



An Najah National University

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Technology
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StudentTechShop

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Acknowledgements

“First of all, we would like to thank our supervisor, Dr. Asmaa Afeefi, for his consistent efforts throughout the semester, and for being completely prepared to assist us with scientific support. We thank our friends and family. Those who gave us their undivided attention and believed in our ability.”

Disclaimer

Adam Yaesh and Laith Alayyan have written this report as requirements for a Bachelor's degree in Computer Engineering Department. No one modifies or corrects it because it will be evaluated by professors at An Najah National University. It is worth mentioning that An-Najah National University does not have any responsibility for any word in this report.

1 Abstract

As computer engineering students, we focused on hardware projects and realized that students often struggle to purchase the necessary components for their projects. To address this issue, we came up with the idea of creating a platform to make it easier for students to buy and sell parts, and we unified these processes on our website to simplify the experience.

Our project allows users to buy and sell hardware components directly from other students. The project features a display of previous student projects, allowing users to explore similar ideas. It also provides a chat feature to sort out details and seek advice from previous students.

To enhance the user experience, our platform also allows users to review any item they purchase, and these reviews are visible to other users. Additionally, we have integrated a chatbot that users can interact with to ask and answer questions about specific components.

When a purchase is made, the seller receives a notification letting them know that someone is interested in purchasing their product. Likewise, the buyer is notified that the purchase is in the works. This idea is unique and has not been implemented before, although there may be similar concepts on commercial sites. However, our platform is designed specifically for students and focuses on helping them buy and sell components related to the project.

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2 Introduction

When students seek to start their own hardware projects, they often face challenges in obtaining the required components or identifying the parts they need. These issues are common in our field, computer engineering, where students seek to obtain parts at affordable prices and profit from them after completing their projects by selling the components they no longer need. To address these challenges, we developed a website and mobile application that served as a solution to simplify the process of purchasing and selling hardware components for students. The goal was to provide a convenient online solution that allowed students to search for, view, and purchase products, list unwanted parts for sale, and benefit from viewing past projects. This report details the development and features of the platform, which enables students to find, buy, and sell project-related components, and display items which the student interested in and direct communication features to enhance collaboration and chatbot to answer student's questions.

2.1 General background

Students working on hardware projects face difficulties in obtaining components and making use of unused parts

after completing the project. Although there are general e-commerce sites, there are no sites dedicated to the needs of students to buy and sell hardware components for the project. That is why we created StudentTechShop to help students easily find the parts they need and resell the items they no longer need.

2.2 Objectives

In StudentTechShop the student can see all the products offered by the students in a way that enables them to give advice to each other and the student can buy any product or publish a product that he wants to sell. It also enables the students to benefit from the previous projects that were displayed on the site.

2.3 Scope of the work

1. Account Creation: Each user can register and create his own account.
2. Search Feature: Users can search for any product they want and open it.
3. Search Filters: Users can search for any product by product description as well.

4. Product View: Users can see the description of products or previous projects and their images as well.
5. Project View: Users can see all previous projects and their images as well.
6. Product Purchase: Users can buy any product they want.
7. Review: Users can review the product they have purchased by commenting and rating it.
8. Messages: Users can send a message to another user about any information they want.
9. Chatbot Assistance: Provides answers to questions about component usage and connections.
10. Notifications: Users can see everything that is published, whether new products or new projects.

2.4 Significance

Students who want to purchase or post hardware products online can use (StudentTechShop) to do it all.

3 Theoretical Background and Previous Work

3.1 Theoretical Background of the project

It is an application and a website that does not support a profitable institution, but rather aims to help students and facilitate them. Through it, the student can see all the pieces offered for sale, and he can display the pieces he wants for sale. He can also view the projects to benefit from them and have a broader background about projects in general.

3.2 Previous similar works

The project idea was not new, but many features were added that make it popular with students. It does not support a for-profit institution that sells electronic products, which makes this online store a suitable environment to gain the trust of students and encourage them to use it and buy and display electronic products for sale on it. There are similar applications, including Shein and Alibaba, but they do not specialize in electronic products in particular, and the StudentTechShop website has no competitor, because it is not specific to a specific institution.

4 Methodology

4.1 Constraints and Earlier Coursework

1. Economy

Budget Limitations

Developing and maintaining a comprehensive website and mobile application required a substantial budget.

Costs include initial development, server hosting, learning the languages and ongoing maintenance.

Maintenance Costs

Regular updates, bug fixes, and student support are essential, adding to the overall cost of the project.

2. Environment

Power Consumption

The platform is optimized for energy efficiency to minimize power consumption during its operation, both on servers and user devices.

Electromagnetic Radiation Issues

The platform's usage does not significantly contribute to electromagnetic pollution.

Environmentally Friendly Power Sources:

Whenever possible, using servers powered by renewable energy sources to host the platform.

3. Society

Information Security

Good security measures implemented to protect user data from unauthorized access and breaches.

Privacy

User data privacy is absolutely maintained, adhering to data protection laws and regulations.

4. Politics

Promoting Equality

The platform is designed to be inclusive, promoting gender and racial equality in both the user base and the content.

National Security

The platform complies with national regulations and poses no security risks.

Resolving common issues

Access to essential goods as users can easily view products without going to a specific store.

5. Ethics

Safety and Health Issues

Our website and Mobile application are safe to use and do not pose health risks, such as minimizing screen time to

avoid eye strain.

6. Health and Safety

The platform's use does not compromise public safety, such as during product deliveries.

7. Sustainability

Our website and Mobile application are designed to be scalable and easily upgradable to incorporate new features and improvements.

4.2 Used Technologies

1. ASP.Net

ASP.net is a framework designed for building web applications using the .NET platform, primarily leveraging languages like C#. It was developed by Microsoft and first released in 2002. ASP.net provides a robust environment for creating dynamic, data-driven web applications and services. Traditionally, web development involved static HTML and server-side technologies like classic ASP or PHP to handle dynamic content. With the advent of ASP.net, developers gained a more structured and efficient way to build server-side applications.

Why ASP.Net?

1. Asynchronous and Event-Driven: All APIs of the Asp.net library are asynchronous, that is, non-blocking. This means that a server based on Asp.net never waits for the API to return data. All improvements and bug fixes are quicker and released on a regular interval so that you do not have to wait for ages to harness the latest developments.

Flexibility of Open-Source framework is another reason why ASP.NET Core is a preferred choice for developers.

2. ASP.NET, built on the .NET runtime, is highly optimized for performance, leveraging features like JIT compilation, and asynchronous programming to deliver fast and scalable web applications.

3. Asp.net uses a single-threaded model with iterating events. The event mechanism helps the server to respond in a non-blocking manner and makes the server highly scalable, unlike traditional servers that create limited threads to handle requests. Asp.net uses a single-threaded program and the same program can serve more requests than traditional servers such as Apache HTTP Server.

2. SQL Server

It is SQL under the name SQL Server, a relational database management system where data is organized into tables with defined relationships. It uses Structured Query Language (SQL) to manage and query data, making it one of the most widely used systems for relational databases.

Why SQL Server?

Cloud-Based Developer Platform: SQL Server provides a full cloud-based data platform for developers through Azure SQL Database for seamless data management.

Flexible document schemes: It offers flexible schemas for storing data, allowing for easy modifications.

Widely Supported Tools: It integrates with various tools like SQL Server Management Studio (SSMS) for easy data handling.

Change-friendly design: Its design accommodates changes and updates efficiently.

Simple installation: SQL Server is easy to install and set up.

Comprehensive Support: Microsoft offers full technical support and documentation.

3. Visual Studio

Also commonly referred to as VS made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.[vs]

4. Postman

Is an API platform for building and using APIs. Postman simplifies each step of the API lifecycle and streamlines collaboration so you can create better APIs— faster.[Postman]

5. GitHub

Is an Internet hosting service for software development and version control using Git. It provides the distributed version control of Git plus access control, bug tracking, software feature requests, task management, continuous integration, and wikis for every project. [github]

6. JWT (JSON Web Token)

Is an open standard for exchanging security information between a client and a server, and is commonly used for user login authentication. [jwt]

4.3 StudentTechShop as a Website & Mobile Application

When you enter the application, this interface is displayed.

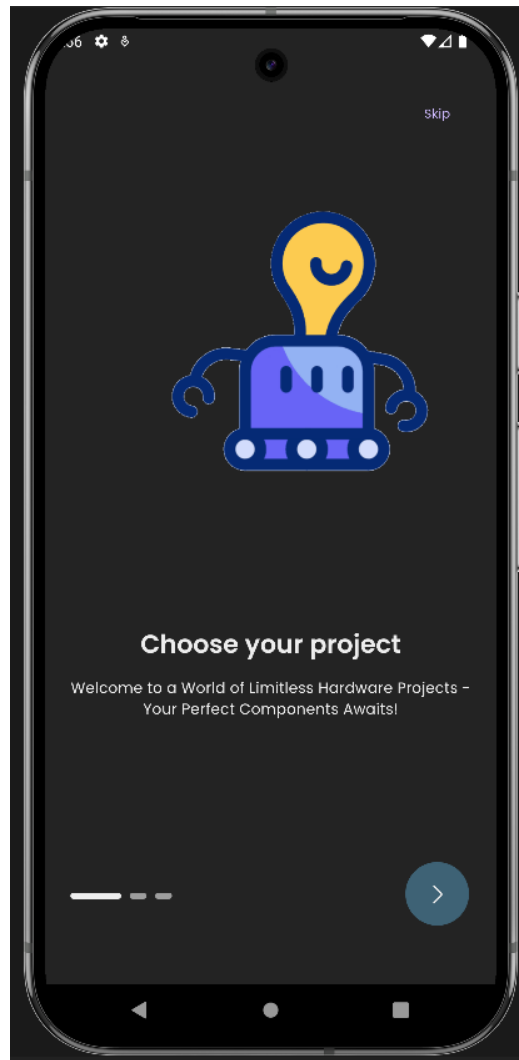


Figure 1: Welcome Page.

1. Authentication and Validation

Because StudentTechShop is regarded as a middleman between the students, each user must register on the platform in order to identify himself and have access to all of its features. The user needs to register his name, email, password.

