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Web Application Development of “Regalia” at Techdojo Limited

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Web Application Development of "Regalia" at Techdojo Limited

By

Farzana Tabassum

Student ID: 1811014

Autumn, 2022

Supervisor: Rubayed Mehedi

R&D Officer

Department of Computer Science & Engineering

Independent University, Bangladesh

February 2, 2023

Dissertation submitted in partial fulfillment for the degree of Bachelor of Science in Computer Science and Engineering

Department of Computer Science & Engineering

Independent University, Bangladesh

Attestation

This is to confirm that I, Farzana Tabassum (1811014), completed the report, which was submitted as a requirement for the Degree in Computer Science and Engineering from Independent University, Bangladesh (IUB). Rubayed Mehedi sir (Supervisor) provided direction, and it was finished. I also attest that all of the work I've done since finishing my internship is unique. All information sources used for this study and report have received the appropriate credit.



02/02/2023

Signature Date

Farzana Tabassum

Name

Acknowledgment

I want to start by expressing my gratitude to Almighty Allah for endowing me with the strength and capacity to work hard. I consider it a privilege that Techdojo Limited offered me the chance to complete an internship there.

I want to say thank you to everyone who has helped me with my internship. I also want to express my sincere gratitude and appreciation to Rubayed Mehedi, an R&D Officer, in the department of computer science and engineering at Independent University, Bangladesh (IUB), who served as my internal supervisor and took the time to mentor and continually inspire me to patiently complete the project.

I would like to convey my sincere gratitude to my mentor and external supervisor, Ms. Shama Hoque, for including me in the organization and hiring me as an intern. Without her incredibly strong advice and assistance, I would not have been able to effectively complete the project. Additionally, my senior coworkers Sakib Mahmud and Shraboni Dey Prapti helped me get around the projects and made me feel at home from the moment I joined the organization.

Last but not least, I want to express my gratitude to my parents and other family members for their unending support.

Farzana Tabassum

Letter of Transmittal

Rubayed Mehedi

R&D Officer

Department of Computer Science and Engineering

School of Engineering and Computer Science

Independent University, Bangladesh

Subject: Submission of Internship Report for the completion of Graduation.

Dear Sir,

With due respect, I beg to state that, I am submitting my Internship Report to the requirements of the Bachelor of Science in Computer Science and Engineering program. Working under your active guidance is an outstanding accomplishment. I had been an intern at Techdojo Limited for three months, working under the direction of Ms. Shama Hoque, Managing Director. By doing this internship, I have achieved both academic and practical knowledge. Moreover, I was able to develop a network in the corporate environment. With the knowledge I obtained from my internship, I attempted to make this report as informative as I could. I adhered to the instructions and provided adequate explanations for the necessary fields to create a well-organized internship report. However, I genuinely think that this report will help my internship program achieve its goals.

I, therefore, pray and hope that you would be kind enough to accept this report and offer your insightful opinion. It would make me incredibly pleased if you found this report beneficial and enlightening in gaining a clear understanding of the problem.

Sincerely Yours,

Farzana Tabassum

ID- 1811014

Department of Computer Science and Engineering

Independent University, Bangladesh

Evaluation Committee

.....

Signature

Sabrina Alam

.....

Name

Sabrina Alam

.....

Internal Examiner-1 / Panel Member-1

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Signature

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Name

Md Abu Sayed

.....

External Examiner-2 / Panel Member-2

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Signature

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Name

Rubayed Mehedi

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Supervisor of the intern

.....

Signature

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Name

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Head, Department of Computer Science & Engineering

Abstract

Everybody has shopped in their lives. People spend a lot of time shopping these days. We at Techdojo Limited choose to develop a user-friendly e-commerce web application named ‘Regalia’ to make shopping easier and more enjoyable. I have been working as an intern at Techdojo Limited. People spend a lot of time looking for products before attempting to purchase them. Despite this, it is seen that consumers waste a lot of their time searching for the products they want. As a result, we have developed a solution that also serves as the web application's salient feature: the recommendation. People choose the categories and based on those choices; users receive product recommendations. People can save time and purchase conveniently and hassle-free in this way. Additionally, the seller receives product recommendations in addition to being able to post their products for sale. Many e-commerce web applications are user-friendly and people waste a lot of their time searching for their desired products.

This report provides a brief discussion of the project I created while working as an intern at Techdojo Limited. I had a learning session where I learned the tech stacks needed for the project before I started working on it. Background, goals, scope, firm profile, and other analytical topics are briefly explained in this report.

