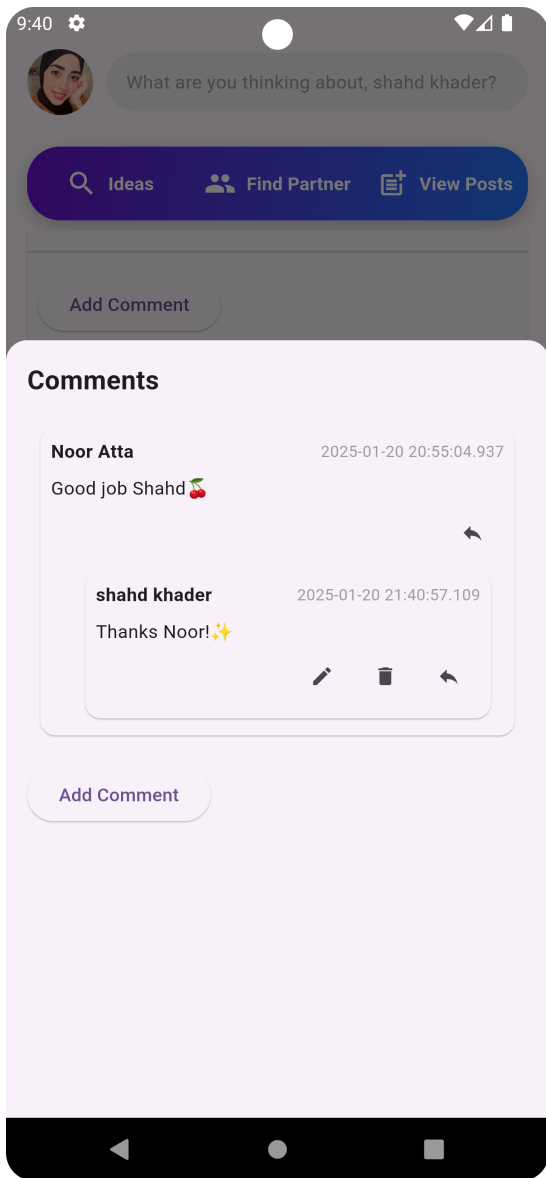


Figure 5.19: Replying to a comment.

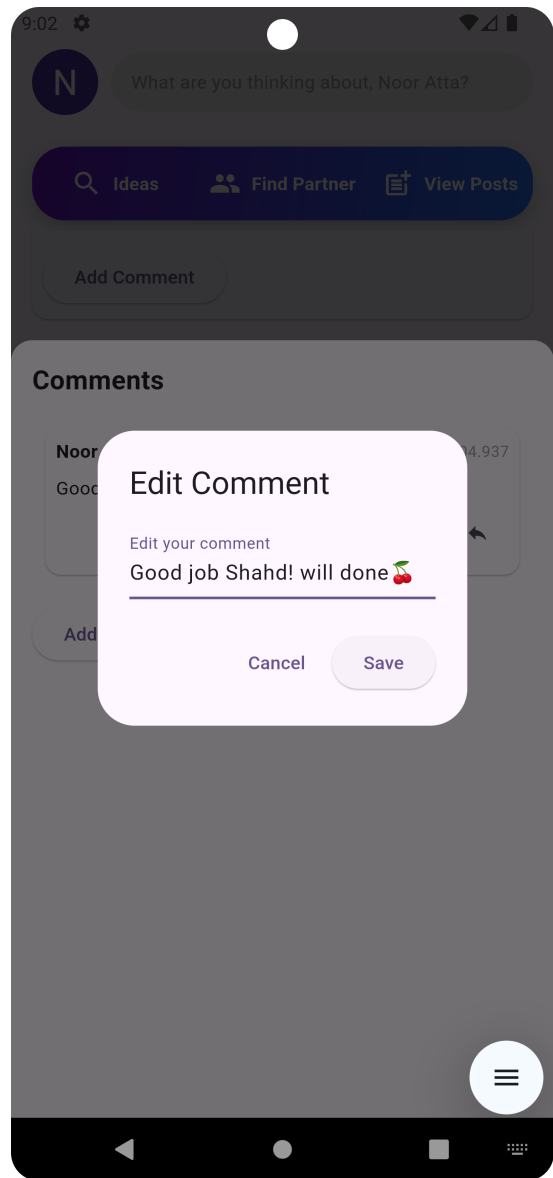


Figure 5.20: Editing a comment.

1.4 Search

In this feature, the user can search in a very effective way, as they can search using: projectName, projectType, projectFeatures, purpose, description, technologies, skills, and hardware components. In short, users can search using anything—even part of a word—which provides a very fast and efficient search experience.

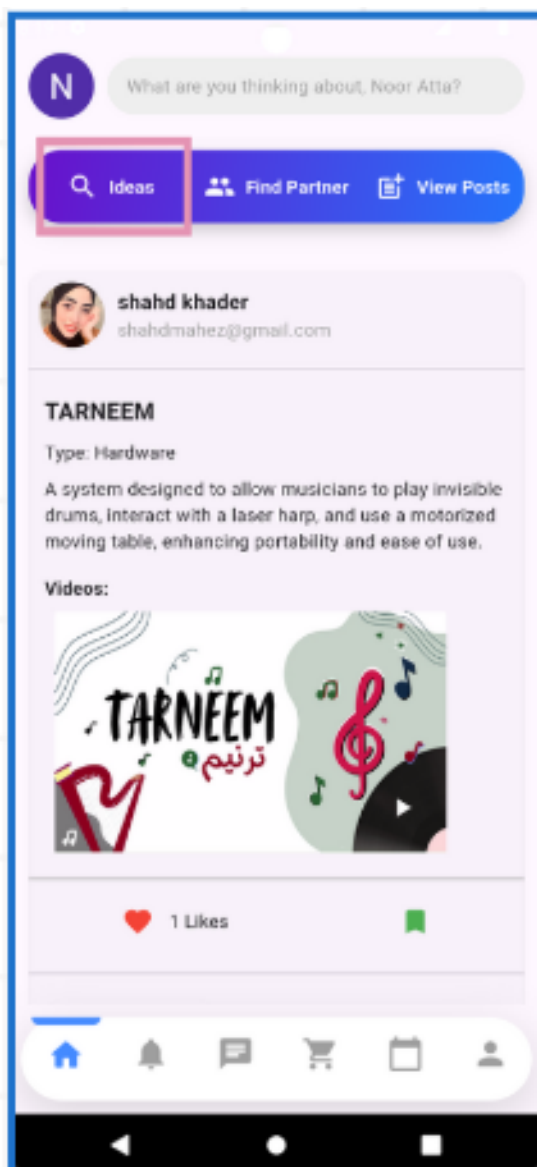


Figure 5.21: Search interface allowing users to input various criteria.

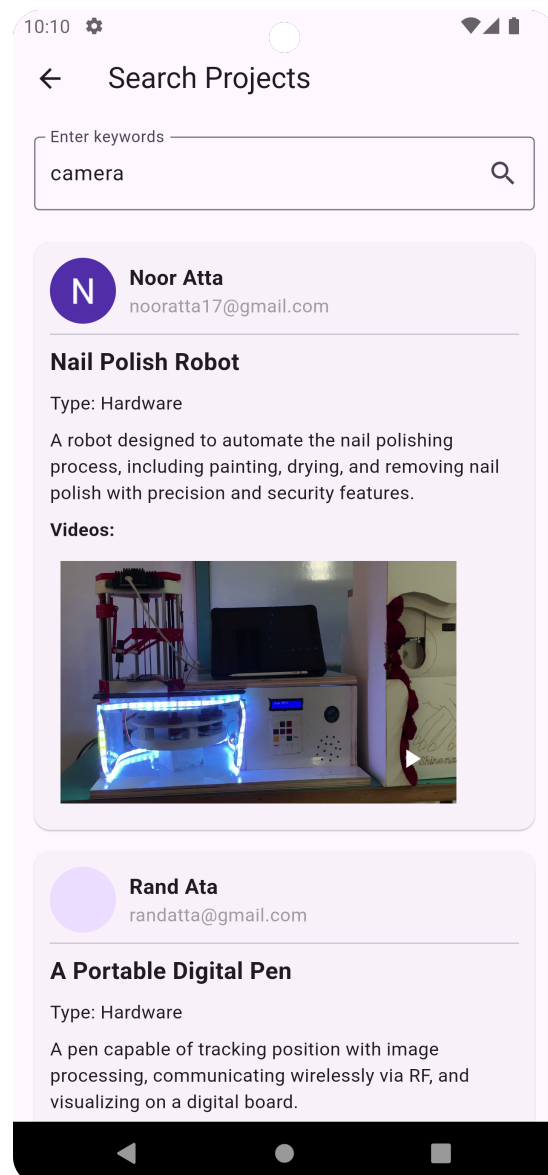


Figure 5.22: Search results displaying relevant projects.

1.5 Posting a Project

The user can publish their project on the Brain Box platform easily, but this process requires some steps in order to obtain all the necessary information that makes it a complete and detailed project that benefits others. Below is a detailed explanation of the process, accompanied by corresponding screenshots.

1. **Choosing the Post Type:** Users can choose between a normal post, a project (hardware or software), or a partner search post. For now, we explain the project posting process.

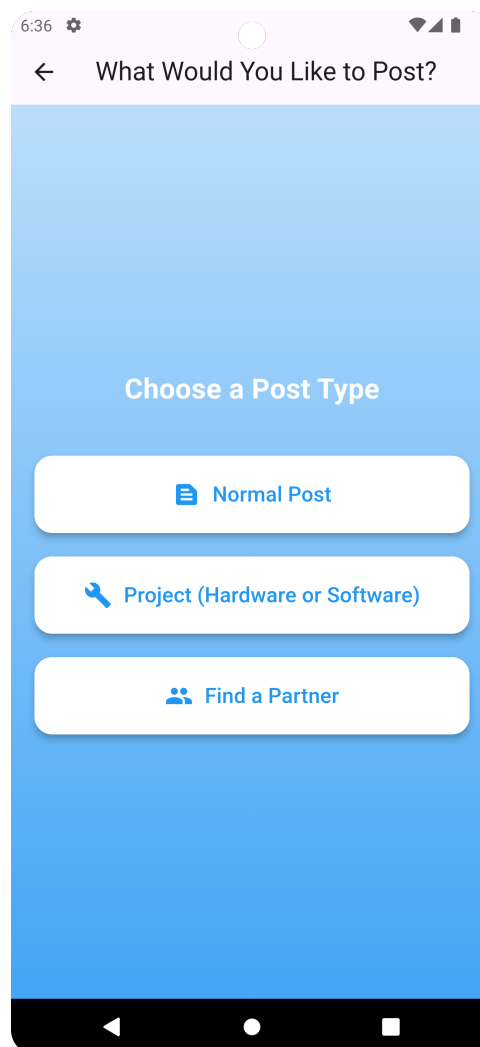


Figure 5.23: Selecting the post type.

2. **Filling Project Details - Basic Information:** Users are required to fill in details such as the project type, name, features, purpose, description, time spent working on the project, skills, technologies, and media.

The screenshot displays a mobile application interface for creating a new project. The title bar at the top shows the time 8:52 and various system icons. The main heading is 'Create New Project' with a back arrow. The form consists of several input fields: a dropdown menu for 'Subject' currently showing 'Graduation', a dropdown for 'Project Type', a text input for 'Project Name', a larger text area for 'Project Features', a text input for 'Purpose', a larger text area for 'Description', a text input for 'Time Spent (Hours)', a section for 'Skills (Select by Category)' with a dropdown menu showing 'Select a Skill Category', and a partially visible section for 'Technologies (Select by Category)'. A small instruction 'Please select a category to view skills.' is located below the skills dropdown. The bottom of the screen shows the standard Android navigation bar.

Figure 5.24: Entering basic project details.

3. Adding Skills and Technologies: Users can add skills and technologies associated with their project, helping define its expertise requirements.

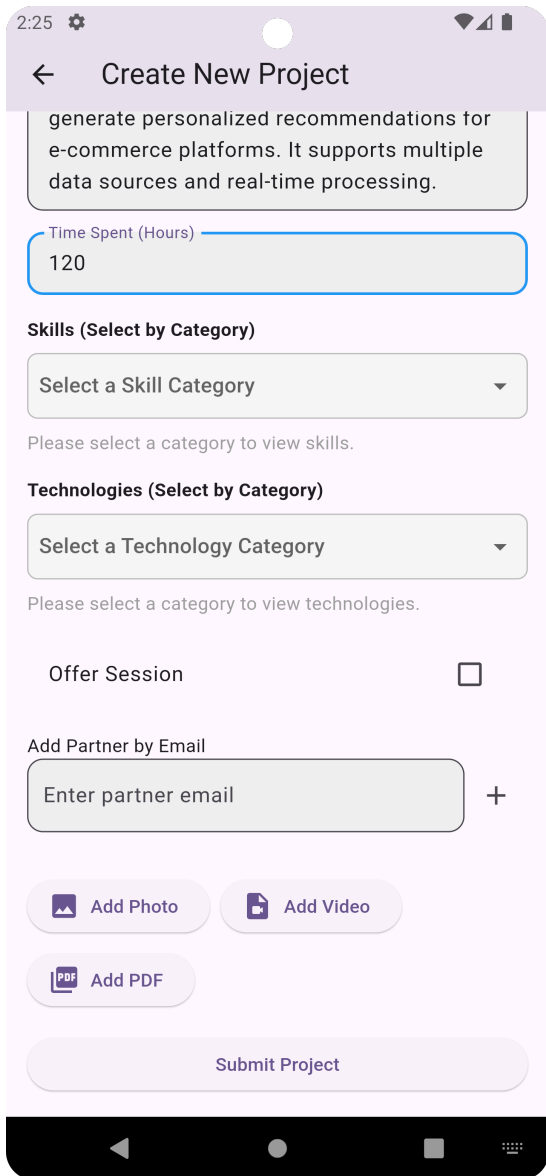


Figure 5.25: Adding skills required for the project.

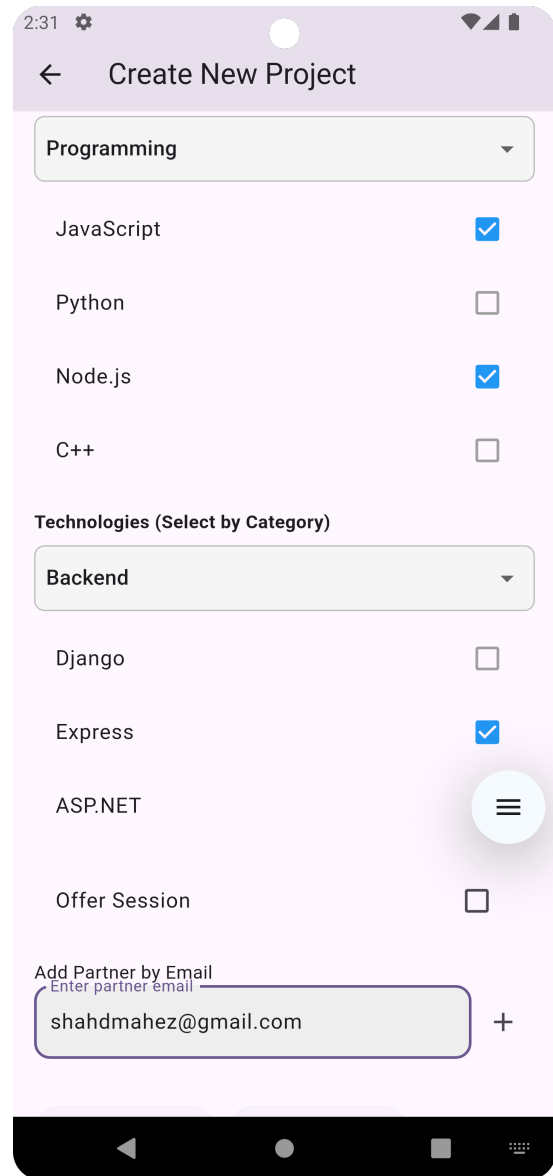


Figure 5.26: Adding technologies used in the project.

4. **Defining Offer Sessions, Adding Partners, and Uploading Media:** Users can specify whether they provide sessions for their project and if those sessions are paid or free. Additionally, they can upload media such as images, videos, or PDF files.

7:40 LTE

← Create New Project

Description

Time Spent (Hours)

Skills (Select by Category)

Select a Skill Category

Please select a category to view skills.

Technologies (Select by Category)

Select a Technology Category

Please select a category to view technologies.