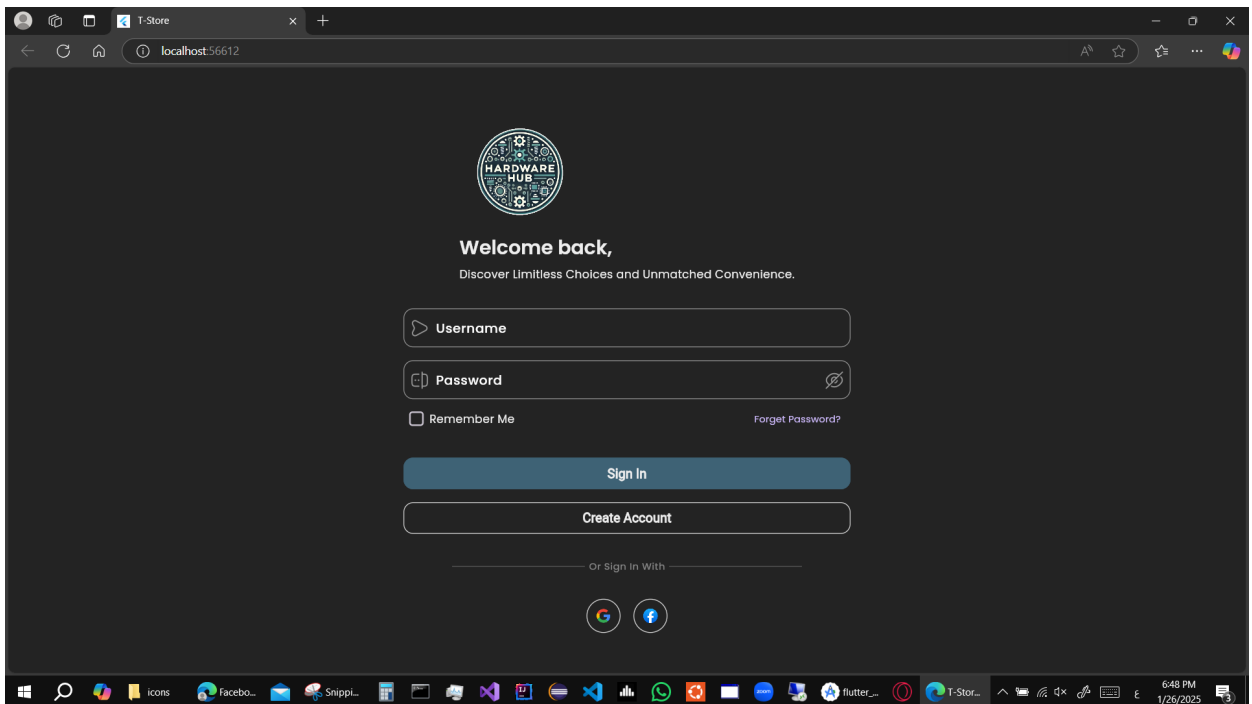
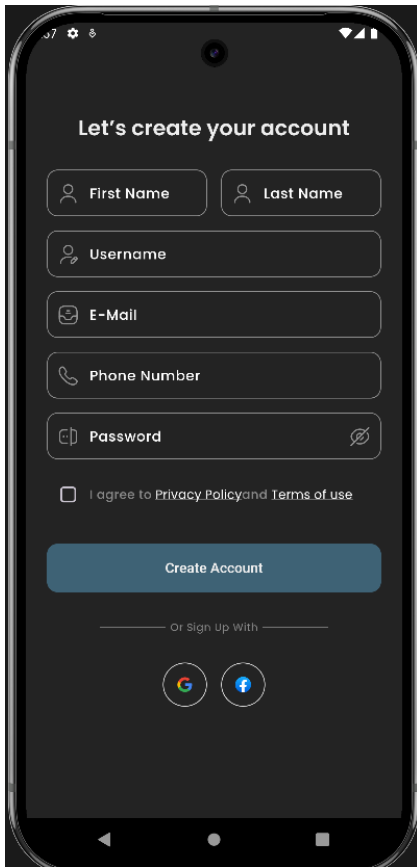
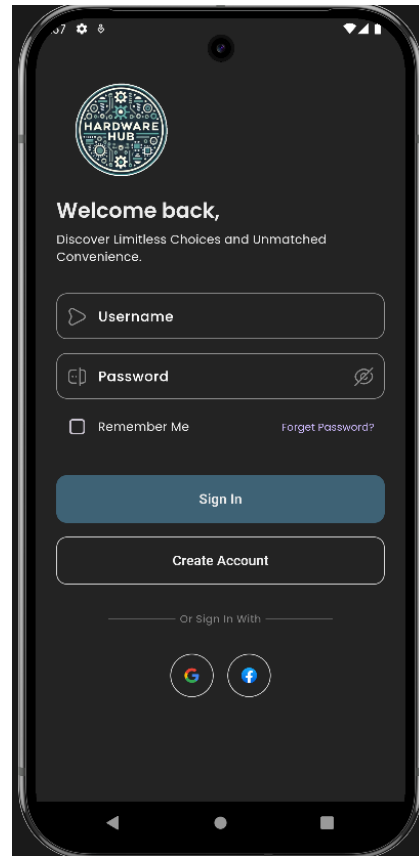


Figure 2: Login Page.



(a) Sign Up Form.



(b) Login page.

Signup

In order to login to the website, you have to enter your first name, last name, username, valid phone number, valid email address and a valid password

Sign up Validation

After signing up if the user tries to sign up with the same email again the system will alert him also.

login

To log in to the website, you must provide certain information such as your email and password that you have already registered with them.

Login Validation

When a user attempts to login, the back-end validates the credentials; if they are invalid, the user is alerted, and if he attempts to log in using a non-existing email address, he is also notified.

Forget password

When a user wants to login and click on a forgotten password he will identify his email again to send the new password on the email, this is done by using Email.JS. As seen in Figure 4.

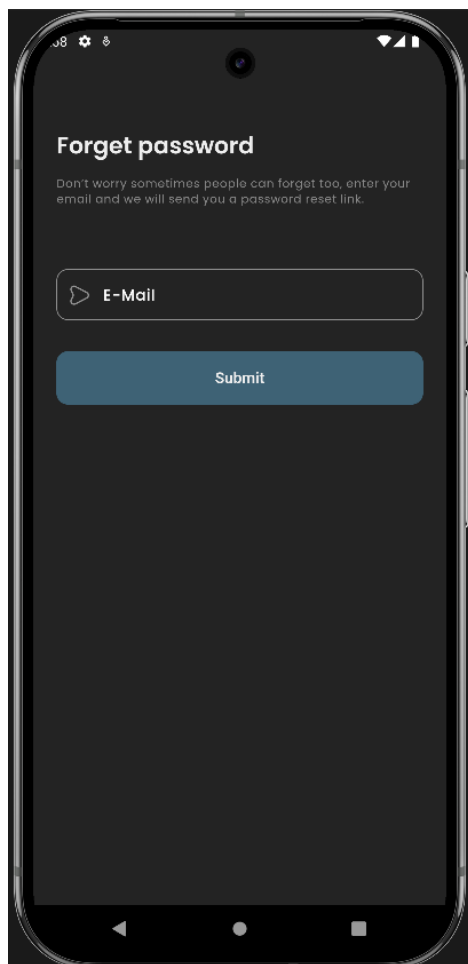


Figure 4: Forget Paswword.

2. User Profile

Each registered user has his own profile where he can see his wish list, his orders and purchases and can also add his number and update his personal information.

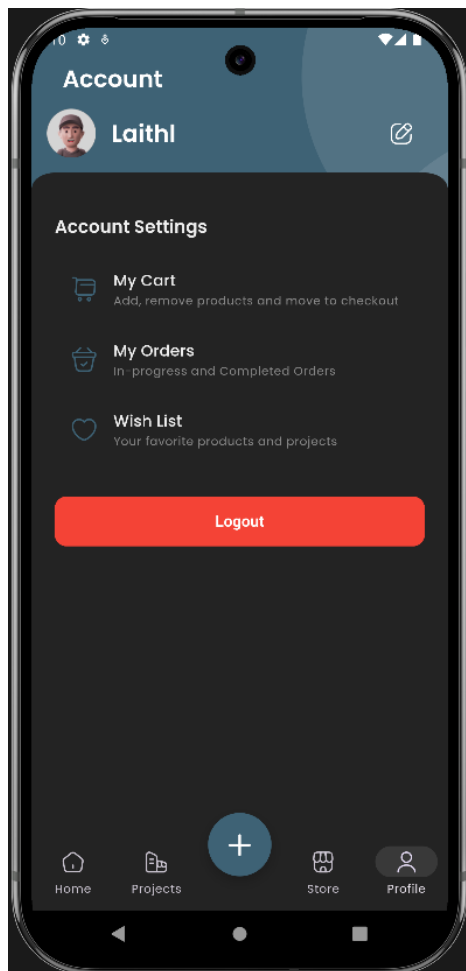
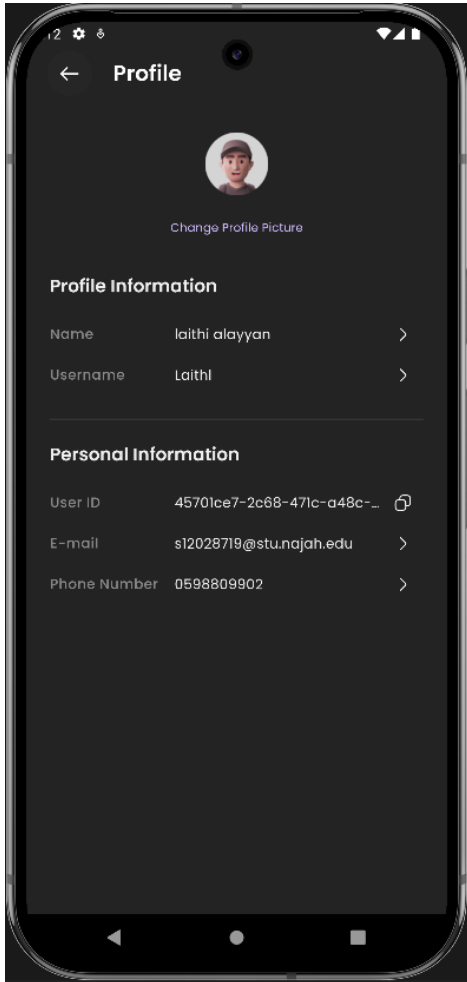
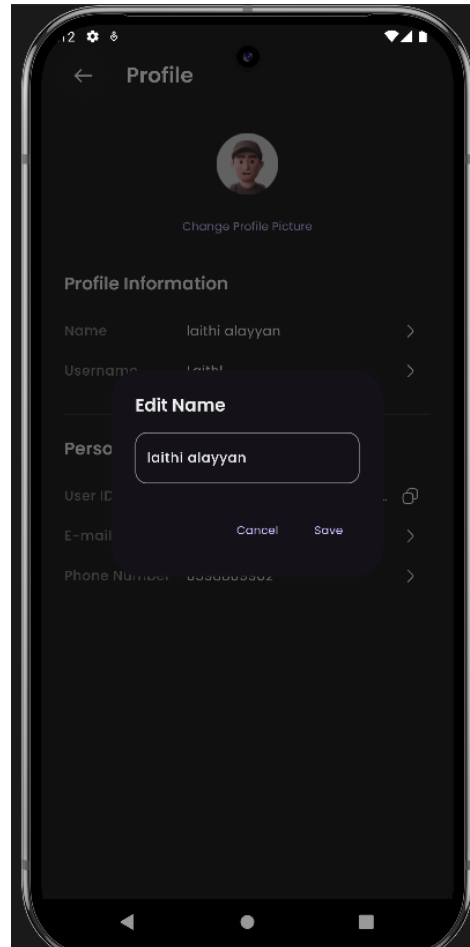