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Chapter 1

Introduction

Internship plays a very important role in a student's life. It aids a student in advancing their academic and professional objectives. A student's internship provides practical experience. They are exposed to the corporate world. They get an opportunity to study, observe, and develop their skills. The school of Engineering, Technology & Sciences of Independent University in Bangladesh offers a bachelor's degree program in "Computer Science and Engineering." An undergraduate student must take an internship course with a reputable company as part of the program to gain practical skills, corporate etiquette, etc. As a student of IUB, I have worked as an intern at Techdojo Limited for 3 months. I have developed a web application named 'Regalia'.

1.1 Overview/Background of the Work

In this report, I am representing my working experience with a developer team. I am developing an e-commerce web application named 'Regalia'. It mainly deals with selling used branded clothes.

It is mainly an e-commerce web application whose salient feature is a recommendation. It was developed so that people can save time while shopping. To develop this web application, I have used Next.js a framework of React.js, Node.js, Express.js and Mongo DB.

People usually waste a lot of their time while searching for their desired products. But still, it is seen that, sometimes they can't find their desired clothes. Instead, they ended up wasting a lot of their time. The user who wants to sell clothes also gets recommendation for products. People are also getting branded clothes at cheap prices. Users have to select categories and based on that; they will get recommendation for clothes within a short period of time.

This web application will save a lot of time of the people and will make shopping easier.

1.2 Objectives

A project objective often outlines the results that the project hopes to achieve. A project's objective must be precise, quantifiable, adhere to schedule and financial constraints, and most significantly, satisfy the needs of the client. The main objectives of the web application 'Regalia' are given below:

- User (seller) will be able to create product for sale.
- User (seller) can update and delete their product if they want.
- User will be able to select preferred categories.
- User i.e. both buyer and seller will get recommendation for products.
- User will be able to update their selected preferred categories and get new recommendations for products.

- User will be able to update their profile i.e. name and password.
- User will be able to view the details of a product.
- User will be able to view the total user view of the product.

1.3 Scopes

This web-based e-commerce will allow users to register and select preferred categories. Based on their selected categories, they will get recommendation for products. User who wants to sell products will have to fill up a form by providing the details of the product to add a product. Seller will be able to view the list of products he has posted for sale. Seller can also update or delete the product he has posted for sale if he wants.

User can also update their selected categories if he wants to get new recommendations. I have used Mongo DB aggregation to implement the recommendation feature. User can also view the details of the product and the total user view of the product. User will be able to update his profile i.e. name and password. User will be able to reset and update his password.

1.4 Problem Statement

Process	**Stakeholders**	**Concerns (Problems)**	**Analysis (Reason for the problems)**	**Proposed Solution**
Searching Products	User	This process could be time-consuming as users might find themselves lost in the process of finding the desired product from the list of products displayed.	1. When users visit the website, they are displayed a wide variety of products all at once. 2. This wastes time for the users. Because they must sort through the products to find their desired one.	1. When users visit the system, they must select categories. 2. Selecting the categories will pace up the entire search engine process.
Getting desired Products/	User	This process is lengthy and time-consuming.	1. Users usually search for products by writing the	1. Regalia will search for the products based on

Matching requirements with the product displayed			product name on the search bar. 2. Based on the product name, a list of products is displayed to the user. 3. Despite that, users can't find a product easily that matches their requirements.	the categories selected by the user. 2. The system will then display only the products that match the requirements of the user. 3. User (seller) who posts their products for sale also gets recommendations for products.

Table 1.0 Problem Statement

Chapter 2

Literature Review

2.1 Relationship with Undergraduate Studies

These are the undergraduate courses that helped me to write my internship report. I could successfully apply the knowledge gained from these courses to my project.

1. Database Management (CSE303):

As part of this course, I have created a project in which I have learned about the Rich picture, Six Element Analysis, Problem Analysis, and creating the Entity Relationship Diagram (ERD), which also will help me better understand the relationships between the various parties involved in my internship project. Moreover, I learned how to plan and organize the different sections of a project from this course

2. Object-Oriented Programming (CSE213):

From this course, I have learned about how to plan and identify the roles of different users in a project and then work on the class diagrams, implementing the features. Because of the topics I

learned in this course, helped me to develop my programming skills and that helped me to learn JavaScript, React.js, Next.js, Node.js, and Express.js.