Offer Session

Paid

Add Partner by Email

Enter partner email +

Add Photo Add Video Add PDF

Figure 5.27: Defining sessions, adding partners, and uploading media.

5.5.2 Normal Posts

2.1 Viewing Posts

The user can see regular posts, meaning that they are not a complete project. They may contain useful information, advice, or a few important codes. The user can also interact with these posts as with projects. He can like, comment, respond to comments, and more, as we explained previously.

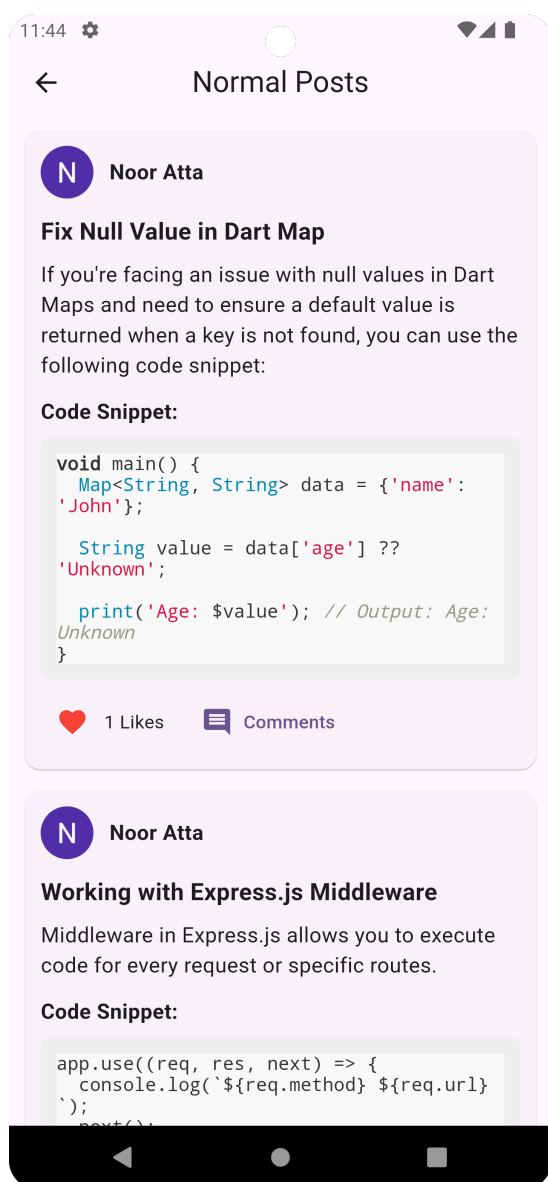


Figure 5.28: Viewing a post with a code snippet shared by Noor Ata.

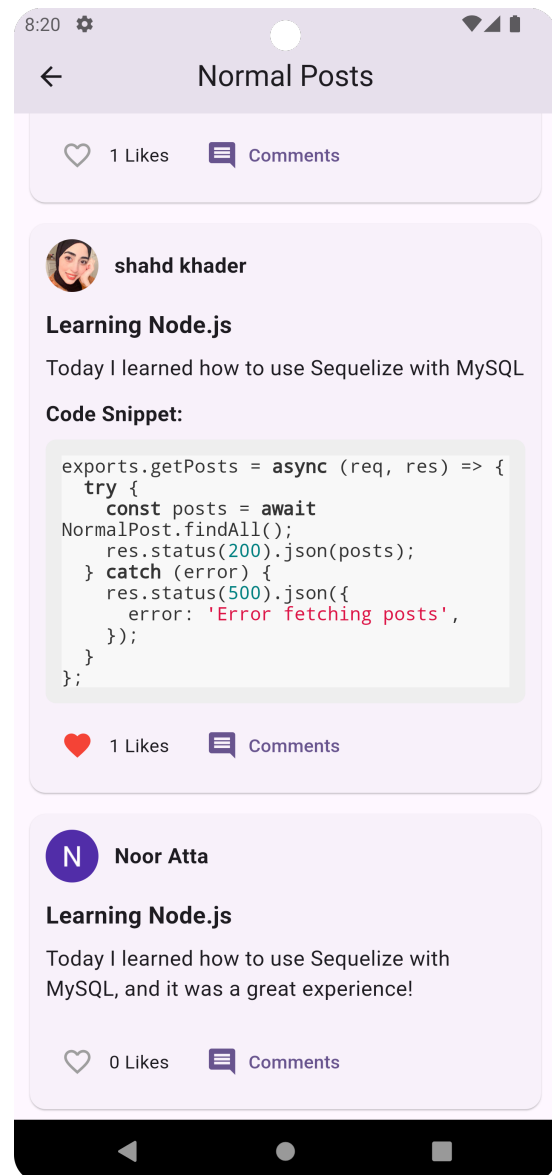


Figure 5.29: Another post shared by Shahd Khader with engagement options.

2.2 Creating a Post

Users can create posts by adding a title, content, and optional code snippets for added detail. This gives the user the ability to add normal post easily.

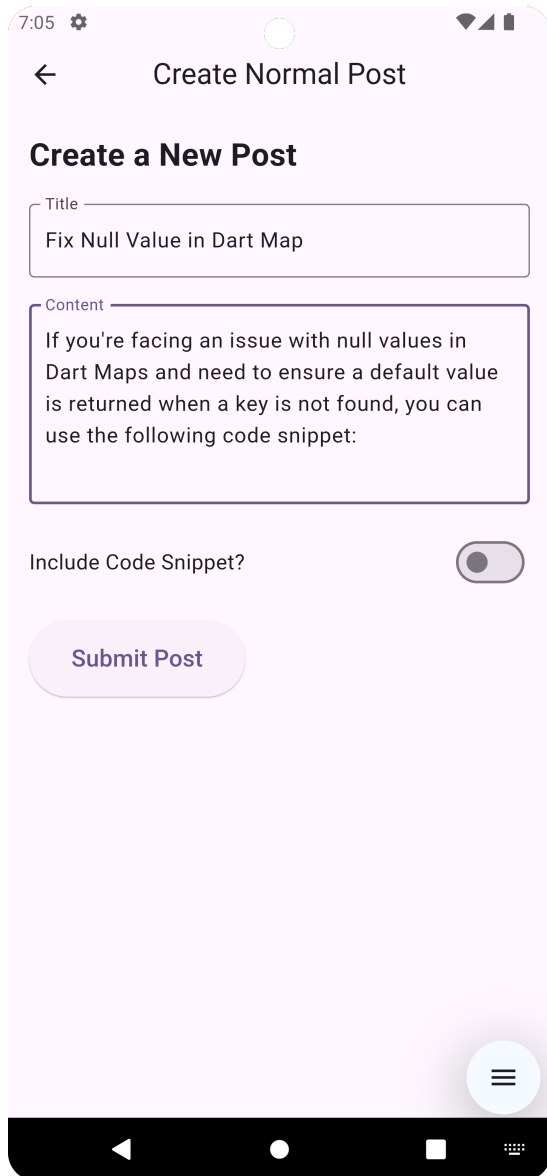


Figure 5.30: Creating a normal post with a title and content.

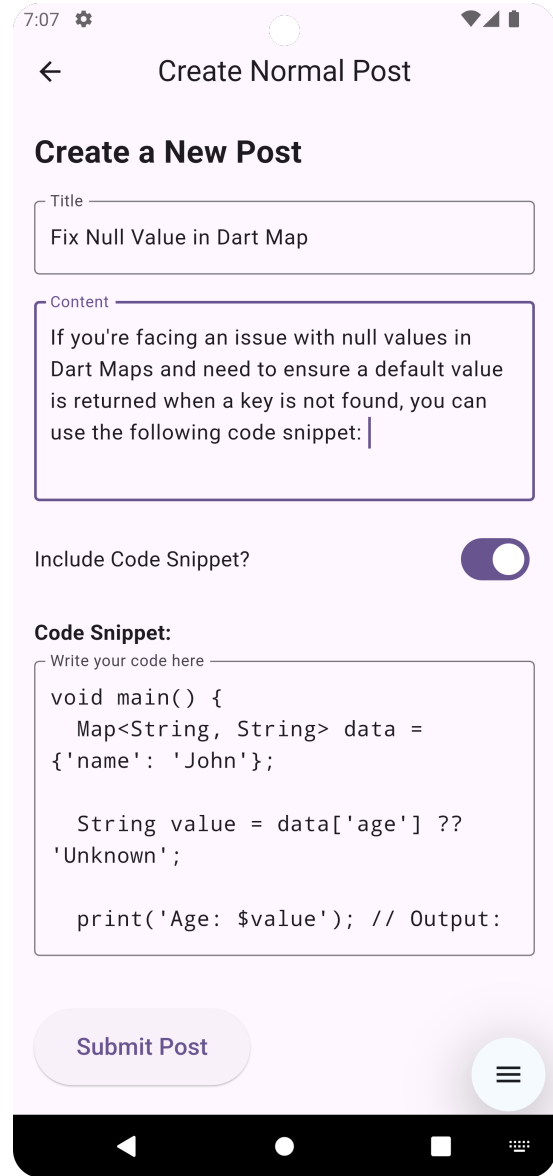


Figure 5.31: Adding a code snippet while creating a normal post.

5.5.3 Partners

The **Partners** section is dedicated to facilitating collaboration. It includes two primary parts: viewing projects that need partners and posting to find a partner.

2.1 View Projects Needing Partners

This feature allows users to see projects that require partners. Users can view description, required skills, and project goals. if he want to join this project he can click to send request and if the project owner accet him, he will add the project and the button status will change to Joined, Below are examples of the interface for viewing such projects:

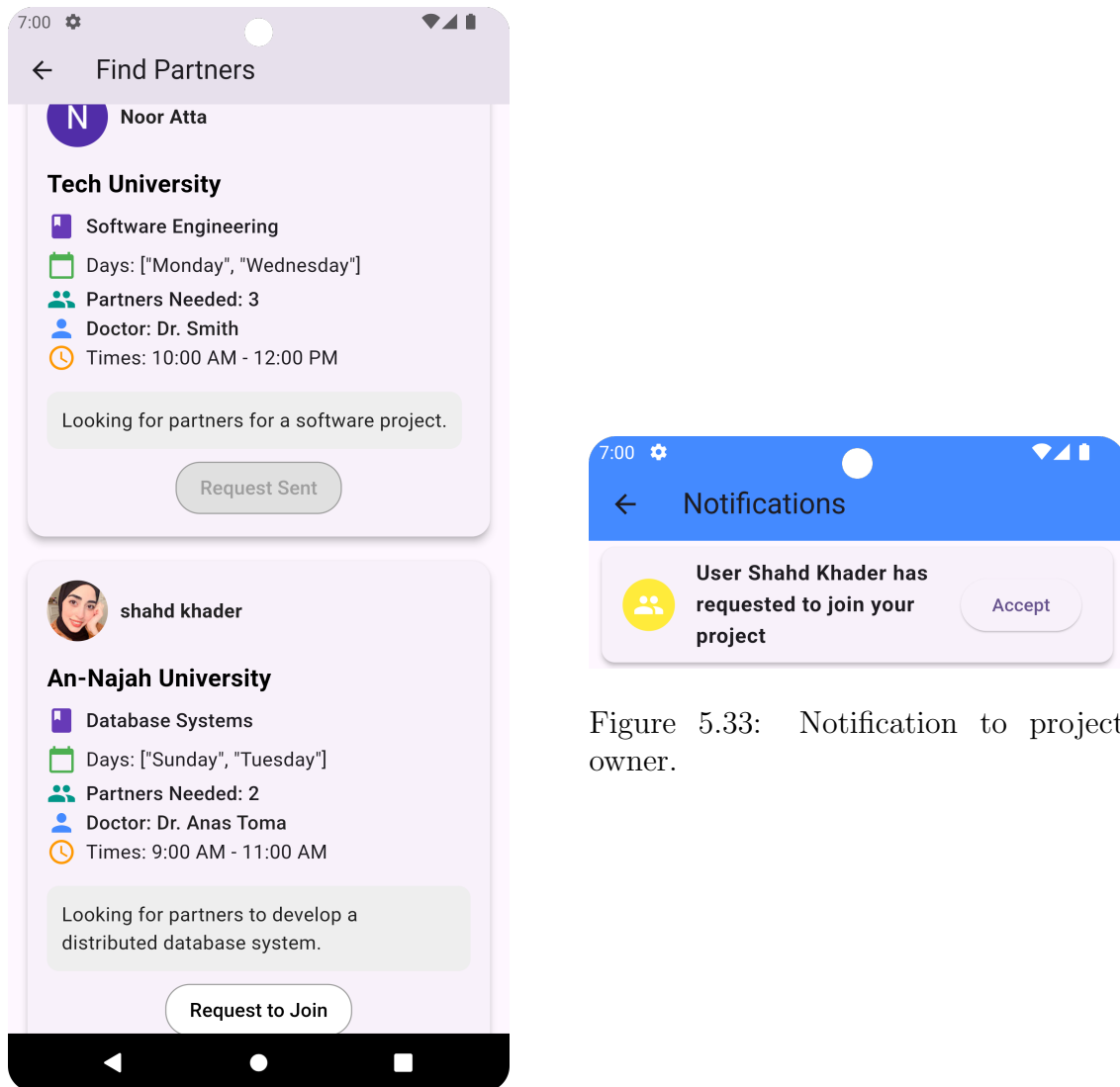
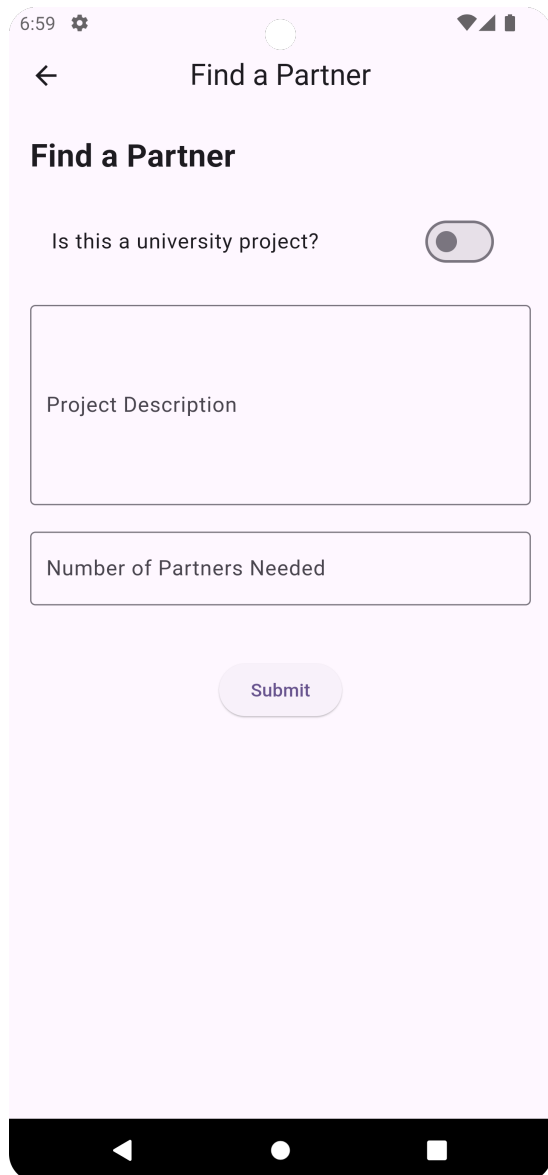


Figure 5.32: Project needing a partner.

Figure 5.33: Notification to project owner.