Figure 5: Profile Page.

Edit Profile



(a) User information.

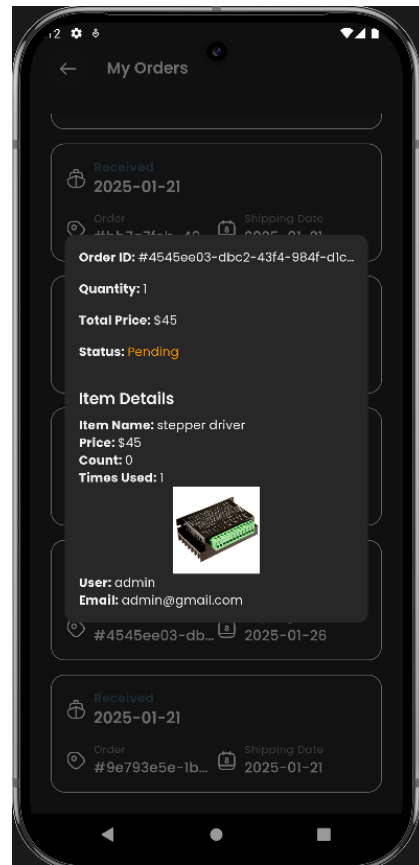


(b) Updating user information.

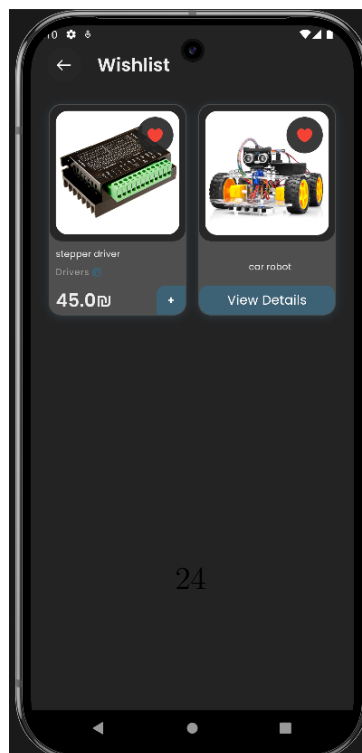
The user can see his wish list, his request list and view the information of each request through his profile page.



(a) Orders list.



(b) Order's information.



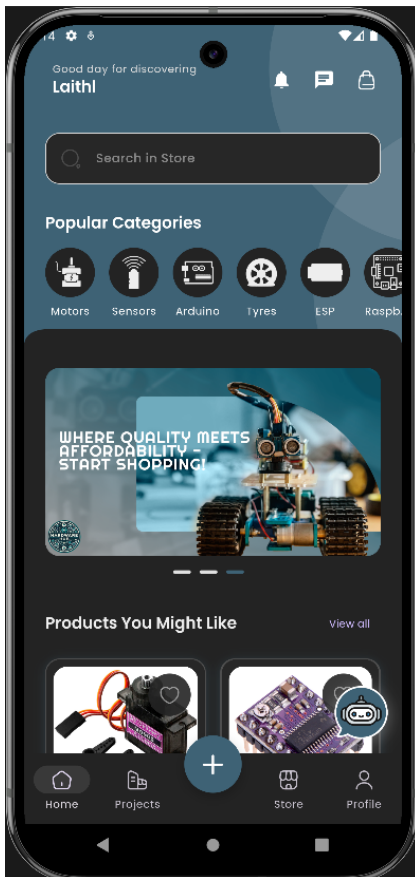
(c) WishList.

3. Home page

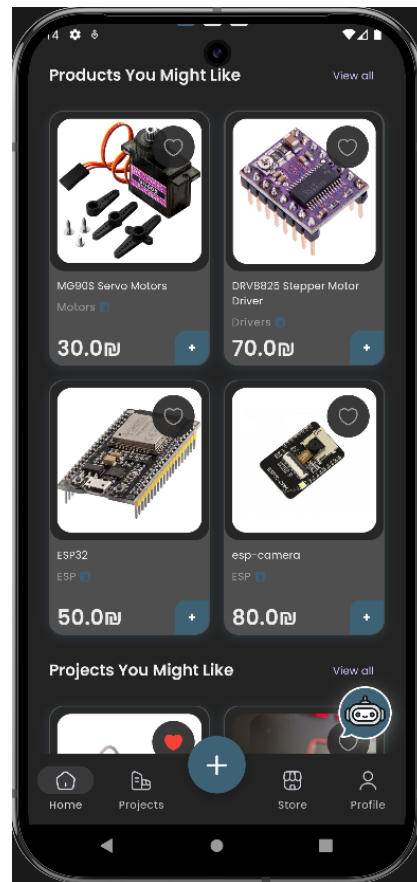
This is the home page that displays the site sections (items and their types, projects) and displays other features as shown in the navigation bar.

This page also includes a box to display the user's favorite products, where he is shown the products he is interested in or has previously purchased a similar product.

(Recommendation System)



(a) Home Page.



(b) Home page2.

4. Items Page

The user can see all the old and new items with the types and subtypes of items to make it easier for the user to find what he wants.

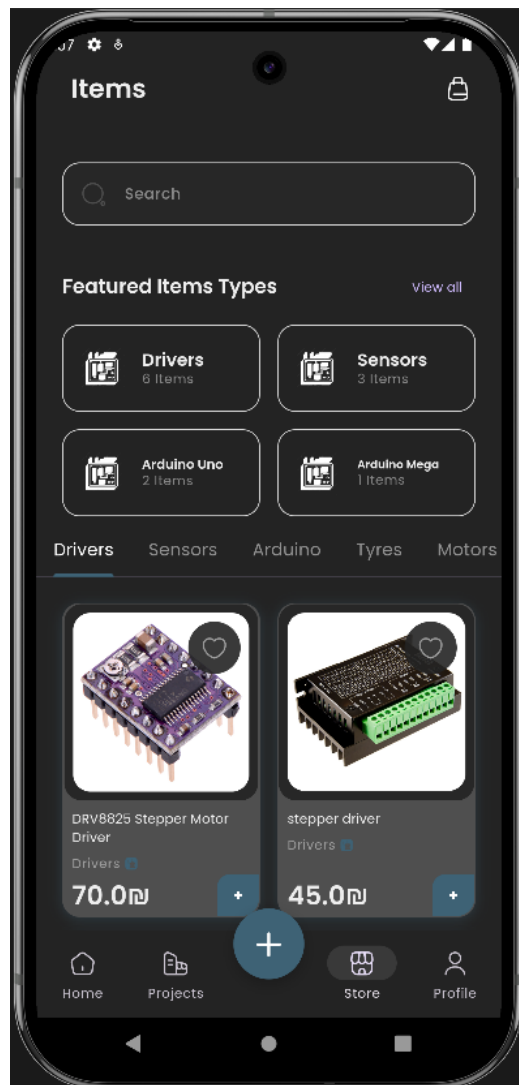
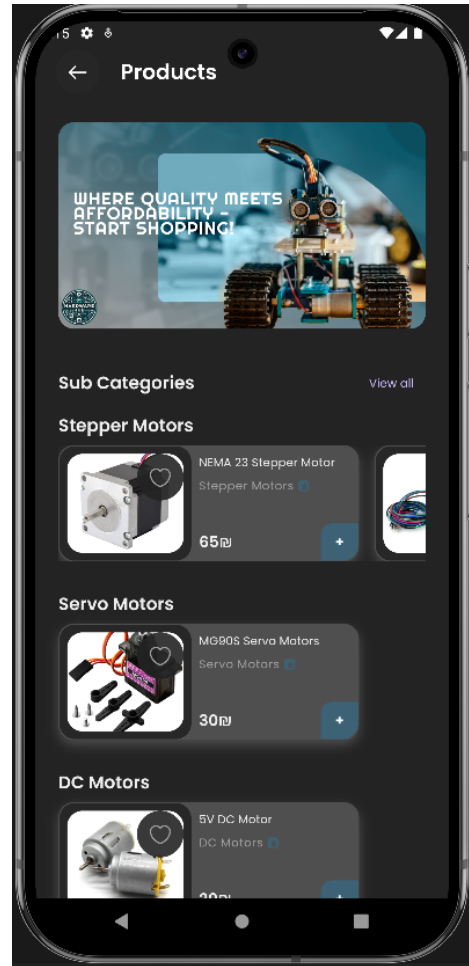


Figure 9: Items Page.