3. Web Application and the Internet (CSE309):

Since I am also developing a web application, I have gained the basic knowledge of developing a web application from this course. I have learned HTML, CSS, JavaScript, and Bootstrap, and also learned how to connect the front end with the backend.

4. System Analysis and Design (CSE307):

For developing a system, I have learned from this course that I have to think about the User and how to make budgets for the project. How to negotiate with the client for the implementation of a feature of the project. Also learned about the Functional and Non-Functional Requirements of a system, and different diagrams that helped me to understand a system.

2.2 Related works

I am developing an e-commerce site named Regalia which is based on used branded clothes. The salient feature of this web application is that it "searches through recommendations of products". This is why the attires will only be displayed based on the requirements/data given by the user. It helps users to find their desired products within a short time. Moreover, the user gets the recommended products that match their requirements. So, I have listed some works that are similar to my project, and they are:

- **The RealReal** - It is an e-commerce web application that deals with authentic luxury resale. They sell branded clothes, shoes, bags, etc. Users can select their requirements from the options provided by the system and based on that, they show products to the user. Here, users who want to sell their used products can sign up and sell their products. If any product is sold out, it also shows the user that the product has been sold out.[1]

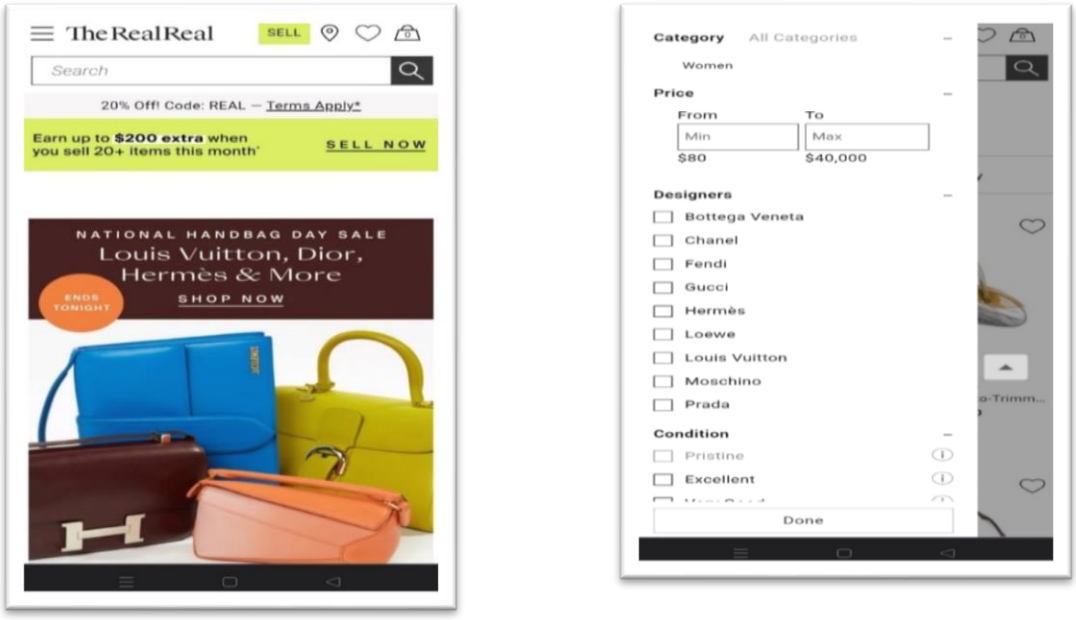


Figure 2.1 The RealReal

- **Findation** - It is an e-commerce web application that helps users to find their matching foundation shades of different brands. Users have to provide their previously used foundation brand and shade number. This website will give recommendations of foundations of brands that match the users' provided foundation shade number. They also sell foundations that match the user's requirements. It's quite popular among girls for its recommendation feature as the girls don’t have to go to the store to match their foundation shade which is kind of a must thing otherwise. For an accurate match, users have to provide two foundation shades that they use and they will be recommended foundation shades from other brands.[2]