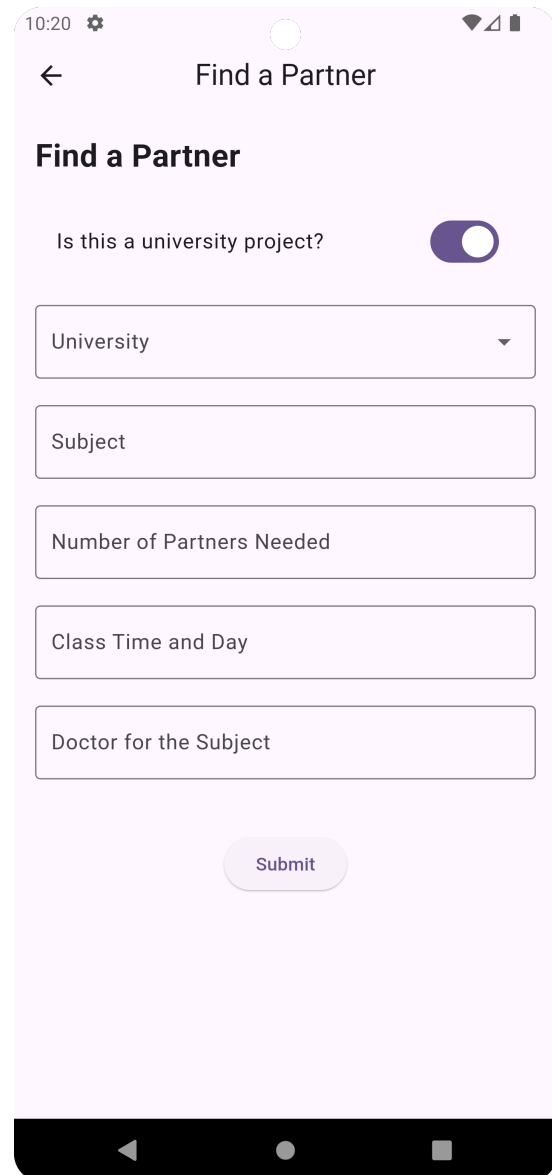
2.2 Post to Find Partner

This feature allows users to create posts to search for partners for their projects whether for the university or not. Users can specify the purpose of the project, the required skills and the expected roles. Here are examples of the interface to create such posts:



The screenshot shows a mobile application interface titled "Find a Partner". At the top left, there is a back arrow and the time "6:59". The title "Find a Partner" is centered at the top. Below the title, there is a toggle switch for "Is this a university project?" which is currently turned off. The form consists of three input fields: "Project Description", "Number of Partners Needed", and "Submit".

Figure 5.34: Posting to find a partner for a non university project .



The screenshot shows a mobile application interface titled "Find a Partner". At the top left, there is a back arrow and the time "10:20". The title "Find a Partner" is centered at the top. Below the title, there is a toggle switch for "Is this a university project?" which is currently turned on. The form consists of five input fields: "University" (a dropdown menu), "Subject", "Number of Partners Needed", "Class Time and Day", and "Doctor for the Subject". A "Submit" button is located at the bottom of the form.

Figure 5.35: Posting to find a partner for a university project.

5.6 Chat System

The **Chat System** in Brain Box provides seamless communication for users. It is designed to cater to various interaction needs through three main types: Private Chat, Groups, and Channels.

5.6.1 Private Chat

The Private Chat feature allows users to communicate one-on-one securely. It is ideal for personal or professional conversations, enabling users to share messages, files, and media directly with another user.

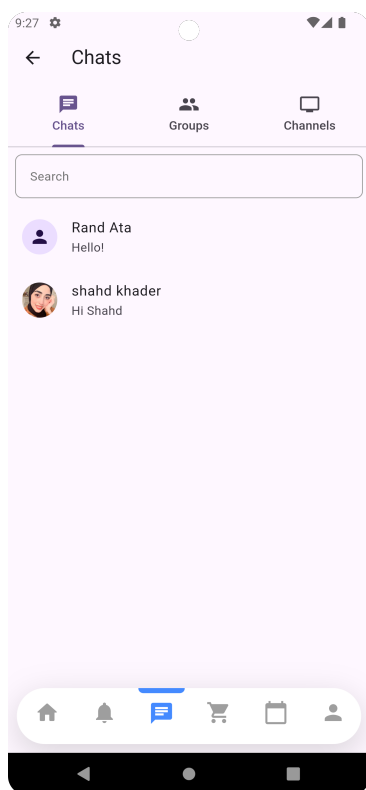


Figure 5.36: Private chat List.

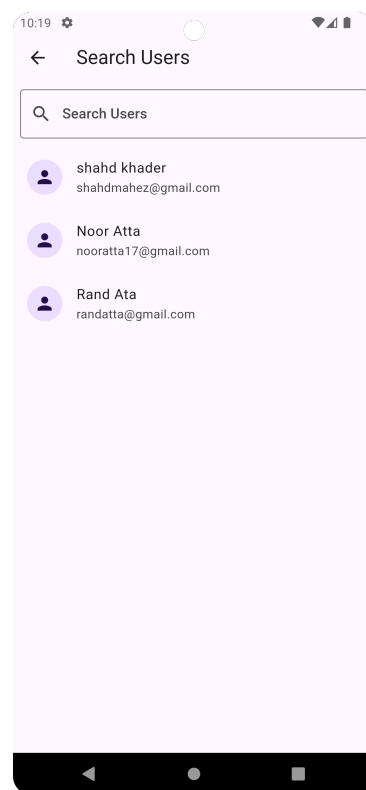


Figure 5.37: Private chat Search.

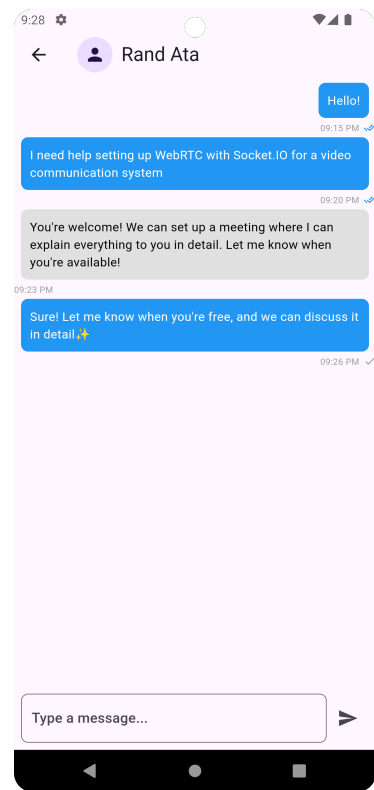


Figure 5.38: Private chat interface example.

5.6.2 Groups

The Groups feature supports collaborative discussions between multiple users. It is ideal for teams working on shared projects or study groups. Group members can send messages, share files, and conduct real-time discussions. Any user can create a group and add their friends to it,

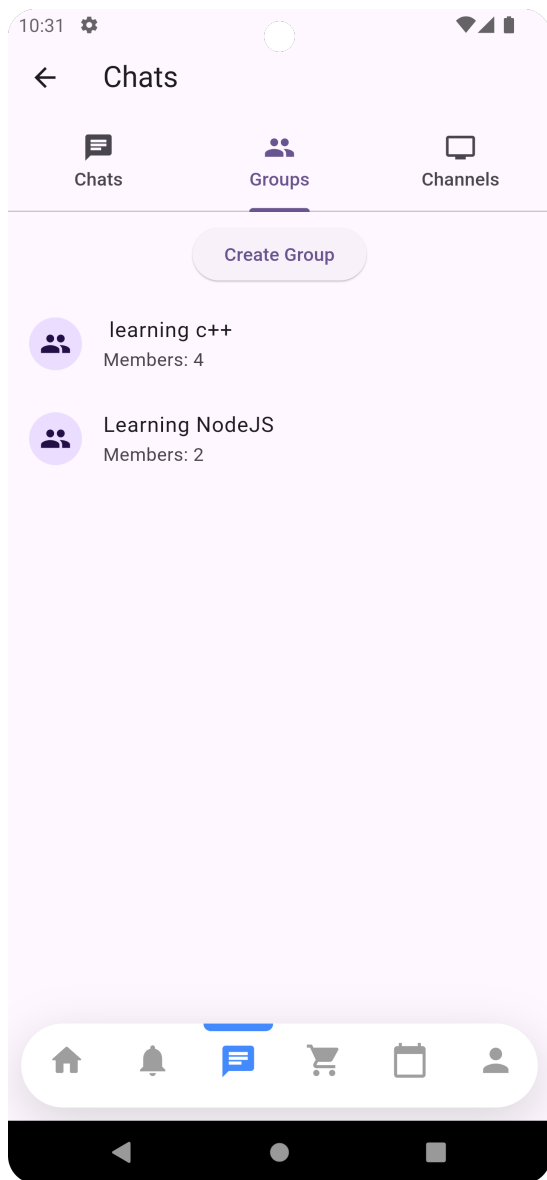


Figure 5.39: Group chat interface List.

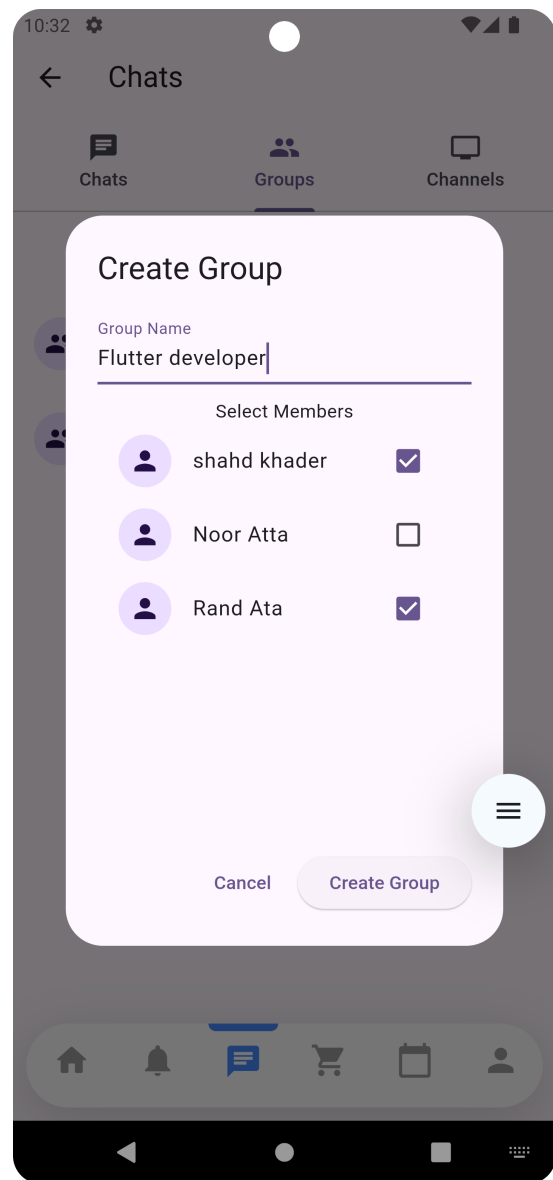


Figure 5.40: Create Group chat .

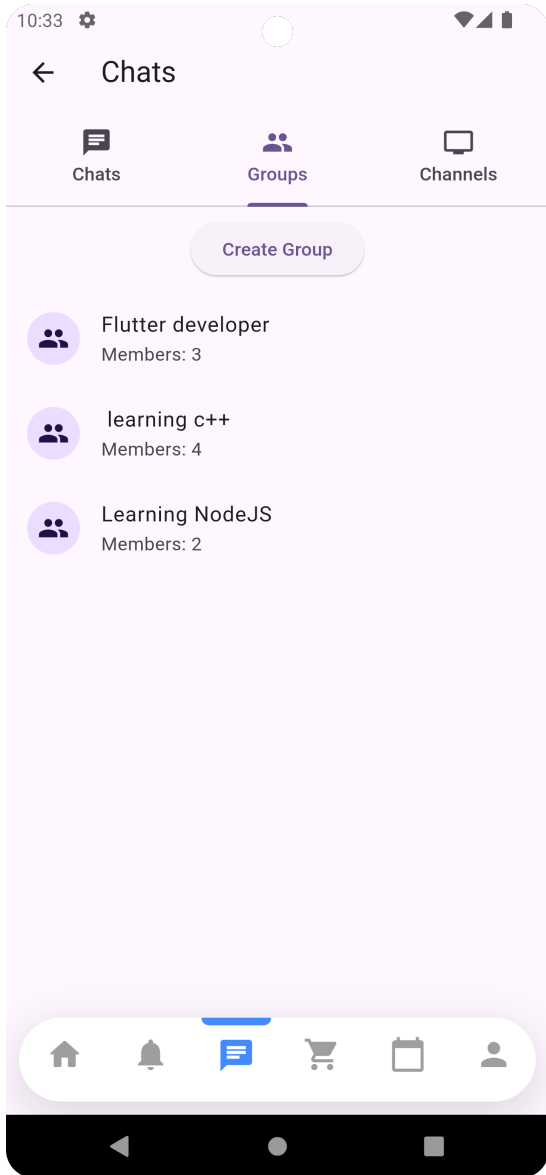


Figure 5.41: Group chat List after create new group.

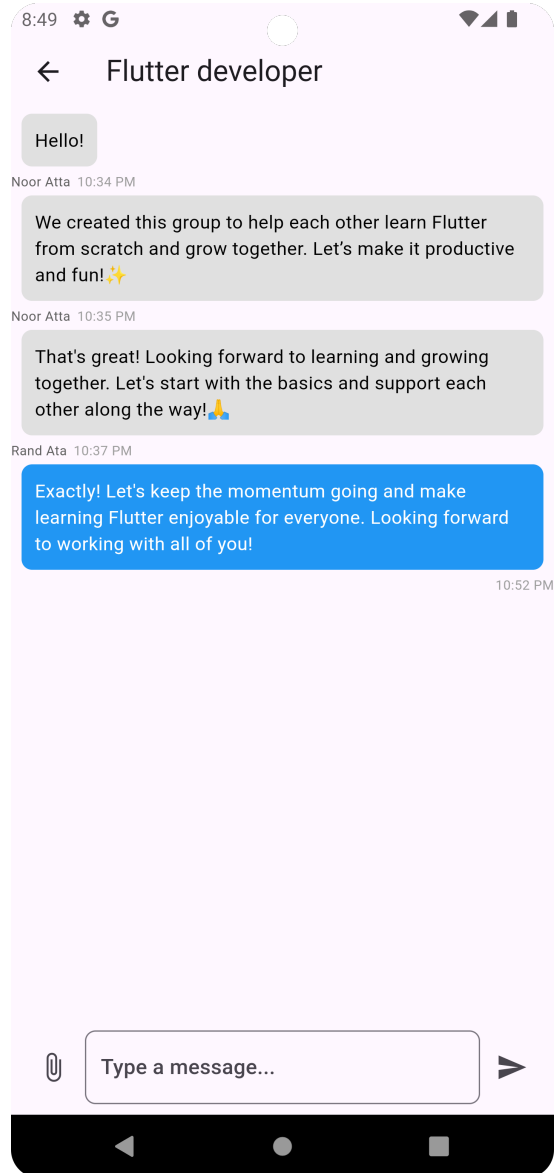


Figure 5.42: Group chat interface.

5.6.3 Channels

Channels are designed to broadcast messages to project owners. They are typically used for announcements, updates, or sharing information during the course of a project. Unlike groups, only authorized users can send messages in a channel, ensuring focused communication.

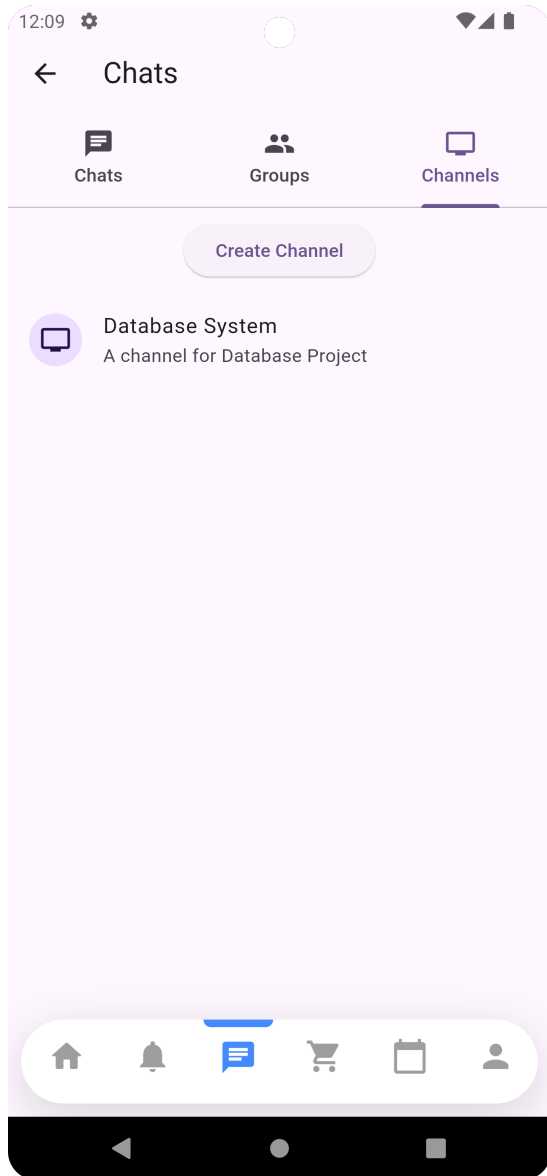


Figure 5.43: Channel interface example 1.