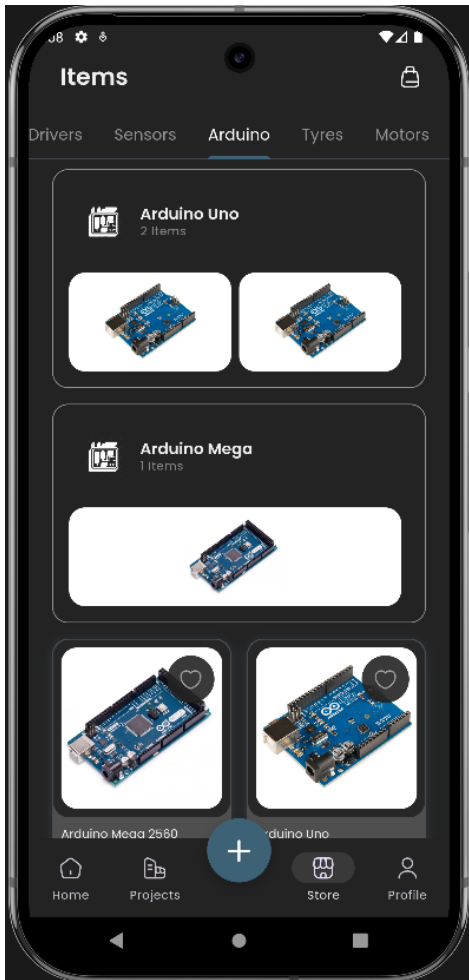
Categories and SubCategories



(a) All Categories.



(b) Items and Subcategories of a specific category.



(a) Category Item1.



(b) Category Item2.

The user can also sorting the products to see them by price from highest to lowest or by the date they were added from most recent to oldest.

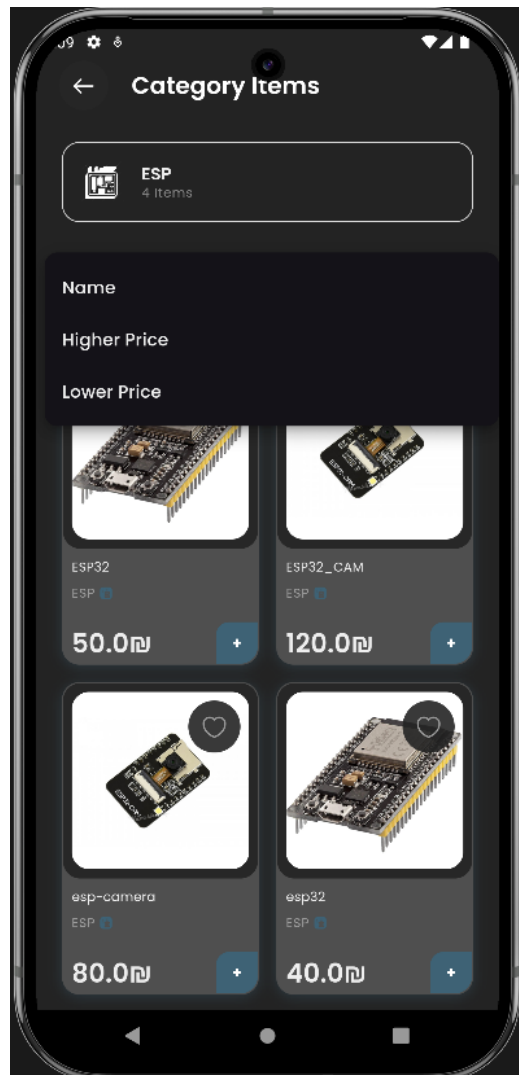
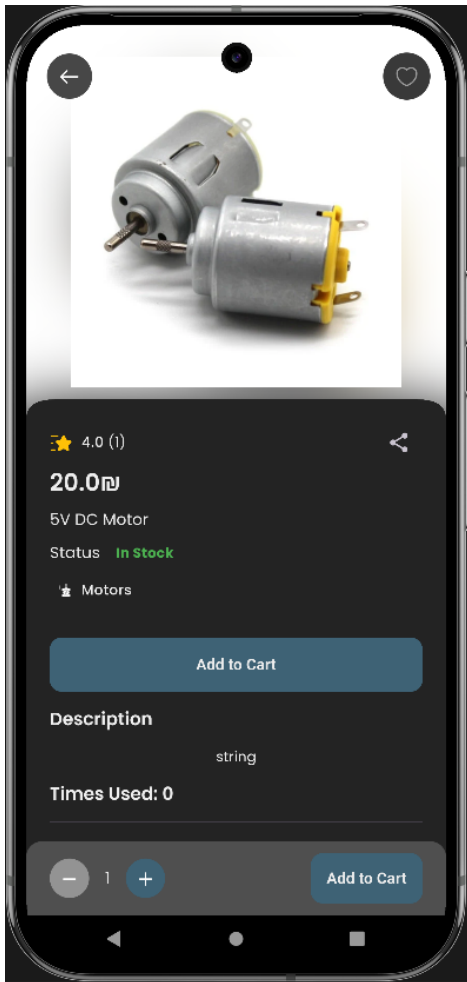
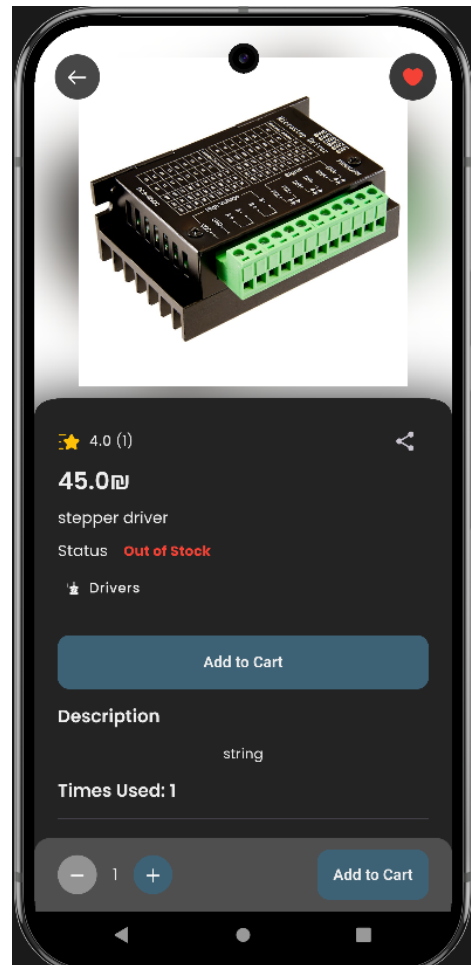


Figure 12: Sort Items.

When the user clicks on the item, all the details of the item appear (price, explanation, number of times used, and the status of the item, whether it is available or not), and the user can add it to his card or to his wish list.



(a) Item1.



(b) Item2.

When you scroll down the product page:

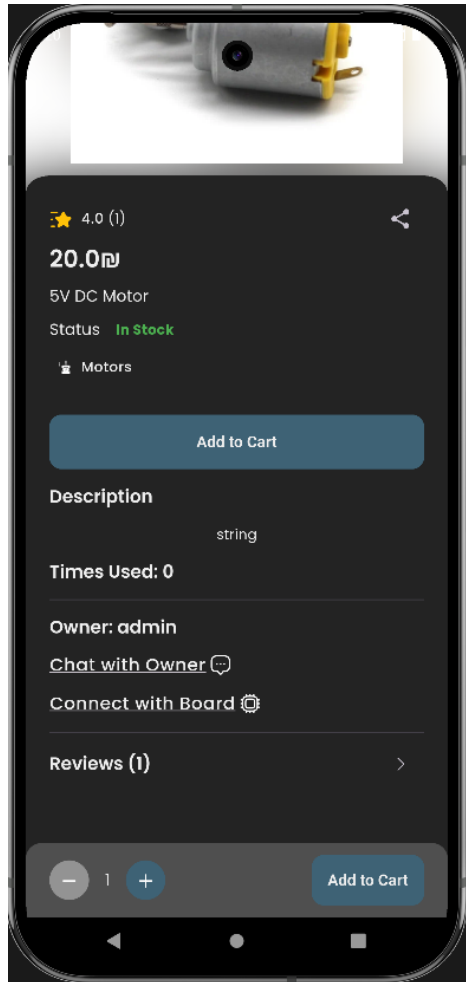


Figure 14: Item.

From here, the user can communicate and talk to the product owner, and see the connection of this item with another item of the user's choice. He can also evaluate this product and add a comment on it for the benefit of other users.

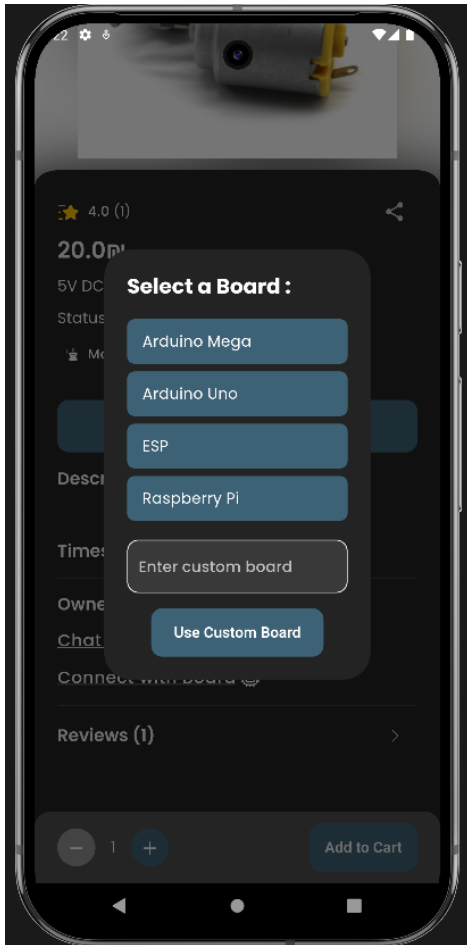
As shown in the following pictures:

Chatting Page

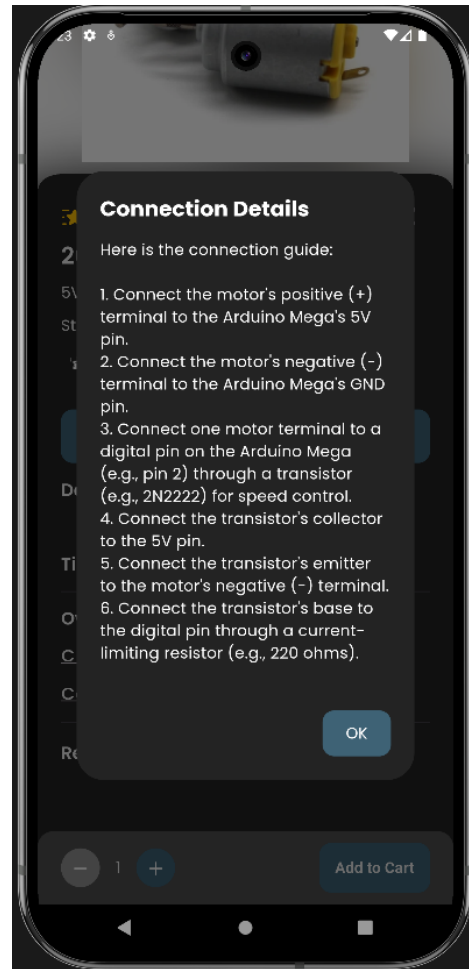


Figure 15: chatting with the item's owner.