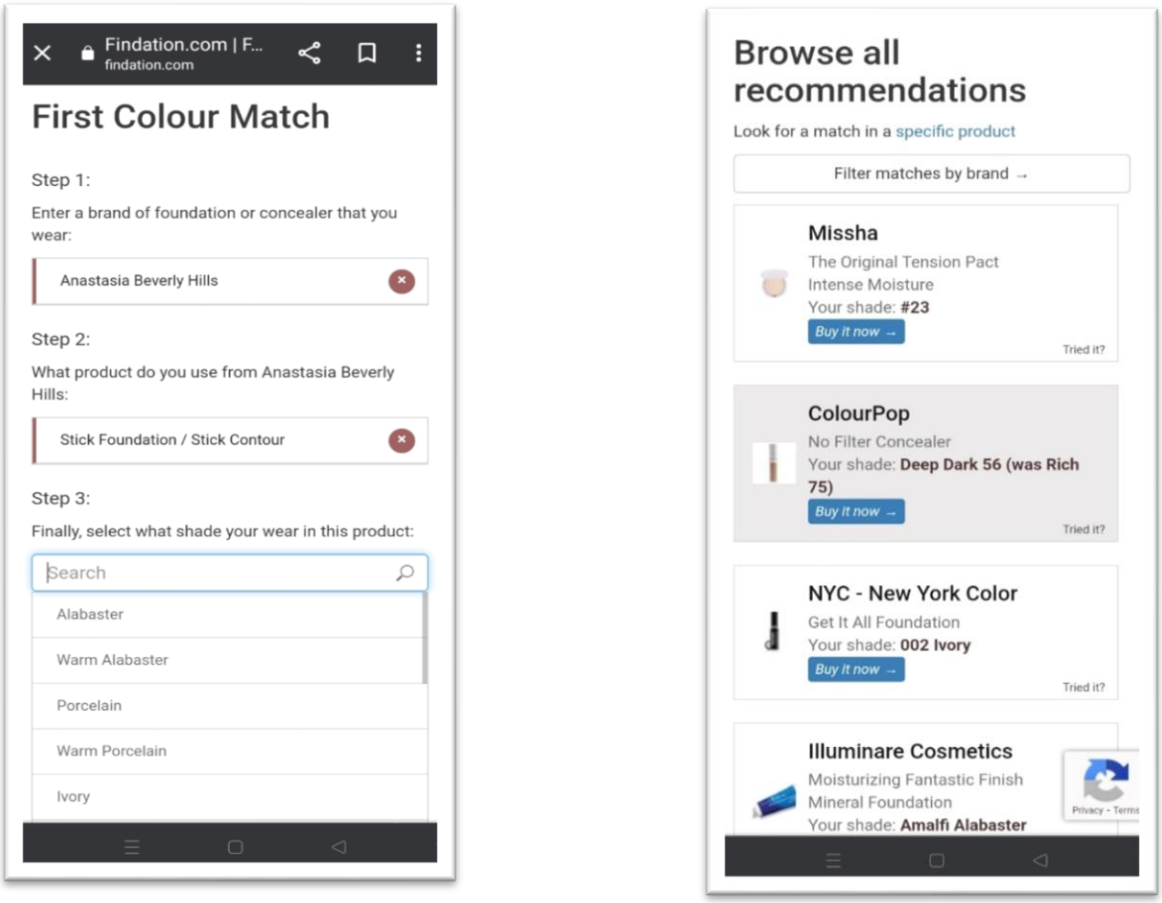


Figure 2.2 Findation

Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure (WBS)

A work breakdown structure (WBS) is a grouping of the tasks involved in a project that defines the overall scope of the project and is deliverable-oriented. It serves as the framework for planning and controlling project timelines, expenses, and adjustments, making it a foundational document in project management. The team's work is divided into manageable pieces as a result of this important project deliverable [3]. The top-down approach of WBS for this project is given below:

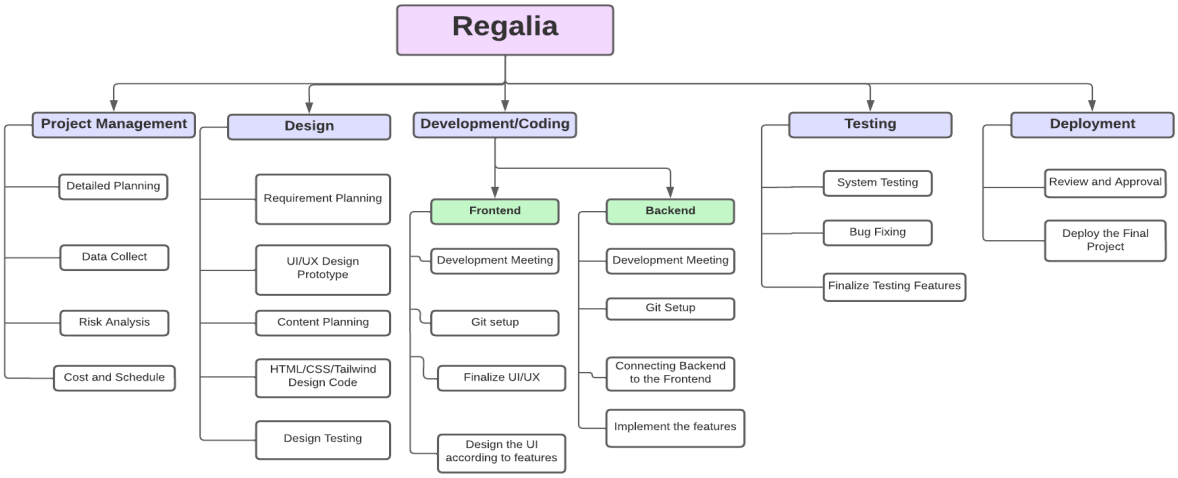


Figure 3.1 Work Breakdown Structure for Regalia

3.2 Process/Activity-wise Time Distribution

Prior to beginning a project, a developer must concentrate on time management. He must determine a deadline for effectively completing the job. The project's time distribution enables the developer to make a mind map and proceed as planned. Additionally, since they have previously scheduled the work, it aids them in completing it by the deadline. Time management is a crucial component of any endeavor. Before beginning the project, a well-organized plan should be in place. One can successfully complete the job on schedule by adhering to the plan.

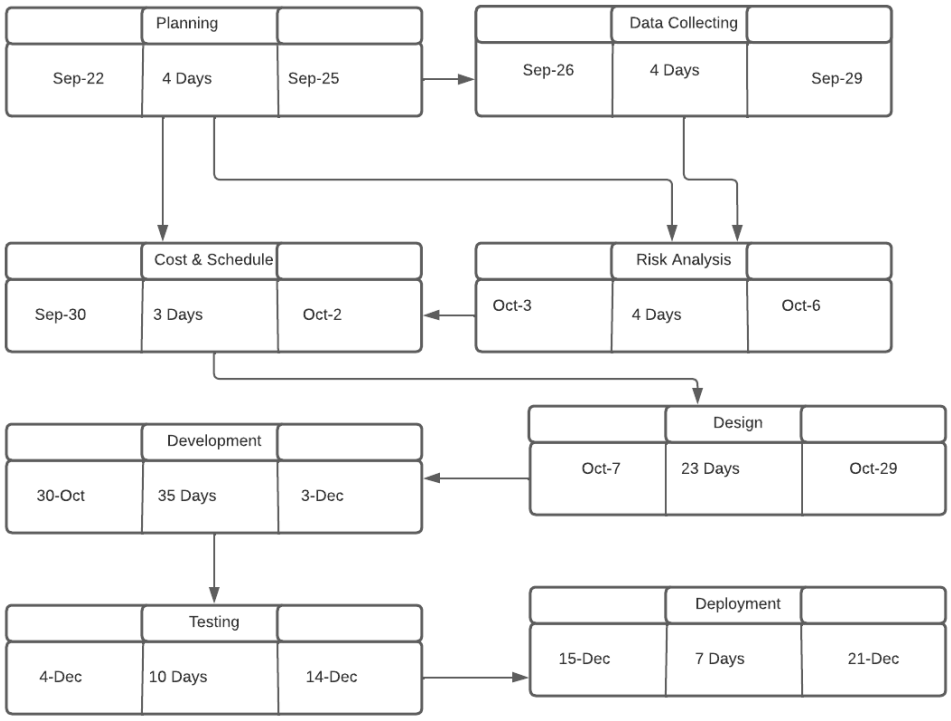


Figure 3.2 Critical Path Method for Regalia

In this case, four days for project planning, four days for data collection, four days for risk analysis, and three days for cost and schedule. Project management encompasses these four and accounts for 16.67% of total work. After these sections, it takes 35 days for development/coding, which accounts for 38.89% of the total work, and 23 days for design, which accounts for 25.56% of the total work. After development, it takes 10 days to test the project (11.11% of the work) and 7 days to deploy the project (7.78% of the work).