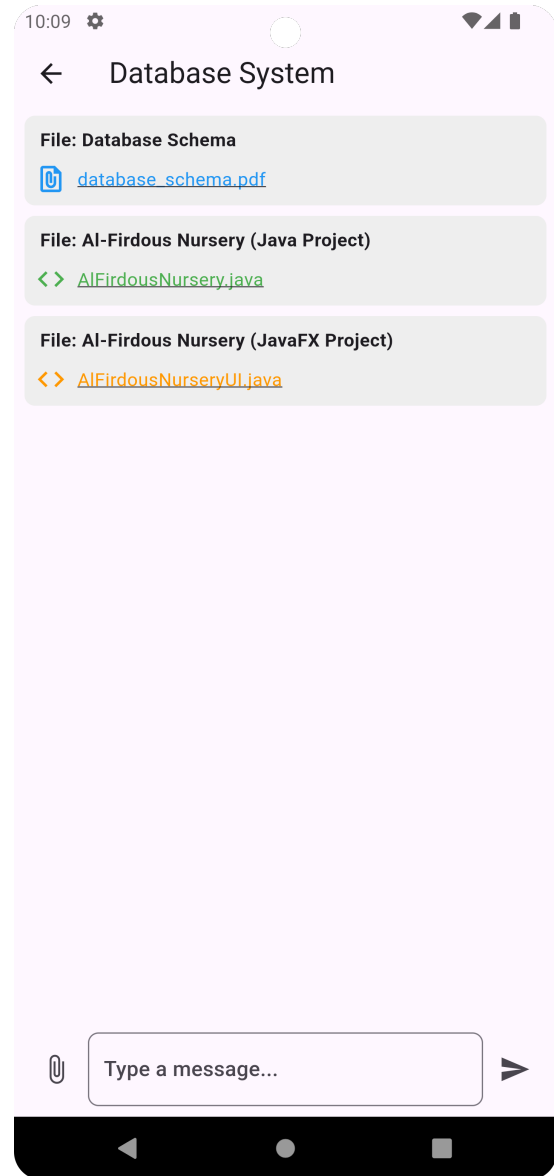


Figure 5.44: Channel interface example 2.

5.7 Marketplace

The Brain Box **Marketplace** allows users to buy and sell hardware components and other items at competitive and student-friendly prices. It provides an easy-to-use interface for managing listings, searching for items, and secure payment options.

5.7.1 Marketplace Page

The Marketplace Page is the main hub for exploring available items. Users can browse a wide variety of products, including hardware components, at competitive prices. Below are examples of the Marketplace interface:

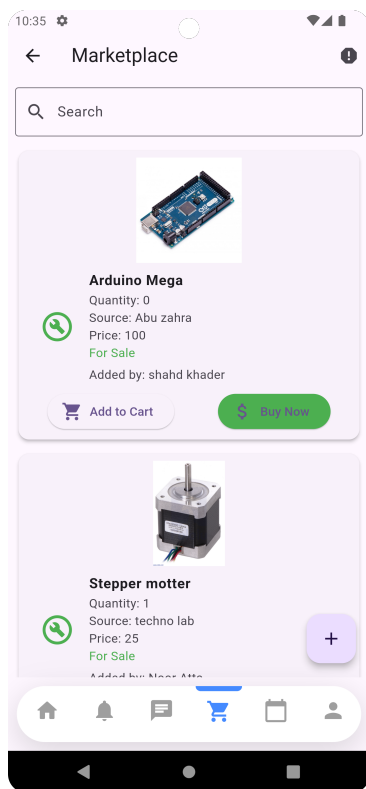


Figure 5.45: Marketplace main interface.

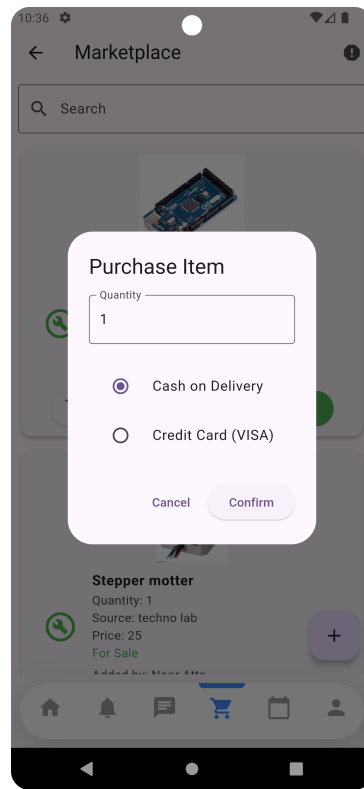


Figure 5.46: Purchase Item to the Marketplace.

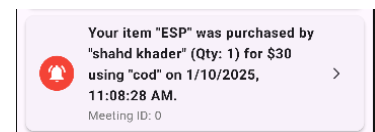


Figure 5.47: Notify the user that her item purchased.

5.7.2 Add Tool

Not only the items from the hardware projects for sale, Users can add her items for sale in the Marketplace by providing detailed information about the product, such as its name, description, price, and images. Below are examples of the Add Tool interface:

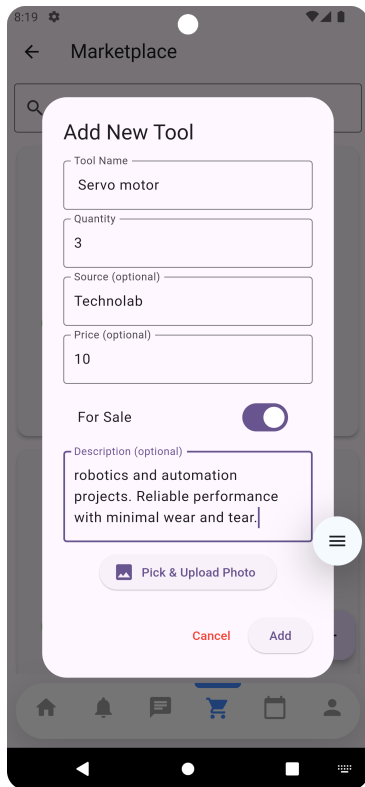


Figure 5.48: Add tool interface: Fill item details.

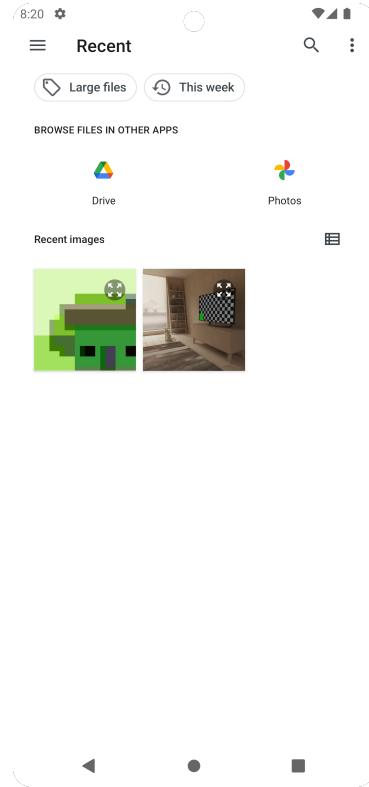


Figure 5.49: Add tool interface: Upload image.

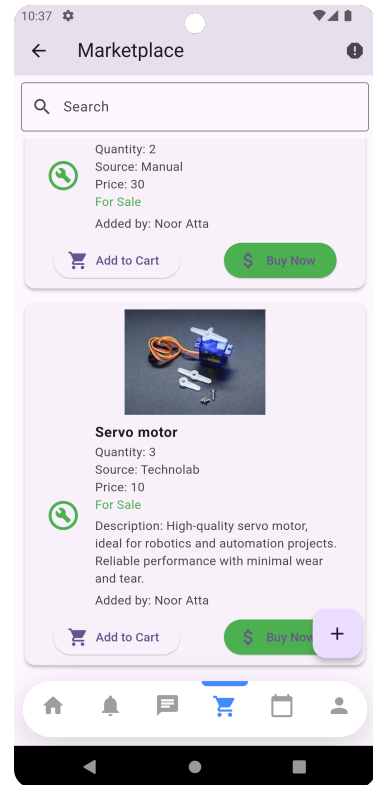


Figure 5.50: Add tool interface: Preview and save.

5.7.3 Payment

The Payment system in the Marketplace ensures secure and convenient transactions. Users can choose between two payment methods: Cash and Visa.

Cash Payment

Cash payment is a simple method where users complete the transaction in person or upon delivery. It is ideal for local transactions and does not require online payment processing.

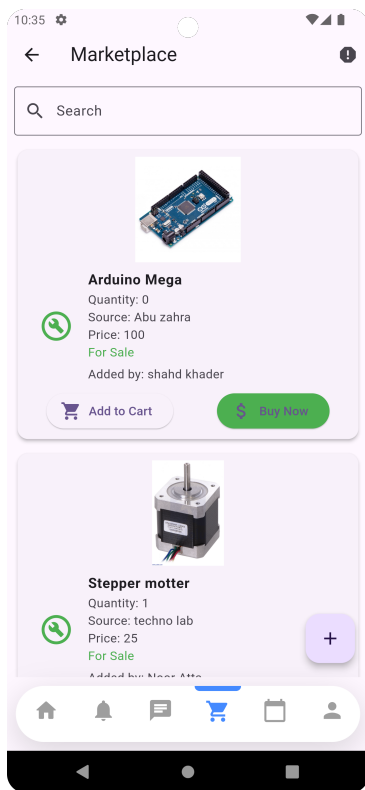


Figure 5.51: Cash payment: Select payment option.

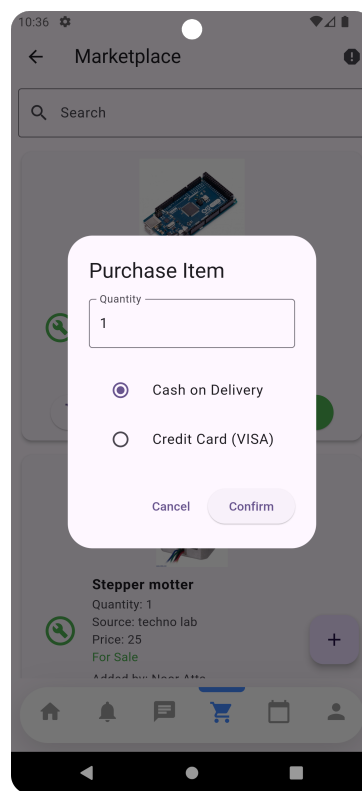


Figure 5.52: Cash payment: Confirmation.

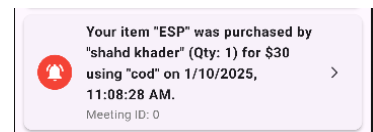


Figure 5.53: Cash payment: Notification to owner.

Visa Payment

Visa payment enables users to pay securely online through the integrated Stripe API. It supports multiple card types and ensures a smooth payment process.

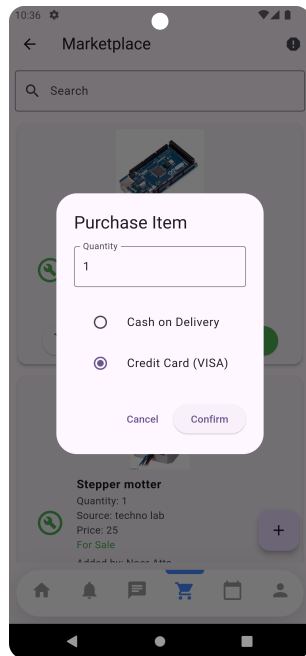


Figure 5.54: Visa payment: Select payment option.

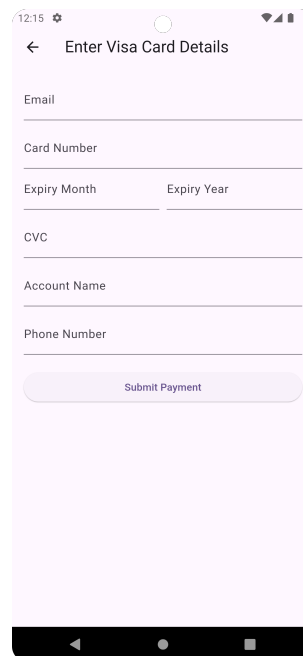


Figure 5.55: Visa payment: Enter card details.

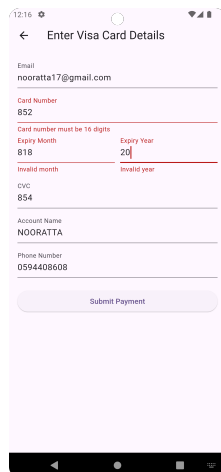


Figure 5.56: Visa payment: Payment processing.

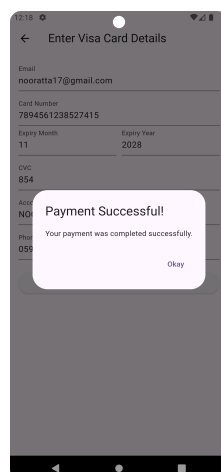


Figure 5.57: Visa payment: Payment successful.

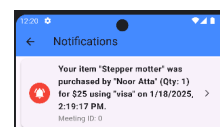


Figure 5.58: Visa payment: Notification to owner.

5.7.4 Complaint

The **Complaint system** allows users to report issues with items or transactions in the Marketplace. This feature provides a streamlined process for addressing user concerns, ensuring transparency and a high level of service quality.

Below are the steps for using the Complaint system:

Users can follow these steps to submit a complaint:

- **Select the item:** Users start by selecting the item or transaction they want to report. This ensures that the complaint is linked to the correct product or service.
- **Write the complaint:** In this step, users can clearly describe the issue they faced. This could include details about faulty items, incorrect transactions, or any other concern.
- **Submit the complaint:** Once the complaint is written, users can submit it through the interface. A confirmation message will appear, ensuring the complaint has been logged successfully.

Below are examples of the Complaint interface:

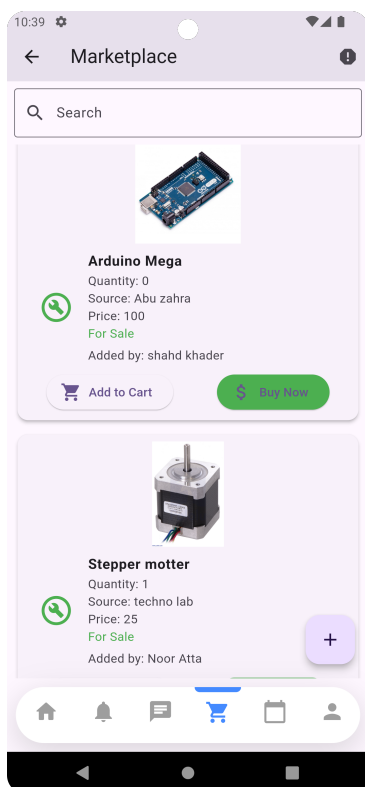


Figure 5.59: Complaint interface: Select item.

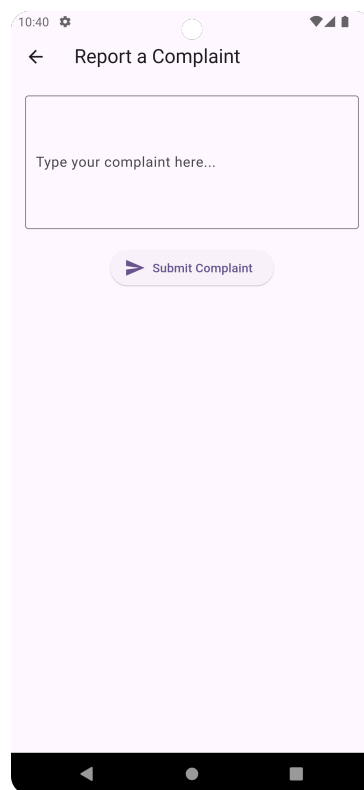


Figure 5.60: Complaint interface: Write complaint.

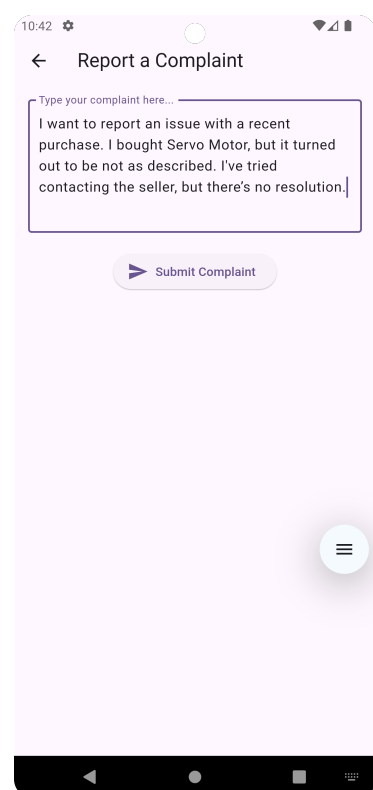


Figure 5.61: Complaint interface: Complaint submitted.