The user can see how the electronic piece is connected to another piece he wants, and this process is done using AI.



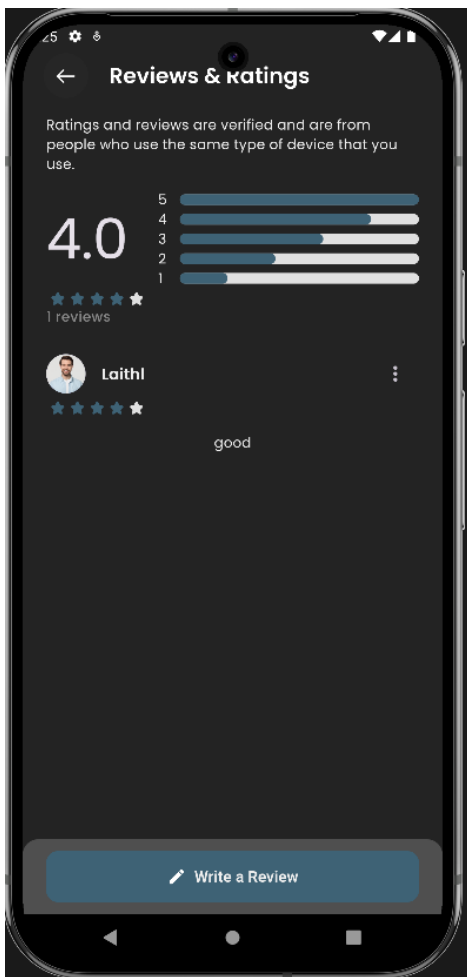
(a) Select Board.



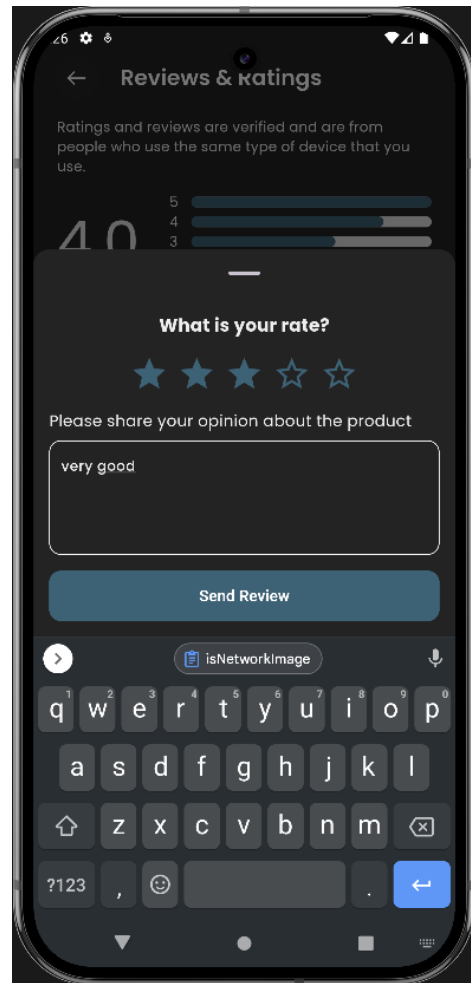
(b) Show Connection.

Review Page

The user can see previous comments and ratings for this product and can also add his own rating and comment for this product.



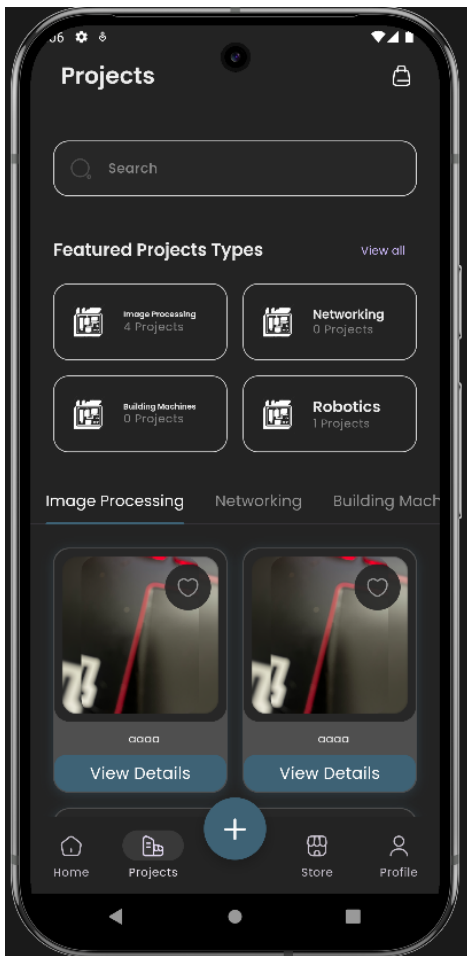
(a) See Reviews.



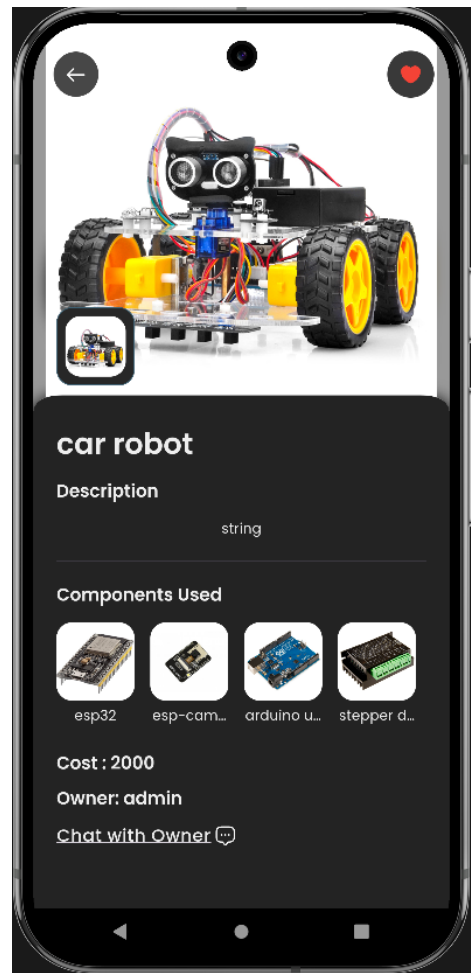
(b) Add Review.

Project Page

The user can view the projects published on the site, see the components used for each project, and see other details of the project to benefit from them as much as possible.



(a) All Projects Page.

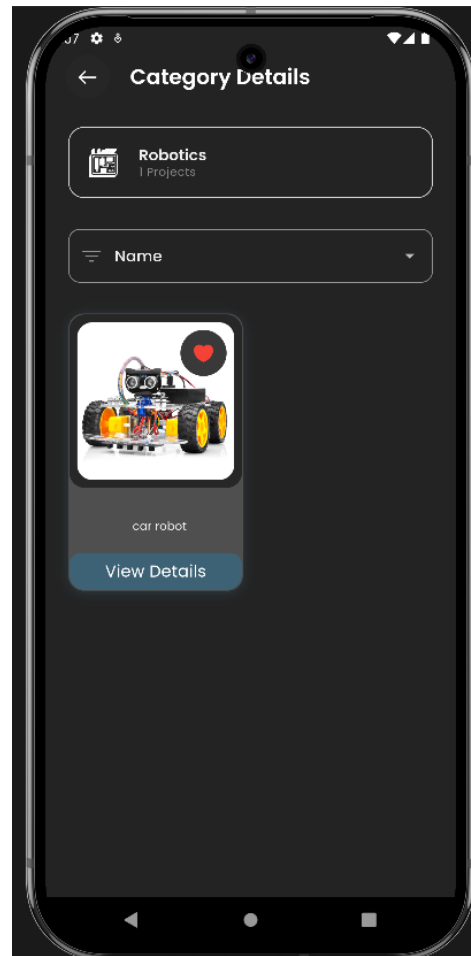


(b) Project details Page.

In addition, there are types of projects to facilitate the search process for the user.



(a) Project Categories.



(b) Project Category.

Add Item and Project

The user can add and display his own product for sale and can also publish projects on the site.