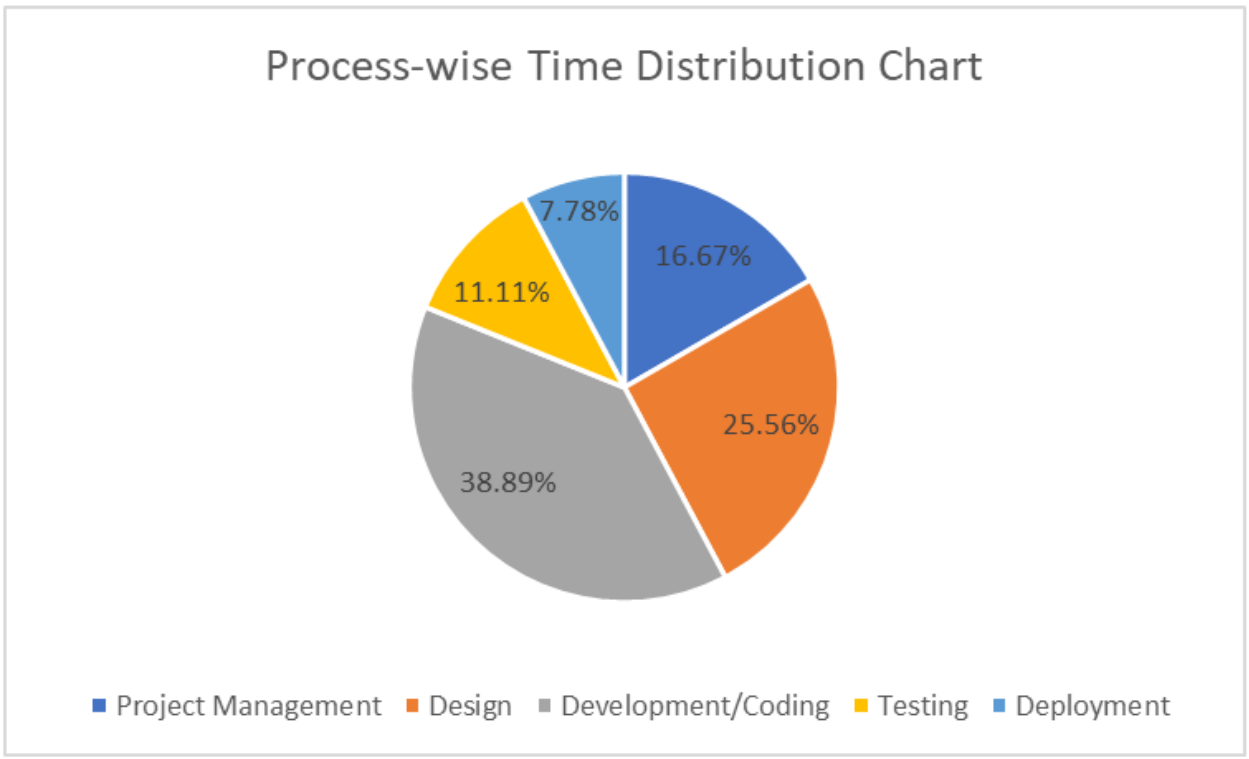


Figure 3.3 Process-wise Time Distribution Chart

3.3 Gantt Chart

Gantt charts display project activities in a calendar format with corresponding start and end dates, making it easy to view project schedules. Determining the duration of the project, required resources, and a plan for tasks is helpful. It also helps you monitor the progress of your project. This Gantt chart includes activity-based time allocation and activity-based resource allocation.

A Gantt chart is used for the following activities:

• Establishing the primary schedule - deciding when a certain task will be assigned to whom along with the duration.

• Allocating resources – everyone acknowledging what they are responsible for.

• Making project adjustments – making alterations to the original plan.

• Monitoring and tracking progress – way of sticking to the schedule.

• Controlling and communicating the schedule - clear visuals for stakeholders and participants.

• Displaying milestones - shows key events.

The Gantt chart is given below:

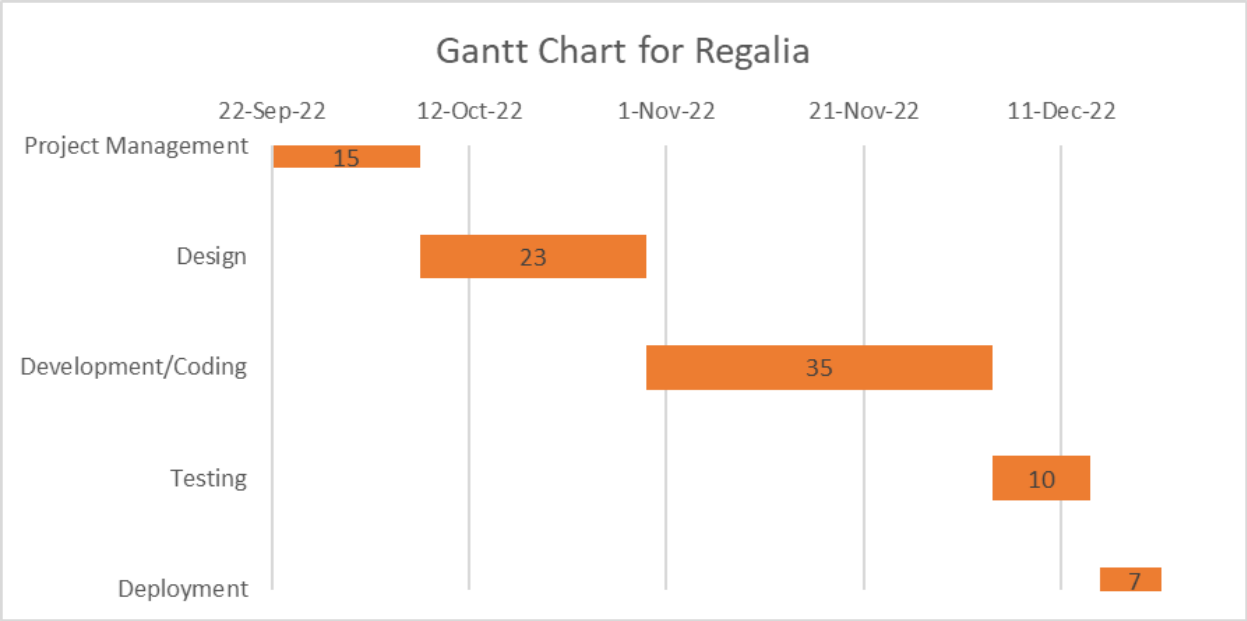


Figure 3.4 Gantt Chart for Regalia

The Gantt chart focuses on the first five stages of the development process. It took 15 days for project management, 23 days for project design, and 35 days for development/coding. After development, I had to test the product for 10 days before using it, and it took another 7 days.

3.4 Process/Activity-wise Resource Allocation

The method of allocating resources to a project in a way that supports the project's primary goals is called resource allocation. The most important asset in this situation is the developer, followed by the office PCs and servers required to deliver the project. Every employee in the company is considered a resource, so they all get their scheduled tasks and ultimately form the whole project together. It takes 90 days to complete this project to develop the whole system. The following information is provided for each step of the project:

• **Project Management:** The CEO was first introduced to the idea at an early stage of this project. The CEO and developers discussed how the project should be built from the ground up, the efforts to take, ideas to propose, and setting smaller goals with a deadline to complete the project within a few minutes. the first weeks. Examples include requirements for IT, software, or other technology used to build the application, features, and developer needs. This part is considered 16.67% of the entire work.

• **Design:** At this point, the management team started working on the high- and low-level diagrams of the project, and started working on developing the web pages for about three weeks. This part is considered 25.56% of the entire work.

• **Development/Coding:** The management team is still monitoring whether all deadlines are met at this stage. The website designs are complete, and the developers have started creating the code for the beginning and the end of the program. The entire process took 5 weeks and accounted for 38.89% of the overall effort.

• **Testing:** As soon as a feature was introduced to the website, testing began. As a result, the developers tested at the same time. After the implementation phase, unit testing of the application started. It takes him 10 days to complete this procedure, which accounts for his 11.11% of the total workload.

• **Deployment:** When testing was complete, the team found themselves behind schedule. I purchased a VPS (Virtual Private Server) and domain to deploy my application on a live server. This represents 7.78% of the total job and takes 7 days.

Activity-wise Resource Allocation		
Activity	Days	Work Percentage
Project Management	15	16.67%
Design	23	25.56%
Development/Coding	35	38.89%
Testing	10	11.11%
Deployment	7	7.78%
Total	90	100%

Table 3.1 Activity-wise Resource Allocation

3.5 Estimated Costing

Based on the functions the customer required from the website, the price was determined. It depends on the website's size, specifications, features, and design. This covers the price of the pre-designed themes, the cost of the logo design, SEO, social network integration, SSL certificates, and many other tools that were utilized to create this website. Additionally, take into account where the developer's fee and the resources utilized. For the entire project, it was

anticipated to cost Tk 1,96,300 (BDT). Within a year of deployment, extra hosting and domain fees will be applied if any further service support is needed.