Once the complaint is submitted, the Marketplace administrators will review the issue and take the necessary actions. Users may receive updates on the status of their complaints through notifications. This ensures that users are informed and their concerns are addressed in a timely manner.

5.8 Meeting

The **Meeting** feature in Brain Box provides users with tools to manage, create, and join virtual meetings. It supports video communication, screen sharing, and other collaborative features for a seamless experience.

5.8.1 Meeting Management

The **Meeting Management** system in Brain Box provides users with tools to manage, create, and join virtual meetings. It supports two types of meetings:

- **Private Meetings:** These are meetings scheduled by the user for personal or group collaboration. Users can view their scheduled meetings, including the title, date, time, and participants.
- **Public Meetings:** These are open meetings created by others, which users can browse and join. Public meetings often focus on specific topics or general discussions.

The system offers features like editing, deleting, or joining meetings and displays details such as the meeting title, date, and time. Below are examples of the Meeting Management interface:

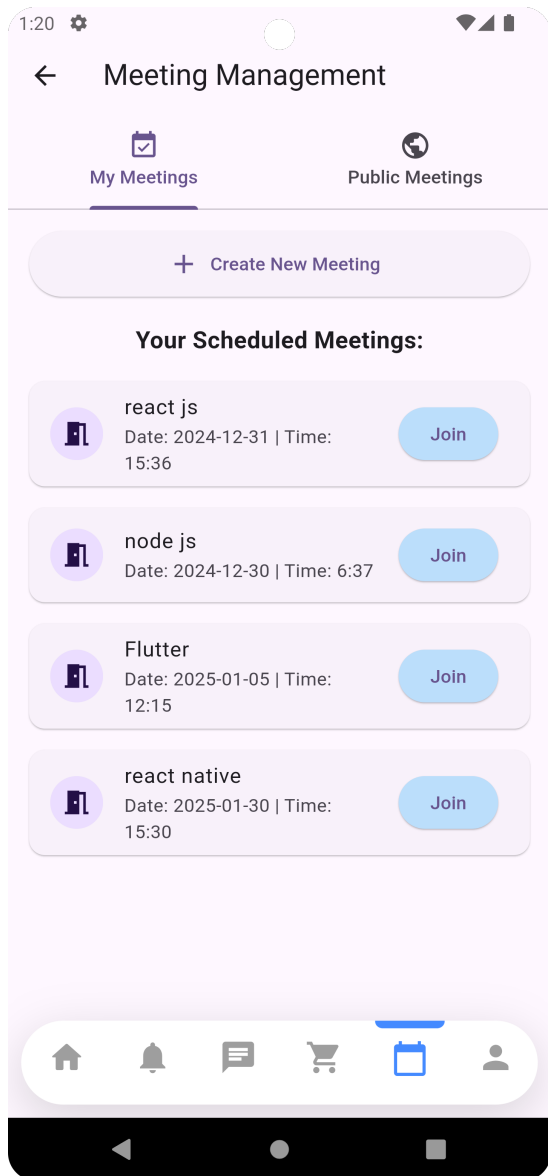


Figure 5.62: Meeting Management: Your scheduled (private) meetings.

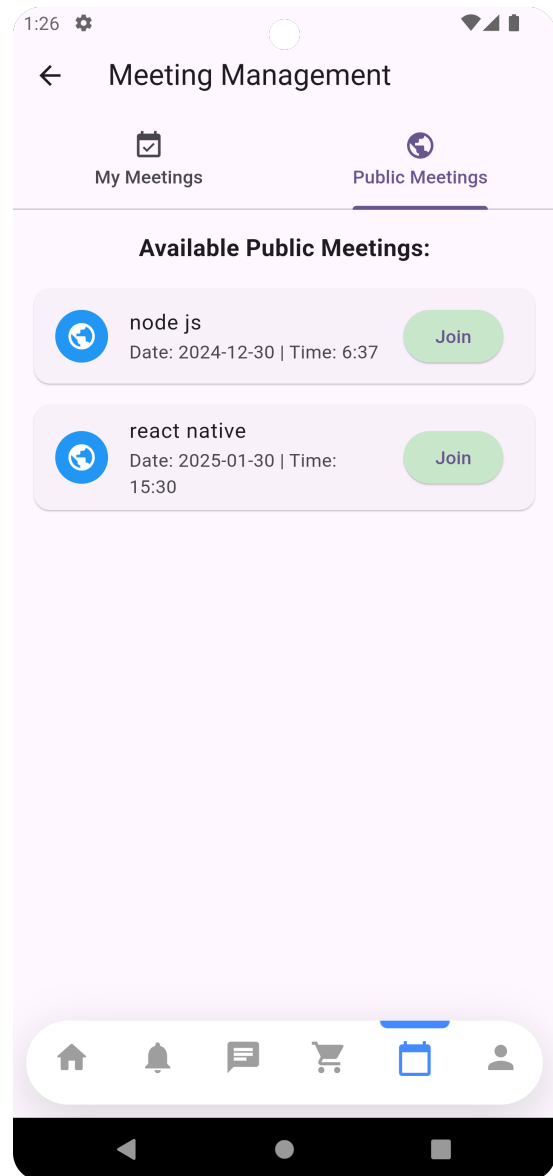


Figure 5.63: Meeting Management: Available (public) meetings.

By providing these features, the Meeting Management system facilitates efficient collaboration and engagement among users.

5.8.2 Create a Meeting

The **Create a Meeting** feature allows users to schedule new meetings by specifying essential details and customizing options. Users can:

- Add a title for the meeting.
- Set the meeting as public or private.
- Pick the date and time using an intuitive calendar and time picker interface.
- Add participants for private meetings.
- Receive notifications for updates or additions to meetings.

The following examples illustrate the steps for creating a meeting:

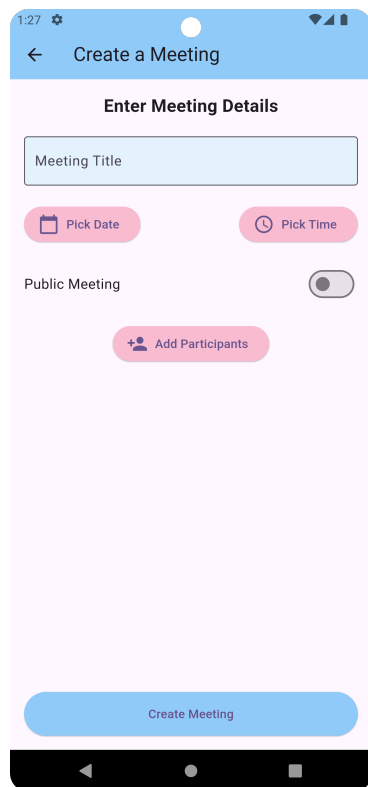


Figure 5.64: Enter meeting details: Add title and options.

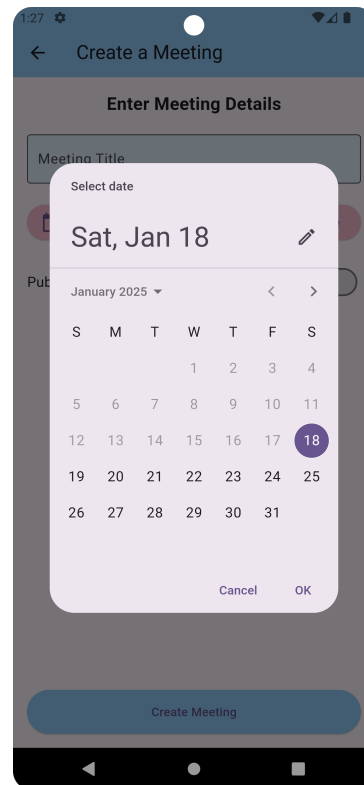


Figure 5.65: Pick a date using the calendar interface.

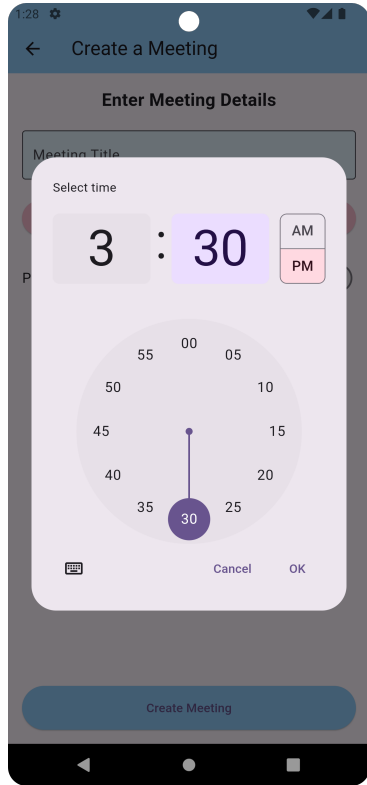


Figure 5.66: Pick a time using the time picker.



Figure 5.67: Add participants for private meetings.

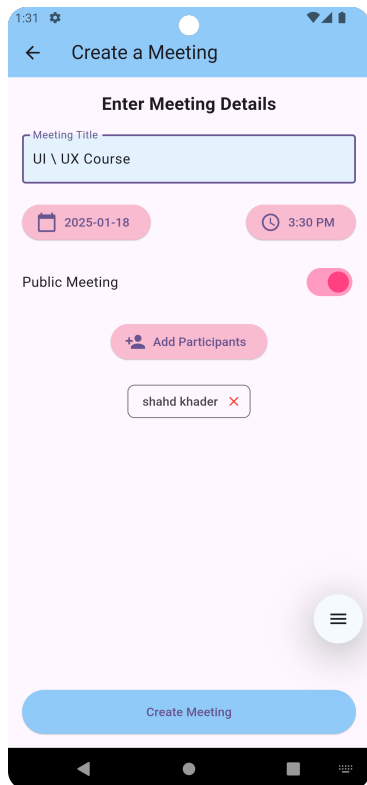


Figure 5.68: View scheduled meetings (private).

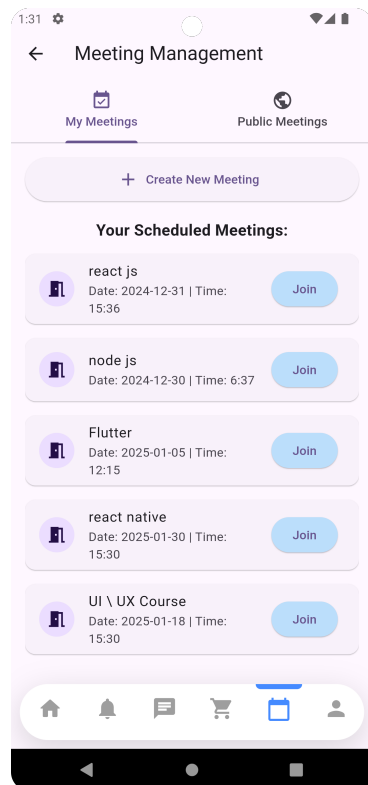


Figure 5.69: View that the meeting added successfully.

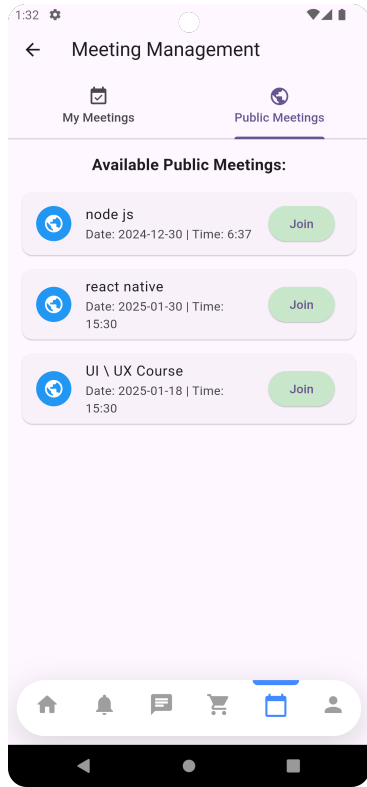


Figure 5.70: The meeting added to the Public meeting.

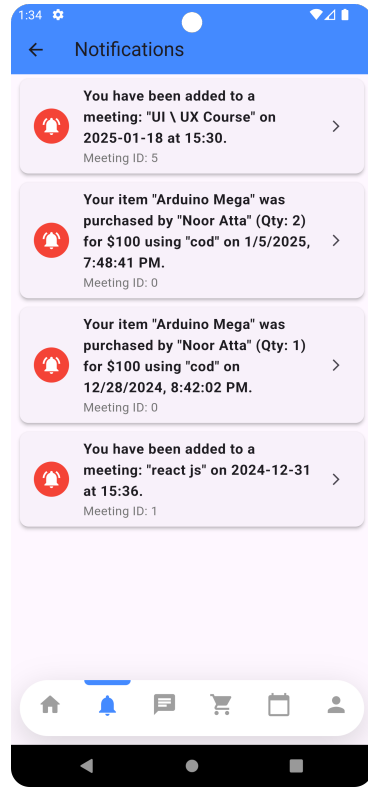


Figure 5.71: Notification for being added to a meeting.

5.8.3 Join a Meeting

The **Join a Meeting** feature allows users to participate in scheduled or public meetings effortlessly. Users can access the meeting by selecting it from their scheduled meetings or public meeting list. They can also enter a meeting password for private meetings, ensuring a secure and controlled environment. The feature supports seamless video and audio communication, enabling collaboration in real-time.

Below are examples of the Join a Meeting interface:

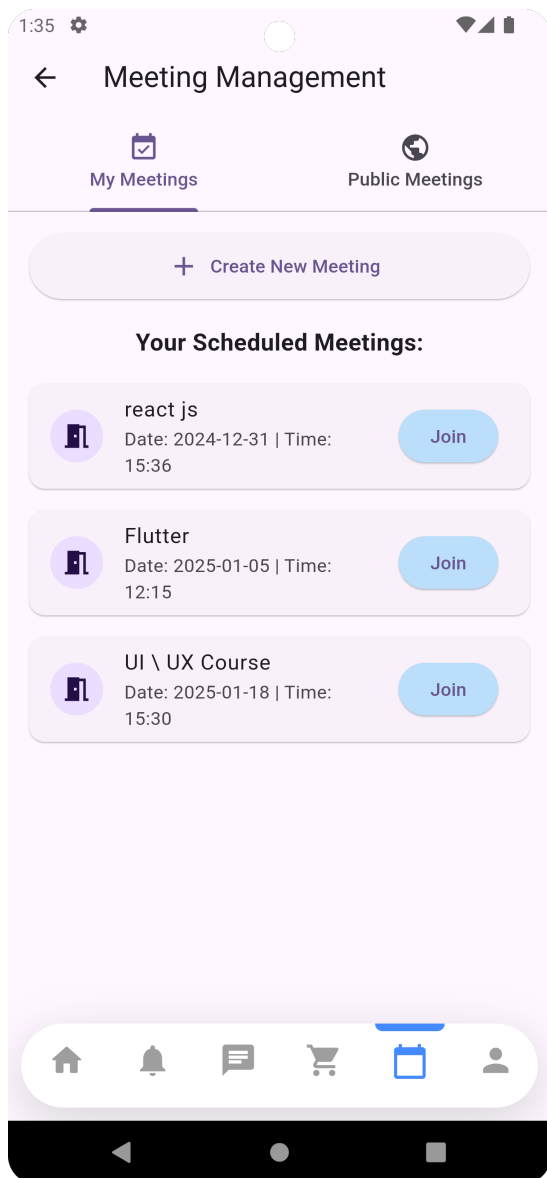


Figure 5.72: View scheduled meetings and join a meeting.