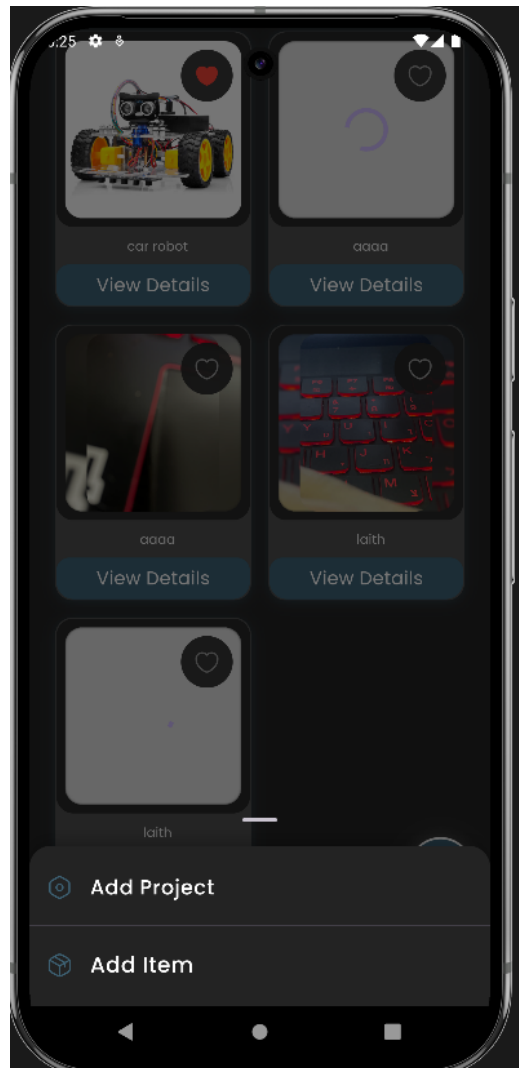


Figure 20: Add Item or Project.

Add Item

When the user adds a new item, he must specify all the details of the item in addition to specifying the item's category and uploading the item's image.

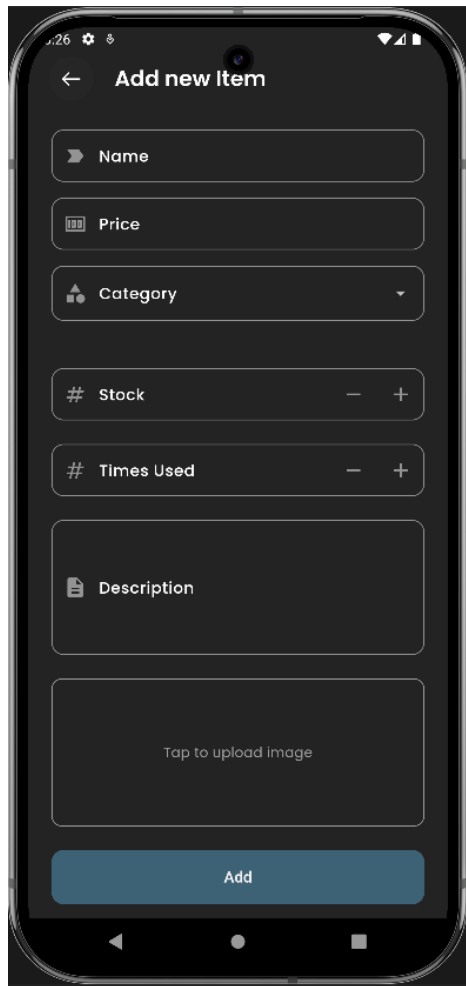
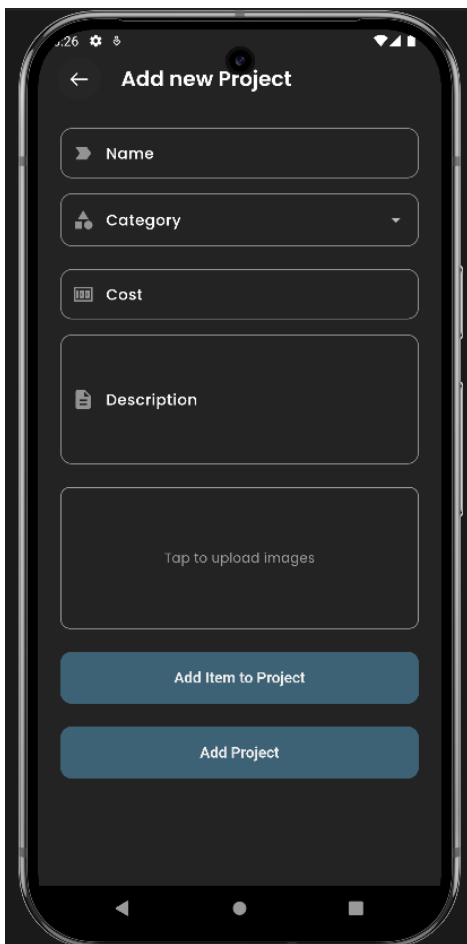


Figure 21: Add Item.

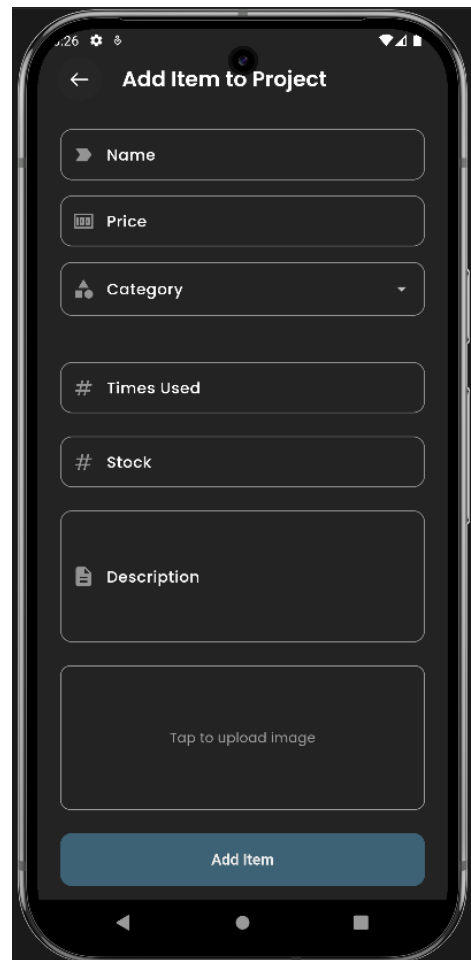
Add Project

When the user publishes a new project, he must enter all the information and details of the project, specify the category of the project, upload a picture or group of pictures of the project, and then add the items used in the project with their details.



The screenshot shows a mobile application interface for adding a new project. The title bar at the top reads "Add new Project" with a back arrow on the left. Below the title bar, there are several input fields: a "Name" field with a right-pointing arrow icon, a "Category" dropdown menu with a downward arrow, a "Cost" field with a numeric keypad icon, and a "Description" field with a document icon. Below these fields is a large rectangular area with the text "Tap to upload images". At the bottom of the screen, there are two blue buttons: "Add Item to Project" and "Add Project".

(a) Add Project.



The screenshot shows a mobile application interface for adding an item to a project. The title bar at the top reads "Add Item to Project" with a back arrow on the left. Below the title bar, there are several input fields: a "Name" field with a right-pointing arrow icon, a "Price" field with a numeric keypad icon, a "Category" dropdown menu with a downward arrow, a "Times Used" field with a hash icon, and a "Stock" field with a hash icon. Below these fields is a "Description" field with a document icon. Below the description field is a large rectangular area with the text "Tap to upload image". At the bottom of the screen, there is a single blue button labeled "Add Item".

(b) Add Item to project.

Cart Page

From this page, the user can see the items he has added to his purchase card and can delete or modify them.

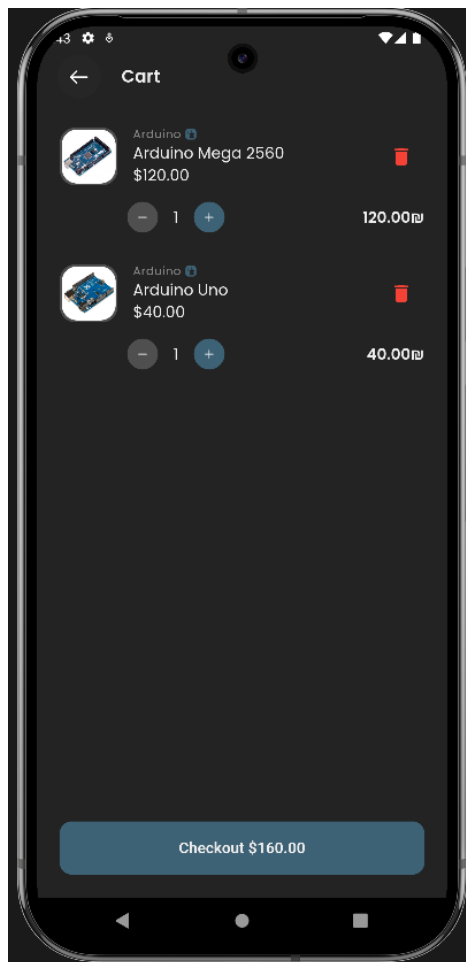
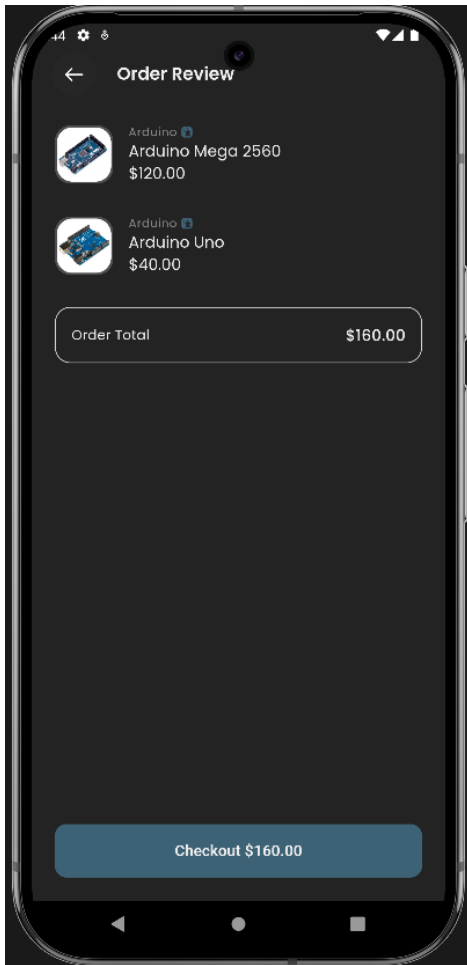


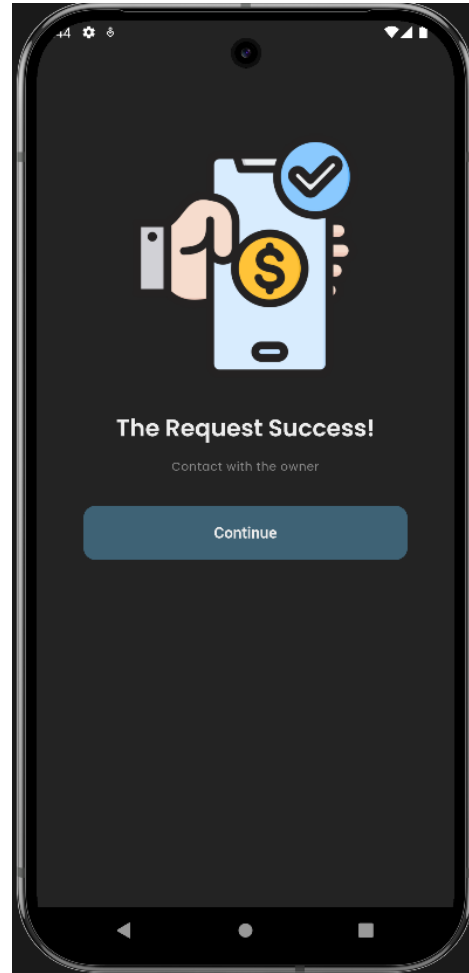
Figure 23: Cart Page.