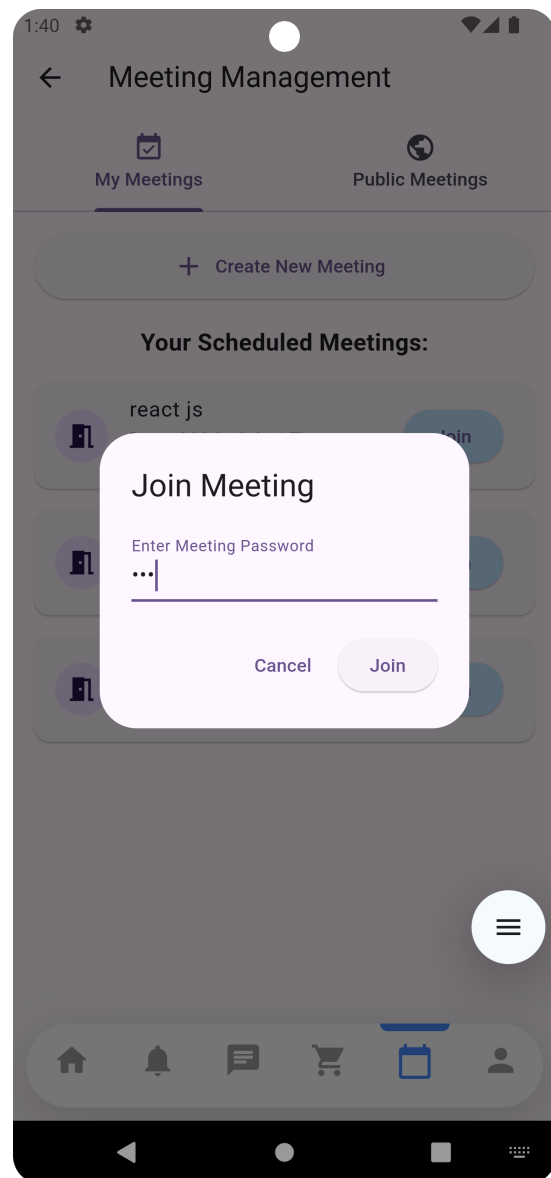


Figure 5.73: Enter meeting password for private meetings.

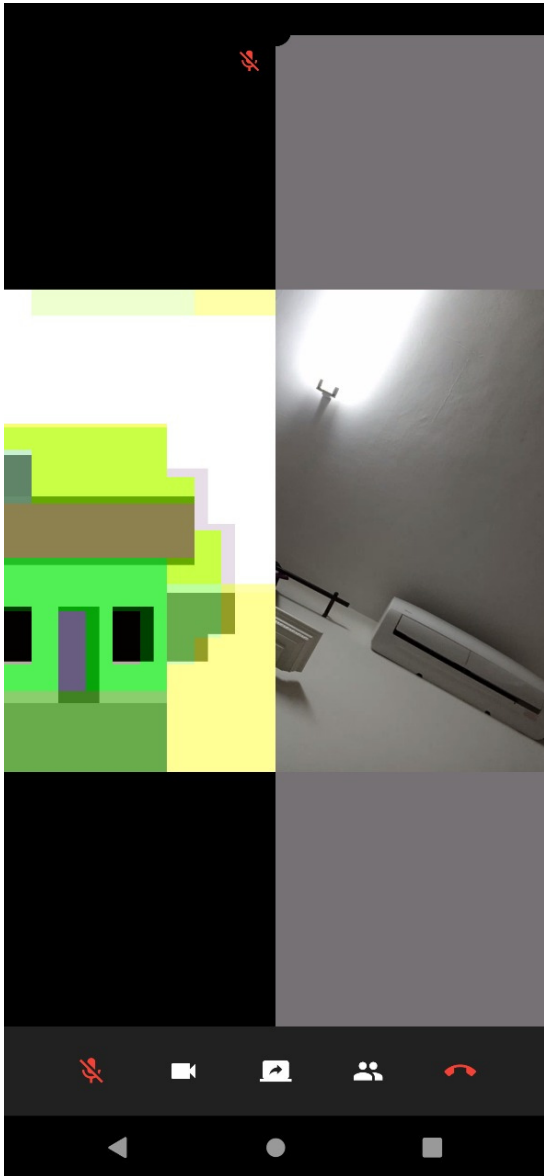


Figure 5.74: Active meeting with video and audio controls.

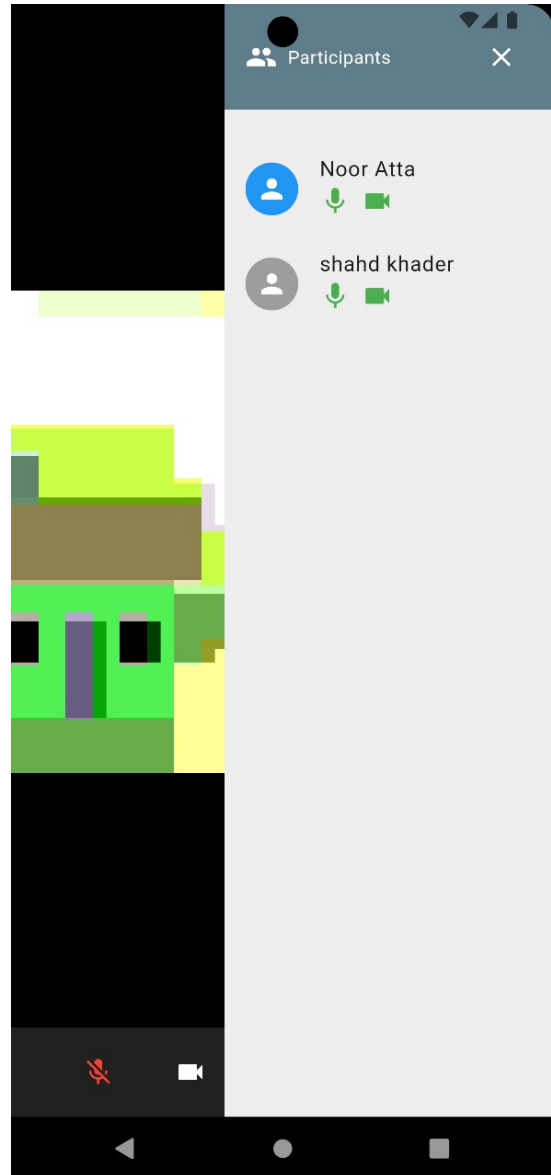


Figure 5.75: Participants list during the meeting.

```
A user connected: sqpdt5Mi0JcEqGmhAAAD
User sqpdt5Mi0JcEqGmhAAAD joined room e97a52ce72a4 as Me
A user connected: mEVYU0muG-0cLTF9AAAF
User mEVYU0muG-0cLTF9AAAF joined room e97a52ce72a4 as shahd khader
Offer received: {
```

Figure 5.76: Meeting additional details.

5.9 Profile Page

The **Profile Page** in Brain Box provides users with a personalized interface to manage their activity, connections, and account settings. It includes the following key features:

5.9.1 Liked and Saved Projects

This section displays all the projects that the user has liked or saved for future reference. Users can quickly access these projects, interact with them, or remove them from the list. Below are examples of the interface for Liked and Saved Projects:

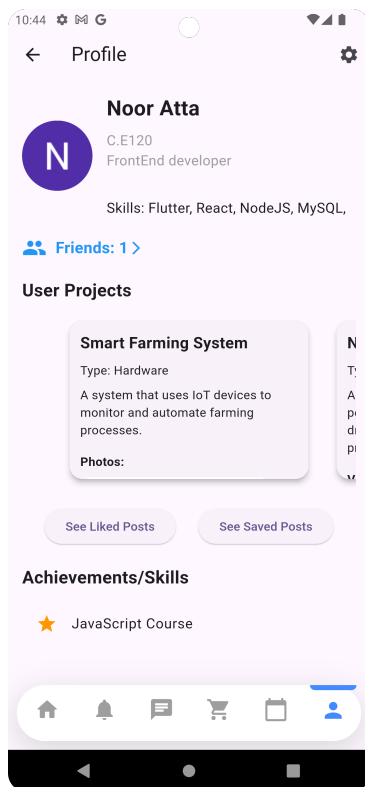


Figure 5.77: My profile page.

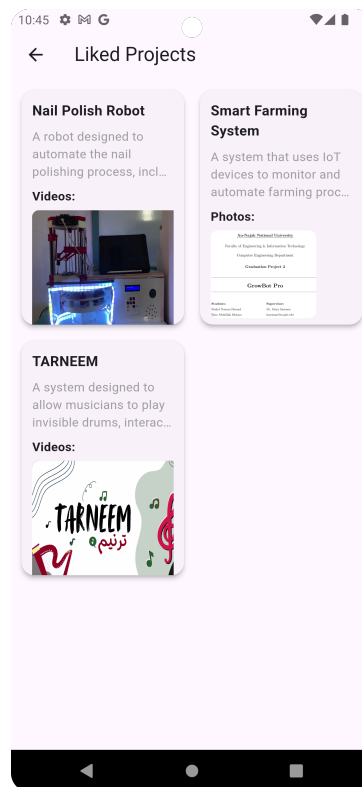


Figure 5.78: Liked projects interface.

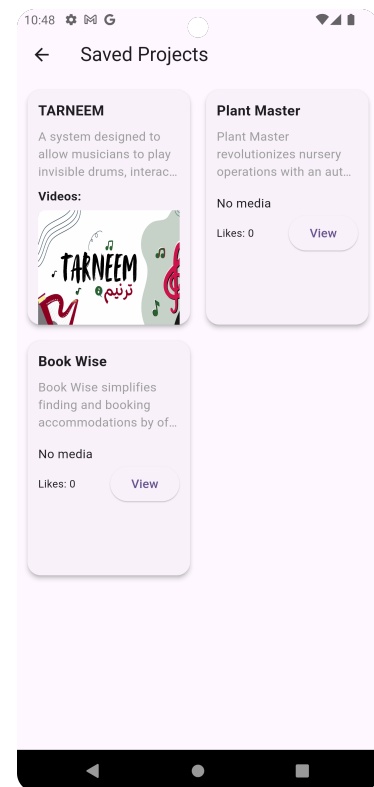


Figure 5.79: Saved projects interface.

5.9.2 Friends List

The Friends List feature allows users to view their connections. They can see friend profiles, remove connections, or send messages directly from this list. Below are examples of the Friends List interface:

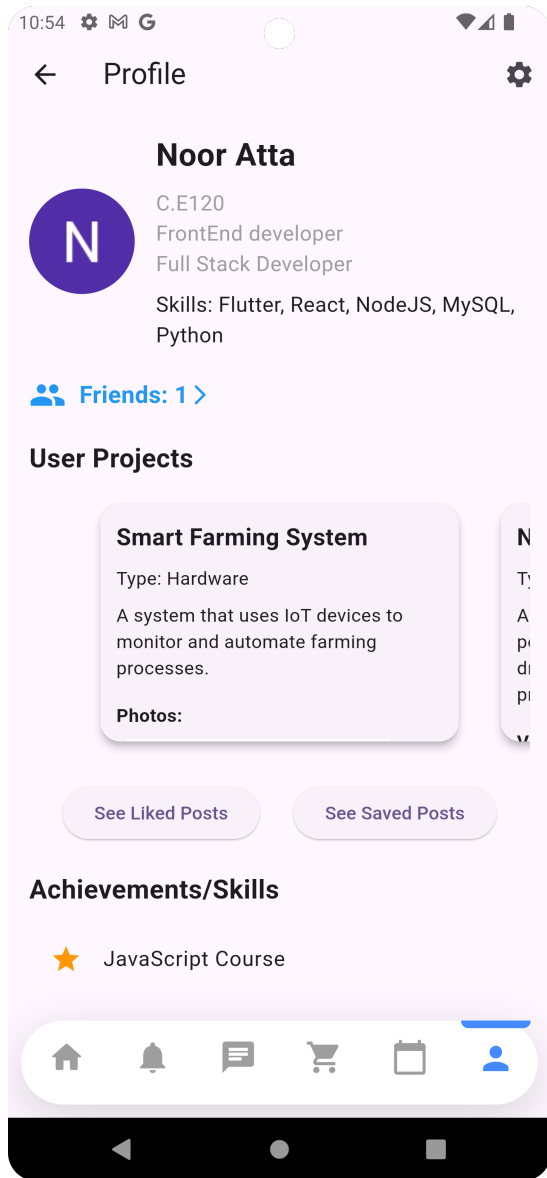


Figure 5.80: Friends list overview.



Figure 5.81: Friend profile details.

5.9.3 Settings

The Settings section provides options for users to customize their profiles and manage their accounts. It includes the following features:

Edit Profile

The Edit Profile feature allows users to update their personal information, such as their username, profile picture, bio, and other account details. Below are examples of the Edit Profile interface:

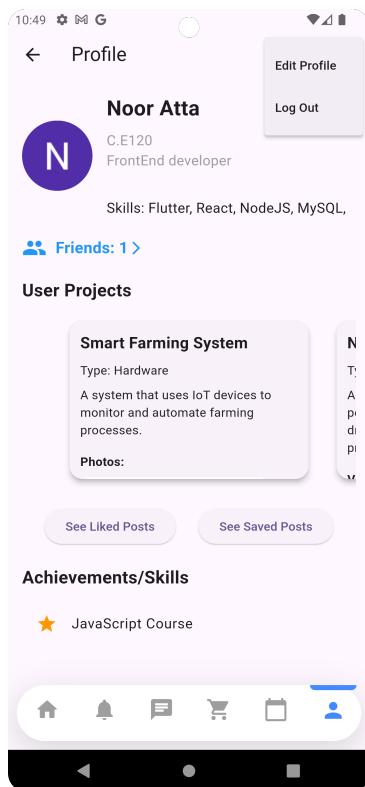


Figure 5.82: Edit profile - Update skills.

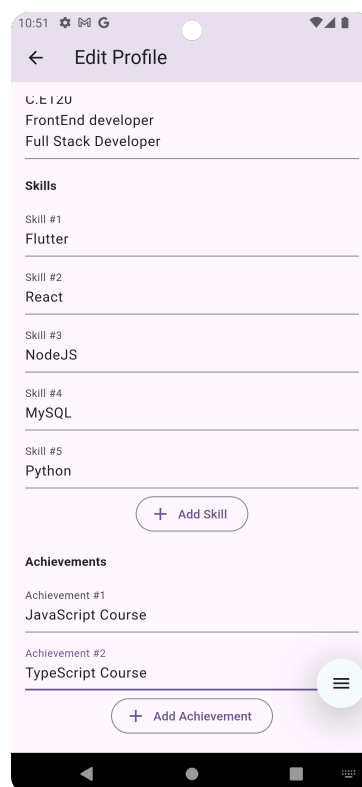


Figure 5.83: Edit profile - Add skills.

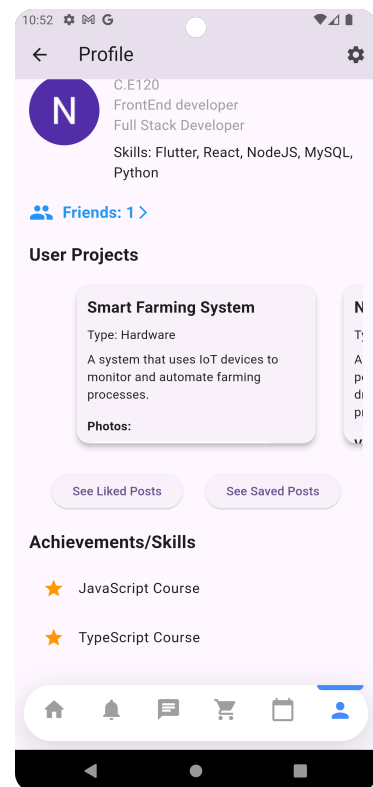


Figure 5.84: Edit profile - Save changes.

Logout

The Logout feature allows users to securely log out of their accounts. It ensures session termination and prevents unauthorized access. Below are examples of the Logout interface:

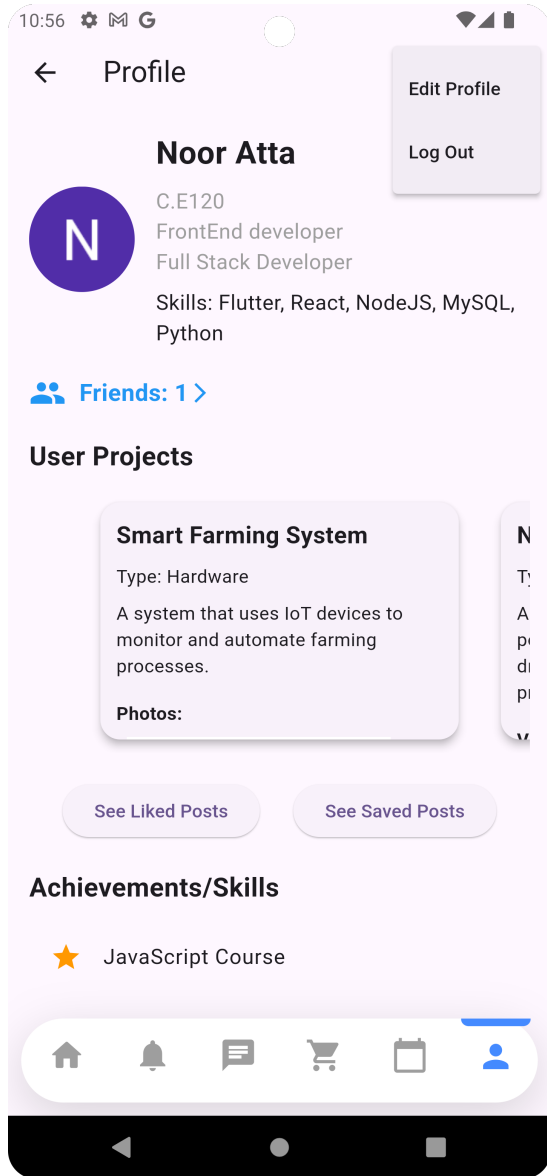


Figure 5.85: Logout confirmation prompt.

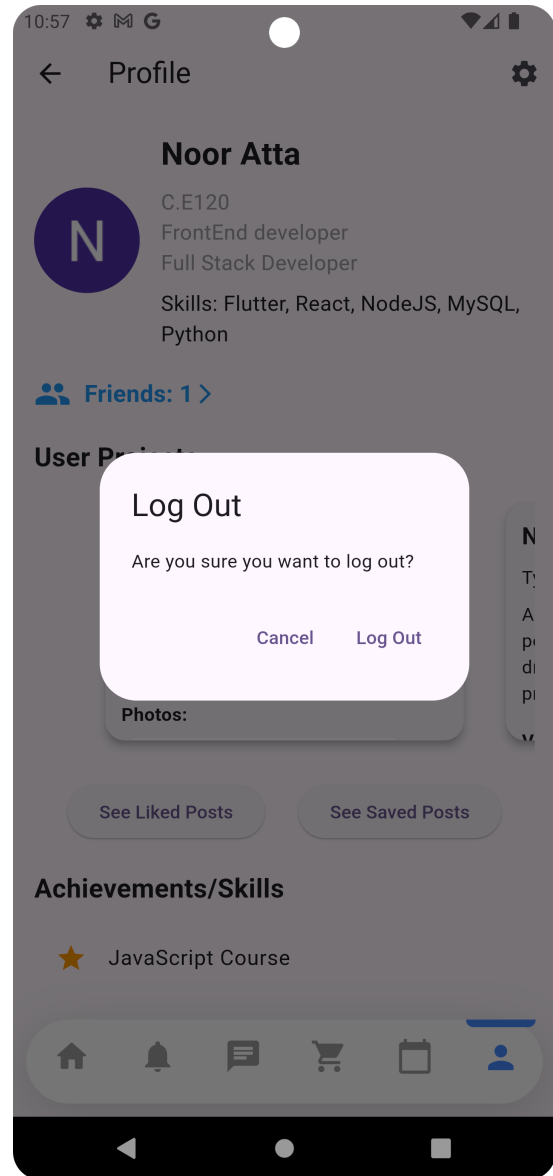


Figure 5.86: Logout completed screen.

Forget Password

The **Forget Password** feature allows users to securely recover their accounts by resetting their password through a simple step-by-step process. Users are required to provide their registered email address, verify their identity through a code sent to their email, and set a new password. This ensures account security while providing an easy recovery option. Below are examples of the interface for the Forget Password feature:

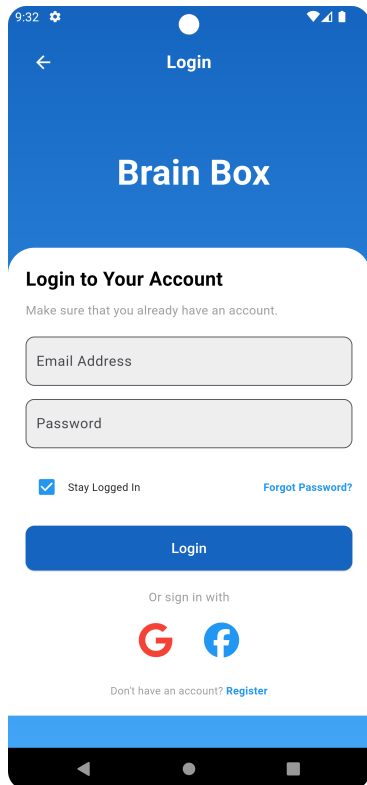


Figure 5.87: Choose Forget password.

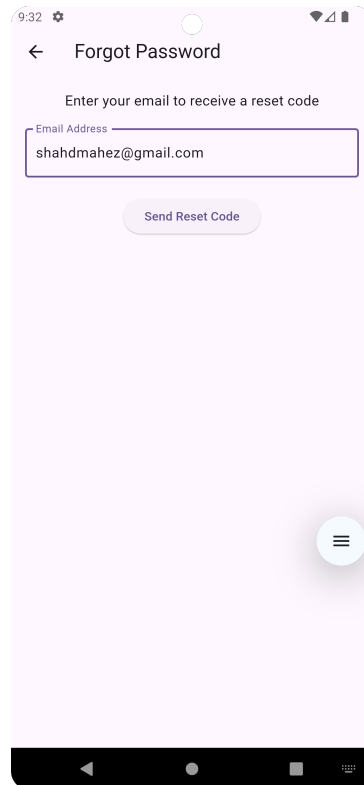


Figure 5.88: Forget password: Verify email.

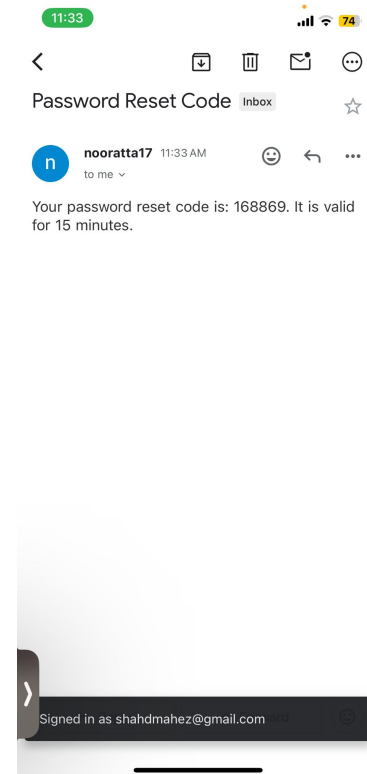


Figure 5.89: Forget password: Verification code received.

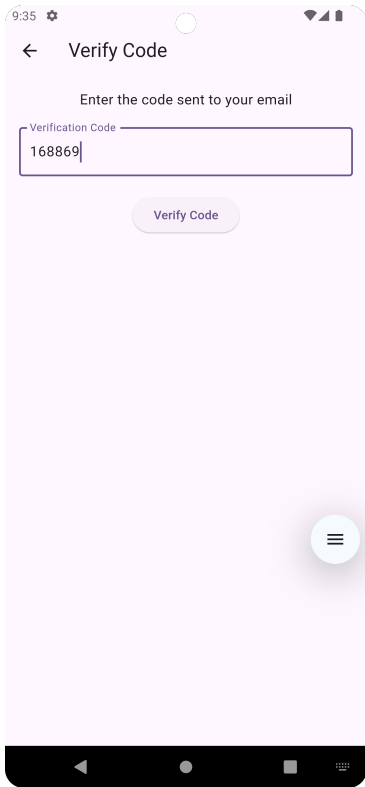


Figure 5.90: Forget password: Enter verification code.

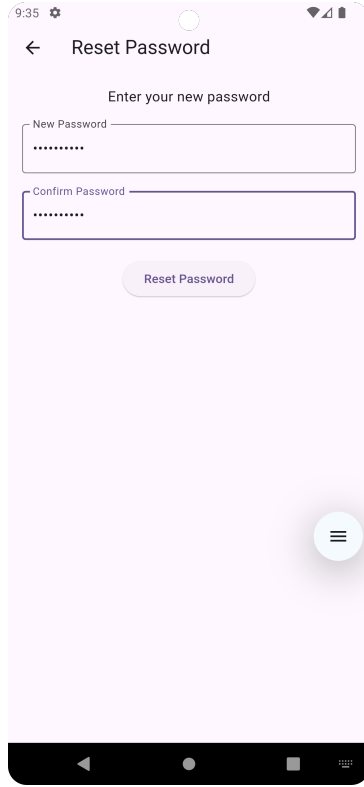


Figure 5.91: Forget password: Set a new password.

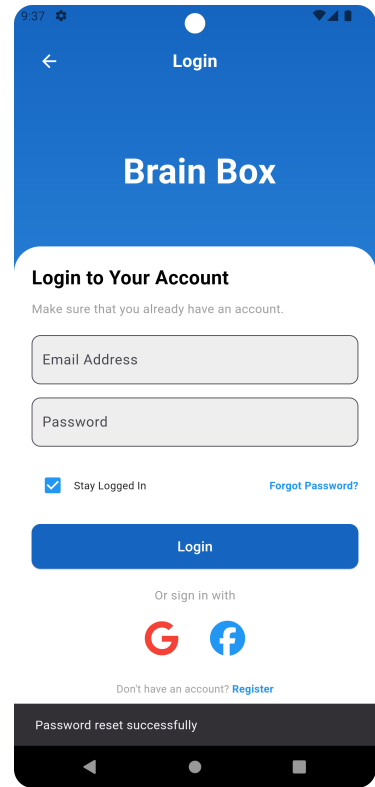


Figure 5.92: Forget password: Password reset success.

5.10 Admin Dashboard

The **Admin Dashboard** in Brain Box provides administrators with tools to efficiently manage platform activities, ensuring a seamless experience for users. The dashboard includes the following key functionalities:

5.10.1 Manage Projects

This section allows administrators to oversee all projects on the platform. Admins can view project details and delete projects if necessary. Below are examples of the Manage Projects interface:

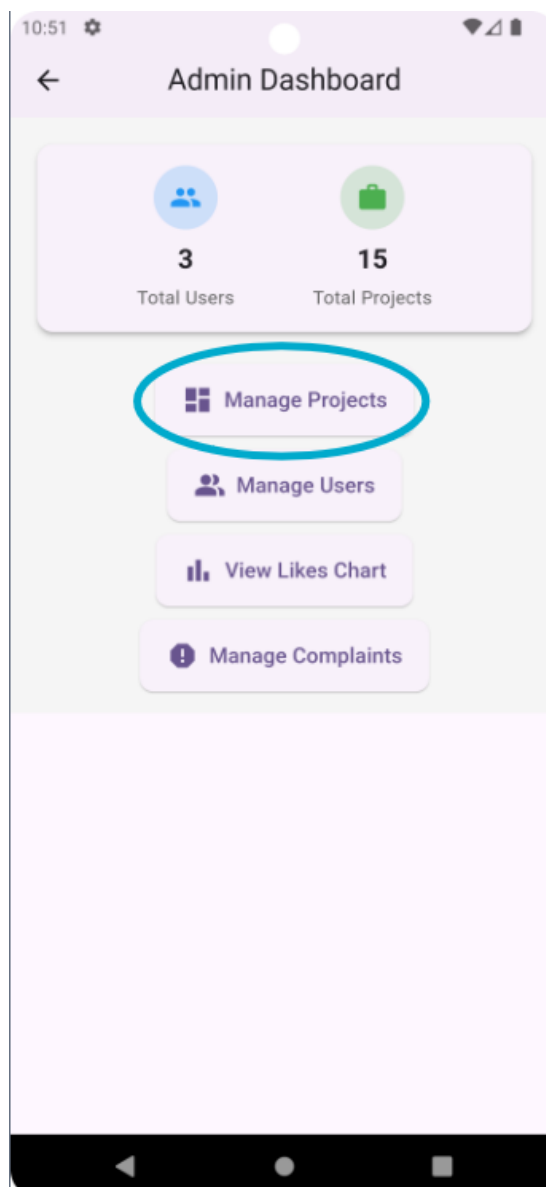


Figure 5.93: Admin dashboard - Manage Projects.

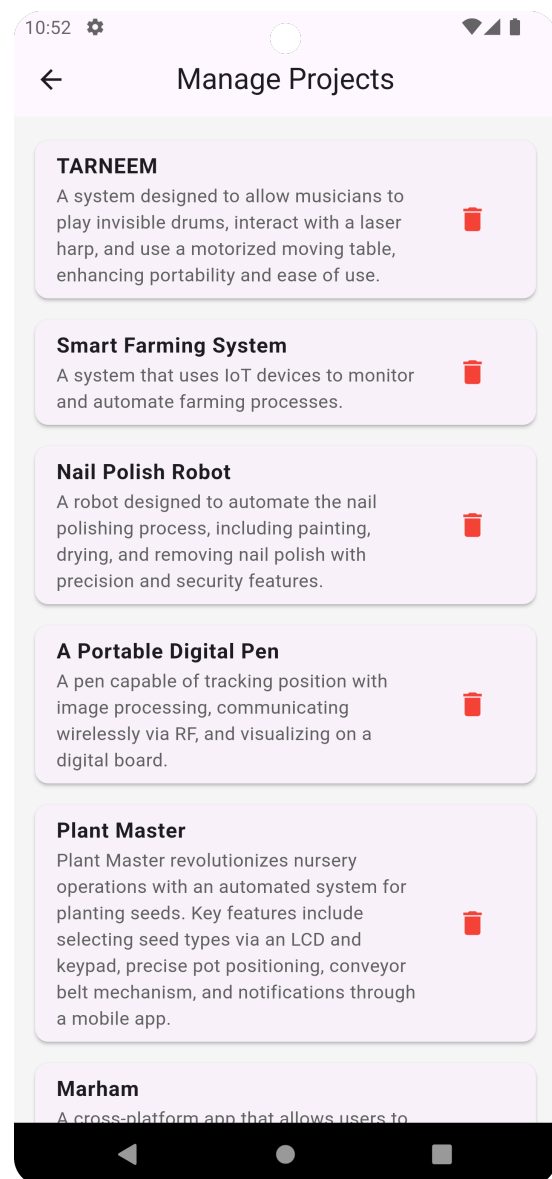


Figure 5.94: Manage projects interface.

5.10.2 Manage Users

The Manage Users feature enables administrators to view all registered users on the platform. Admins can monitor user roles and delete accounts when necessary. Below are examples of the Manage Users interface:

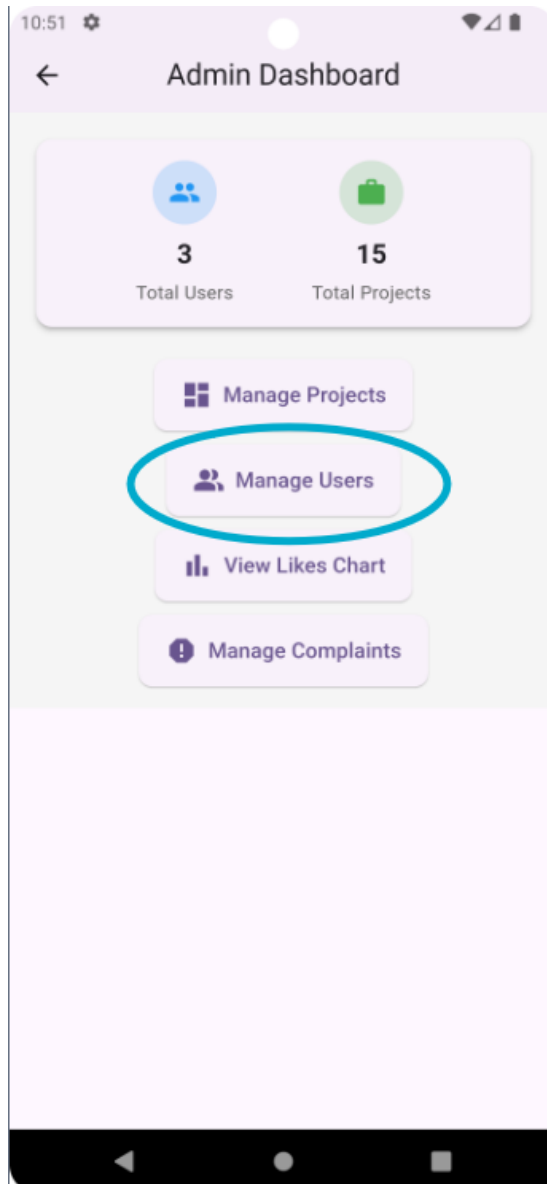


Figure 5.95: Admin dashboard - Manage users.