If the user confirms the order, he will be transferred to the next page to complete the purchase process.

Purchase Page



(a) Confirms the order.



(b) Purchase successful.

Notifications Page

When the user makes a purchase and receives the item, he can register that the purchase has been received, and then a notification will be sent to the owner of the item stating that the purchase has been received by the buyer.

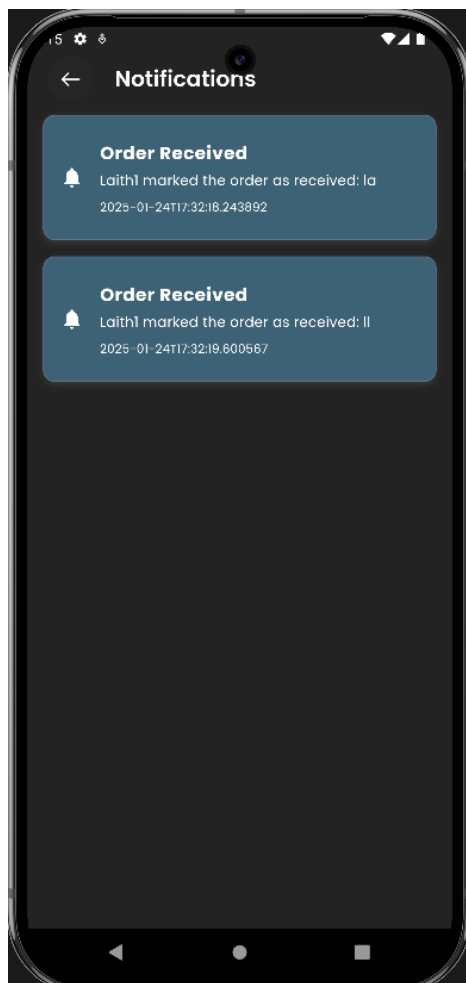
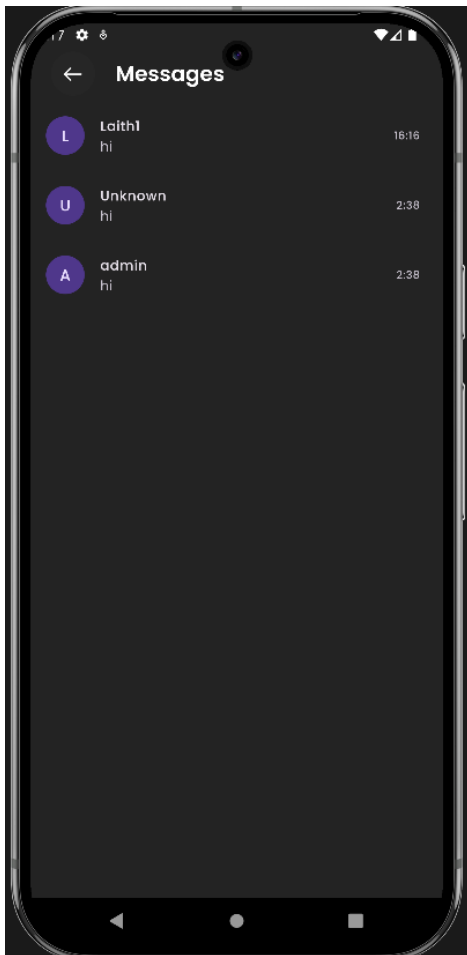


Figure 25: Notifications Page.

Chatting Page

The user can communicate with another user and the owner of any piece or project through the chat page.



(a) Chat Page.



(b) Chatting.

ChatBot Page

The user can also talk to a chatbot to answer any question he wants, as is the case with ChatGPT.

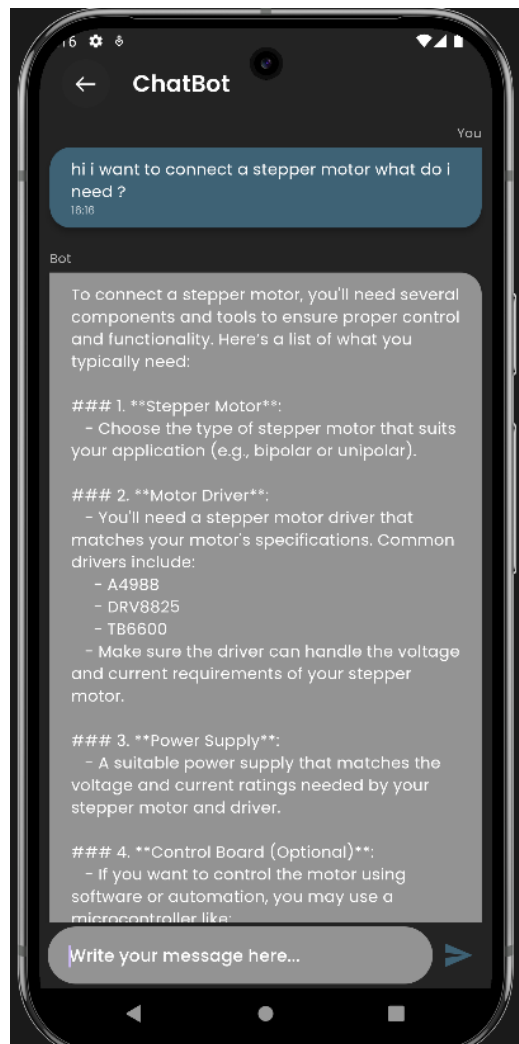
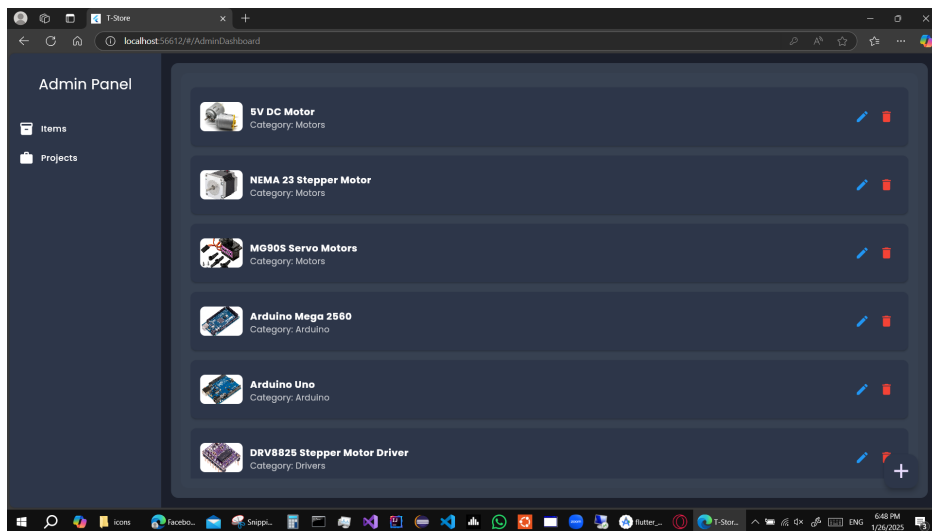


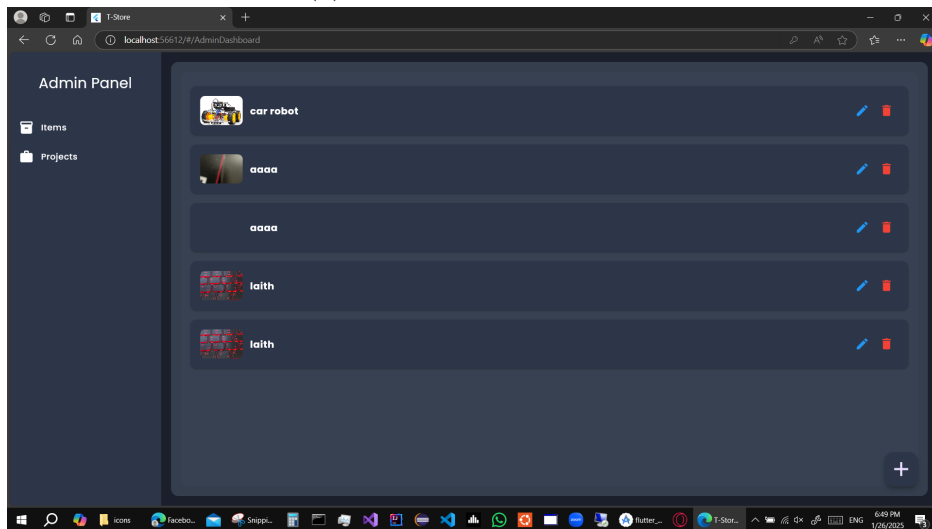
Figure 27: ChatBot Page.

5. Admin Pages

This interface appears to the administrator only when he enters the application as an admin, and a business page is created for him to manage the online store.