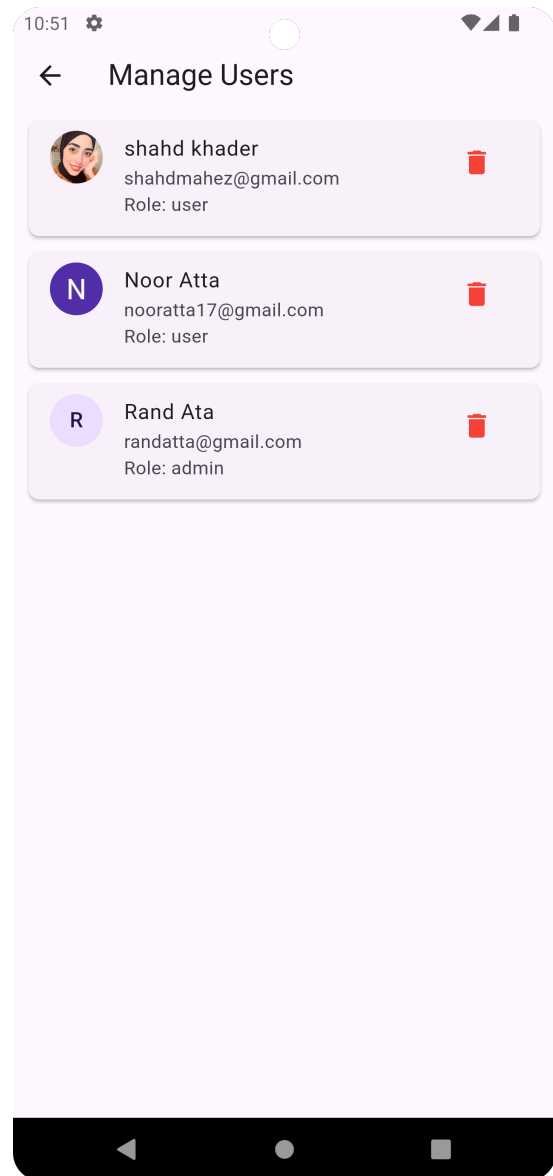


Figure 5.96: Manage users interface.

5.10.3 View Likes Chart

This feature allows administrators to access insights into user engagement through a visual representation of project likes. Admins can identify popular projects and trends based on user preferences. Below are examples of the Likes Chart interface:

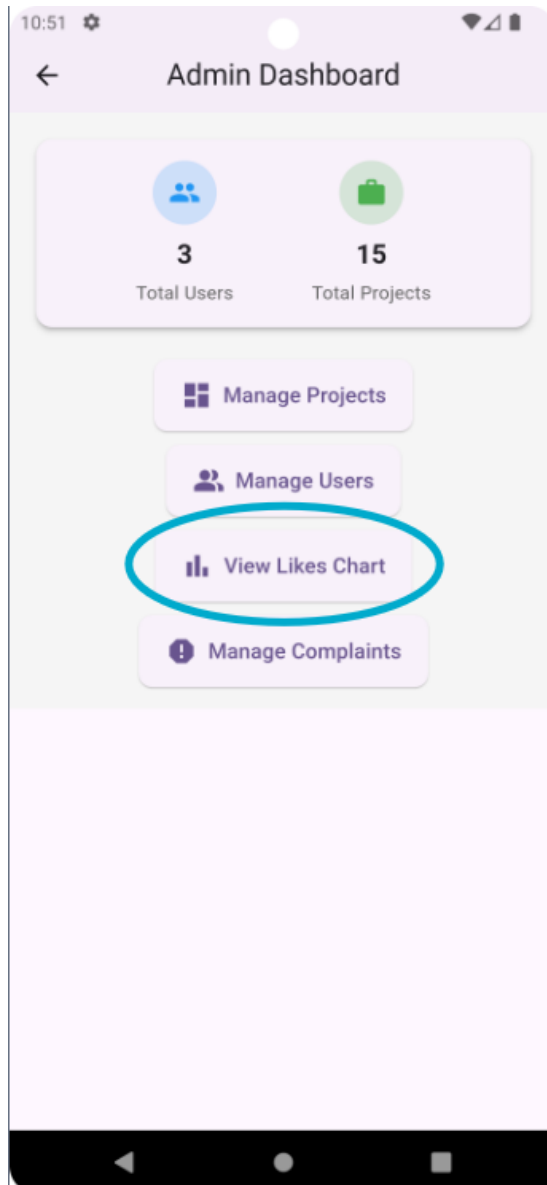


Figure 5.97: Admin dashboard - view likes chart.

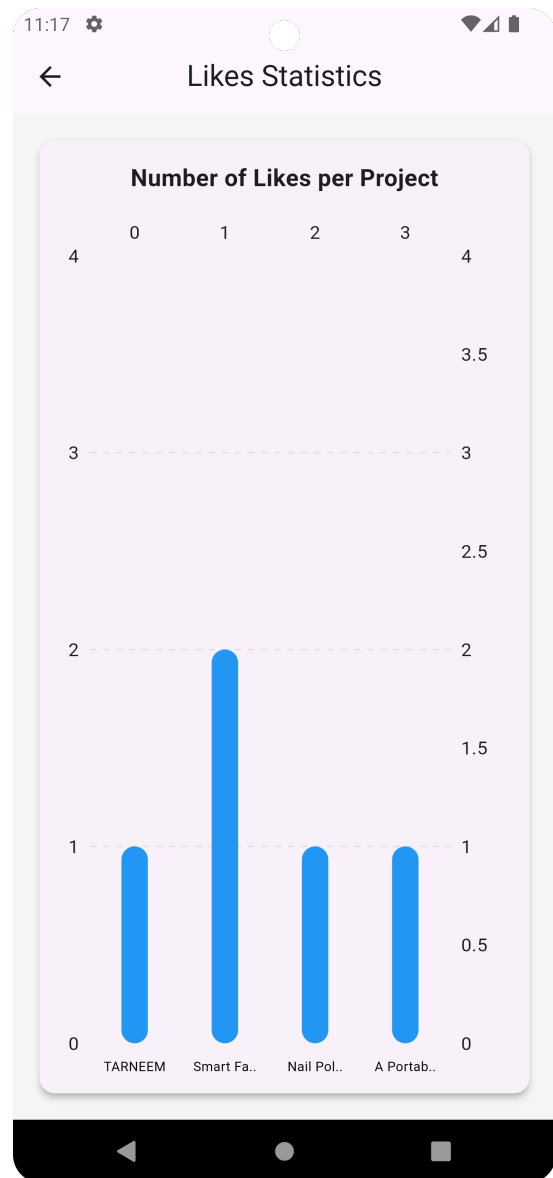


Figure 5.98: Likes chart interface.

5.10.4 Manage Complaints

The **Manage Complaints** feature equips administrators with tools to address user concerns effectively. Administrators can review complaints, provide responses, and take appropriate actions to resolve issues. This feature ensures user satisfaction and helps maintain the platform's quality and integrity.

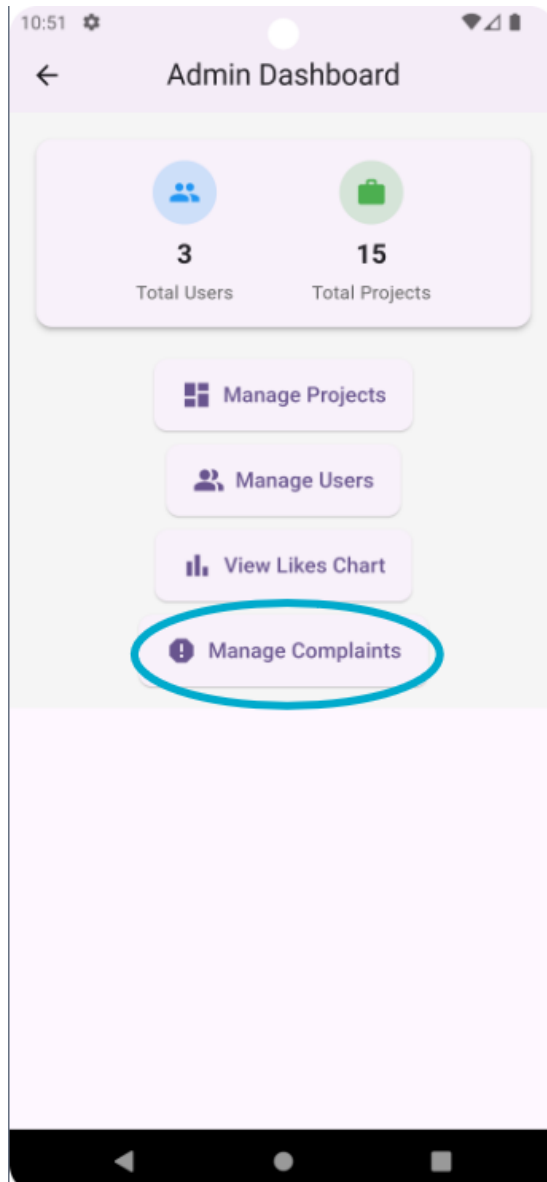


Figure 5.99: Admin dashboard - Manage Complaints.

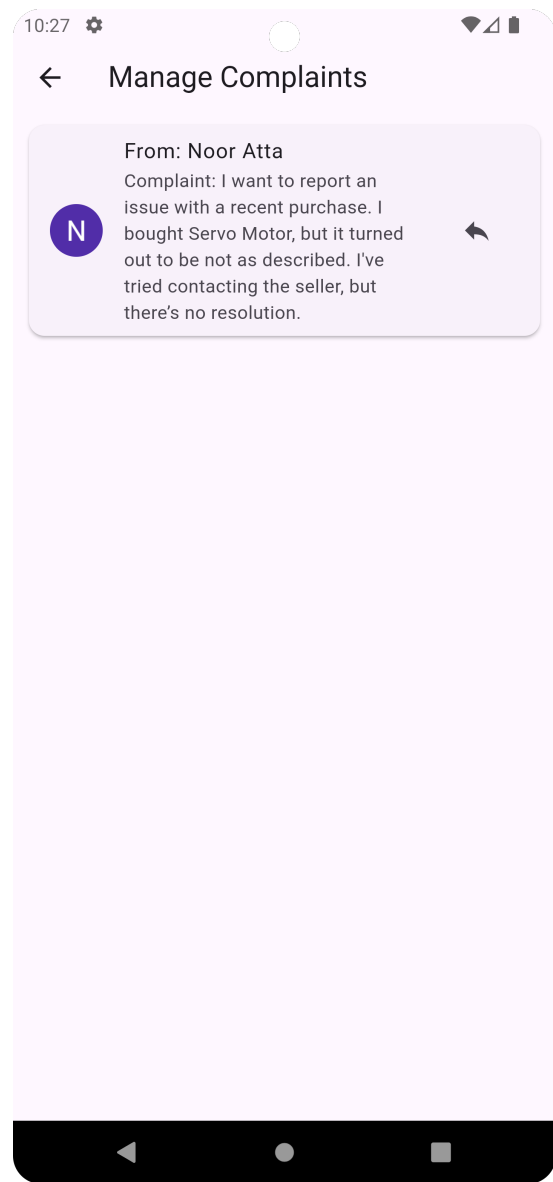


Figure 5.100: Manage complaints interface - View complaints.

In the Manage Complaints interface, administrators can view a detailed list of submitted complaints. Each complaint includes the sender's name, the issue description, and the date of submission. Admins can click on a complaint to review it in detail.

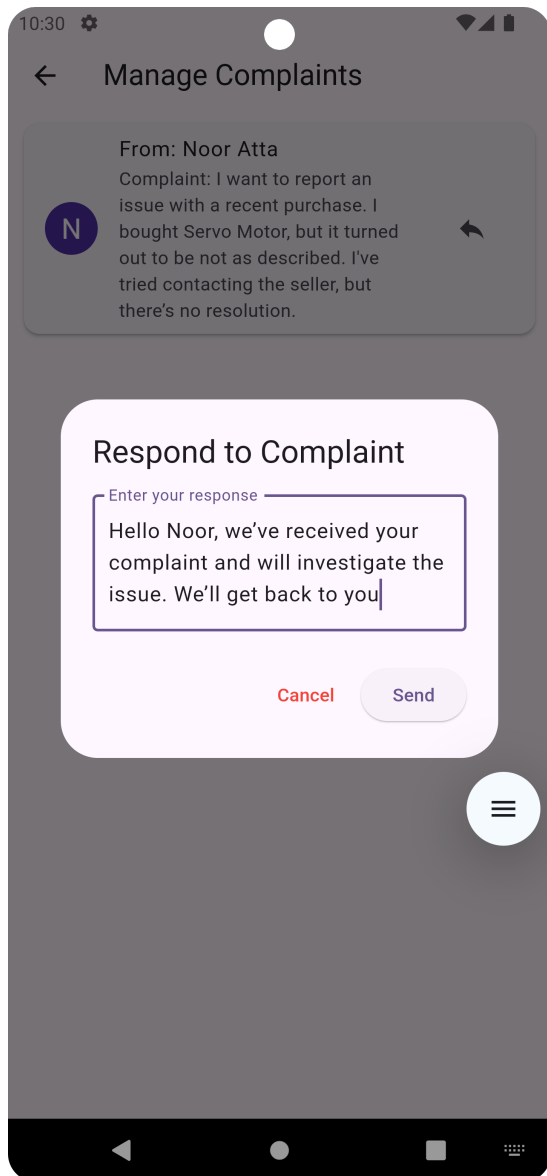


Figure 5.101: Respond to a complaint.

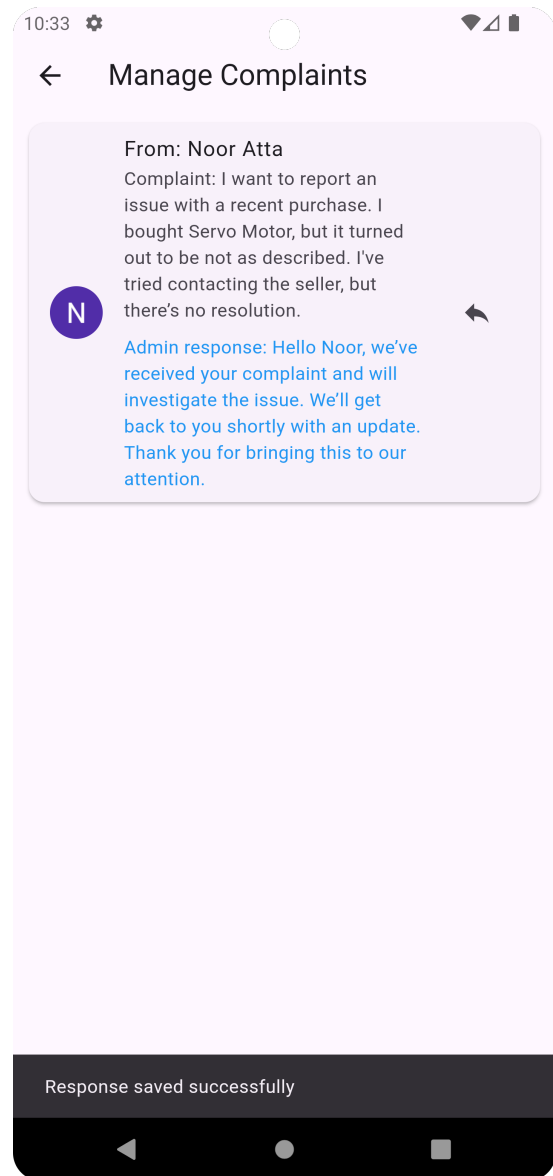


Figure 5.102: Complaint response confirmation.

Once a complaint is selected, administrators can respond directly through the platform by providing feedback or solutions. The response is sent to the complainant, ensuring transparency and swift resolution. A confirmation message is displayed after a successful response, assuring the administrator that their feedback has been recorded.

Chapter 6

Conclusion

The Brain Box platform is a step forward in addressing the challenges students and professionals face when searching for project ideas, finding partners, and accessing educational resources. By combining modern technologies such as recommendation systems, real-time communication tools, and secure payment gateways, Brain Box provides a simple and effective way to collaborate, learn, and grow.

Throughout the development process, we focused on creating a unified platform that simplifies project sharing, enhances teamwork, and makes resources accessible for both hardware and software projects. By tailoring content to user interests and providing features like a marketplace for affordable hardware components, Brain Box proves to be a practical and valuable tool.

Like any meaningful journey, the creation of Brain Box was not without its challenges. From optimizing performance to ensuring a seamless cross-platform experience, every obstacle taught us valuable lessons and pushed us to improve. The feedback we received and the teamwork we relied on helped shape the platform into what it is today.

In the end, Brain Box is more than just a platform—it is a space for innovation, collaboration, and learning. It empowers its users to achieve their goals, share knowledge, and build connections that last. We hope Brain Box will inspire creativity, foster productivity, and contribute to a community that thrives on shared ideas and mutual support.