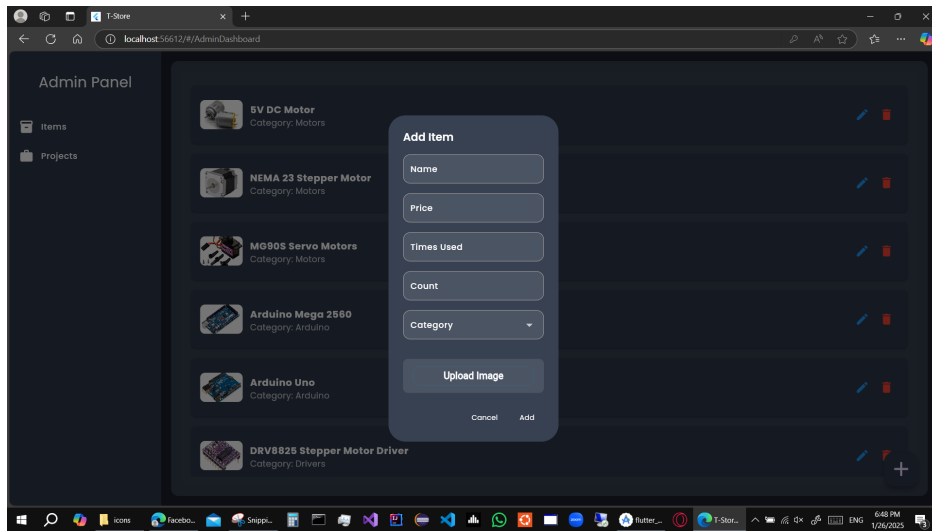
(a) Admin Page for items.



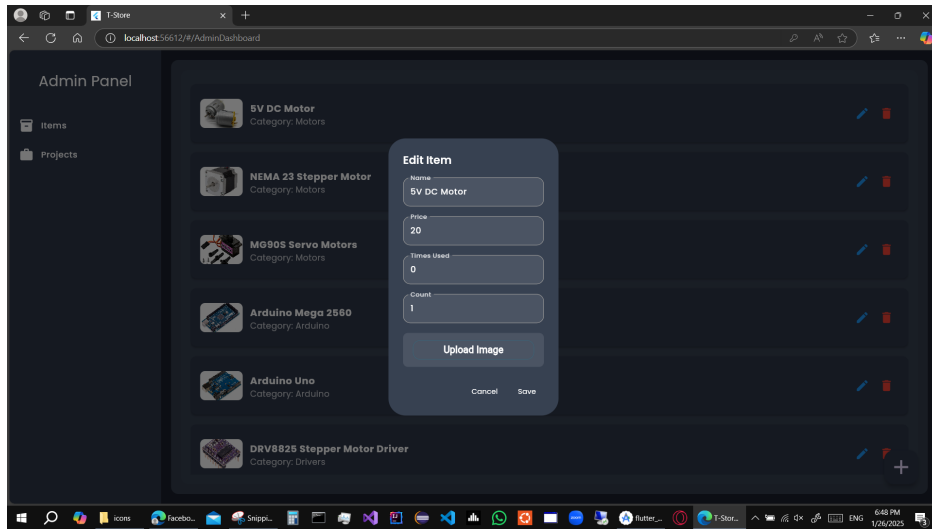
(b) Admin Page for projects.

The admin can add any new item or project and modify any item or project in the store.

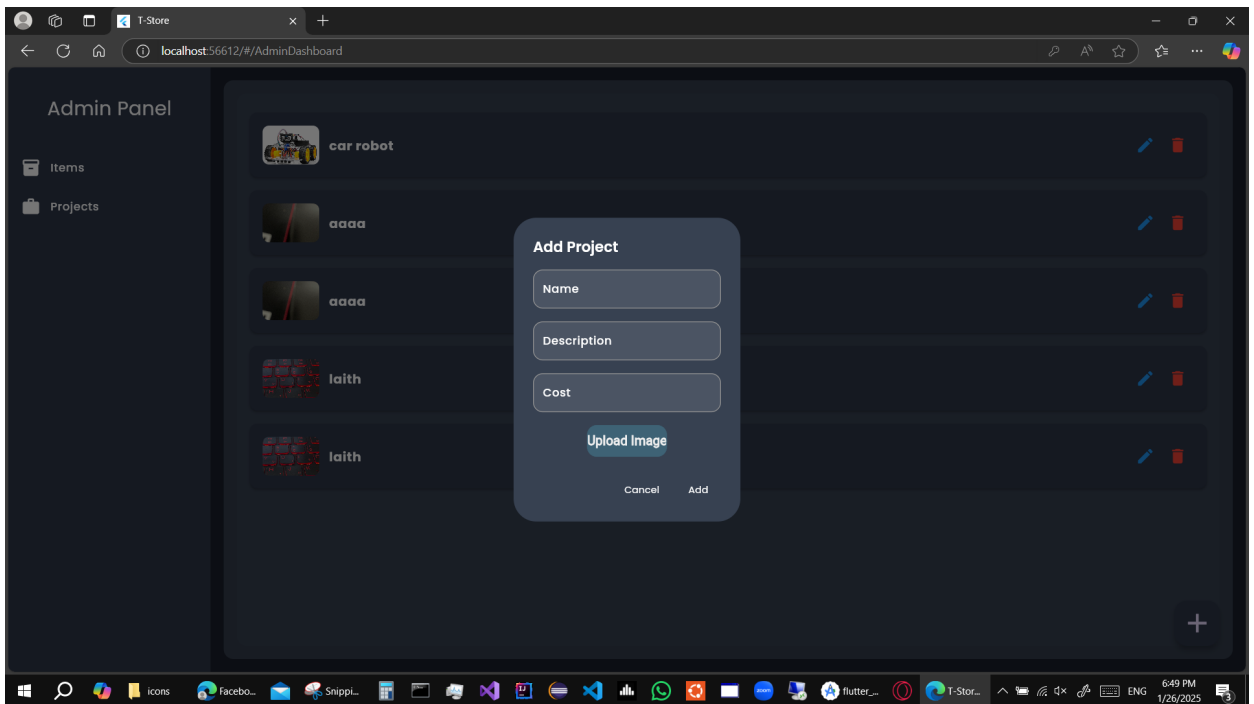
As shown in the following pictures:



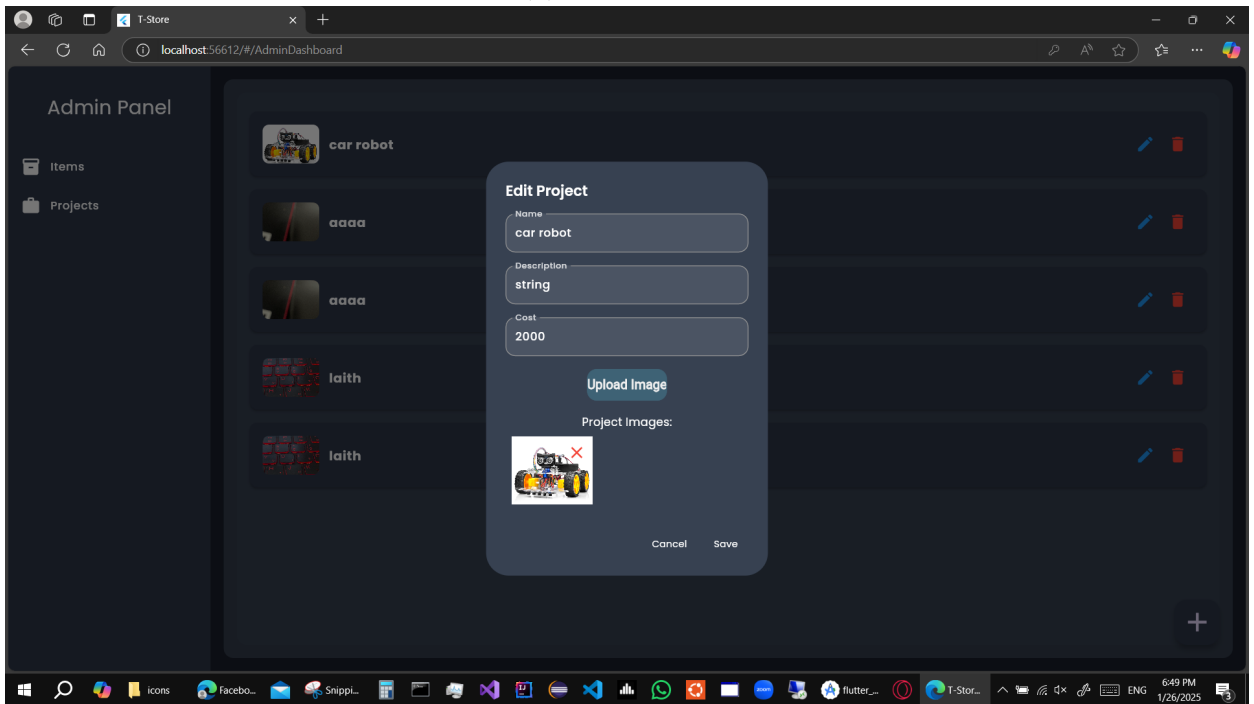
(a) Add Item.



(b) Edit Item.



(a) Add Project.



(b) Edit Project.

5 Results & Discussion

Result

StudentTechShop is a platform with a website and a mobile app that allows users to perform the following:

1. Users can have his own profile page and edit his information.
2. Users can see all new products.
3. The user can display the items he wants to sell for sale.
4. Users can review and buy any product.
5. Users can send a message to the owner of the item, inquire about any product, and have conversations with anyone.
6. The user can add, delete and update any product or project he has published, and the administrator can modify any product or project that he sees needs modification.

Discussion

StudentTechShop most likely supplied the following: Providing an easy-to-use platform regardless of their technical knowledge so that they can easily register and publish on the site.

6 Conclusion & Future Work

Conclusion

The StudentTechShop online store offers various services to users. It provides a feature for the user to publish the pieces he wants to sell so that other students can benefit from them and buy them at a good price. It also allows the user to display previous projects so that other students can benefit from them, and the ability to communicate with students to enhance cooperation between them and communicate with the supervisor for various inquiries regarding the site, and the ability to talk to the chatbot to answer questions related to the pieces. The store is also easy to use.

Future Work

There are several areas where StudentTechShop could improve, including:

1. Agree with a specific company to provide products in good quantities and prices for students and display them on the website.
2. Adding delivery service in agreement with the delivery company.
3. Adding payment service using Visa card.