Features	Cost
Internet Bills	5000
Domain Bills	4500
Hosting Bills	1800
Project Manager	45,000
Frontend Developer	60,000
Backend Developer	80,000
Total Costs	1,96,300

Table 3.2 Table for Estimated Costing

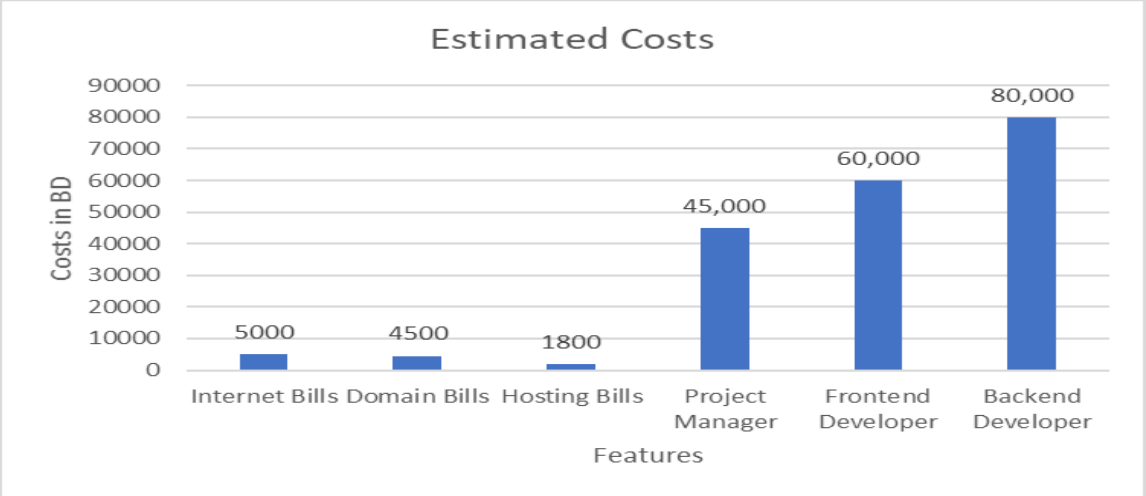


Figure 3.5 Chart for Estimated Costing

Chapter 4

Methodology

My project is known as Regalia, which means attire. I plan to build an e-commerce web application that will only sell branded used clothes. This is affordable, and both time and cost-effective. To develop this web application, I have followed the following methodologies:

4.1 Software Development Methodology:

The Software Development Life Cycle (SDLC) breaks down software development work into phases to improve design, product management, and project management. SDLC focuses on the following parts of software development:

- Planning
- Analysis
- Software design such as architectural design
- Software development
- Testing
- Development

Extreme Programming (XP)

Extreme Programming (XP) is an agile software development framework that aims to produce higher-quality software while also improving the development team's quality of life. Communication, Simplicity, Feedback, Courage, and Respect are the five values of XP.[4]

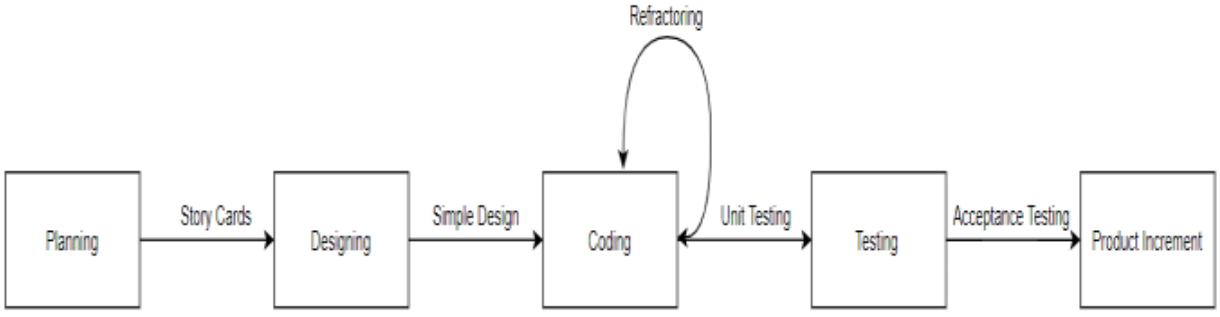


Figure 4.1 Extreme Programming Methodology

Advantages of Extreme Programming:

- The main advantage is that this methodology removes unproductive activities that save both cost and time needed for project realization.
- It reduces the risk of project failure by ensuring that the client gets what he wants.
- Developers create simple code as one of the five values of XP is simplicity. Hence, the code can be altered/improved if needed.
- Constant feedback helps the team move in the right direction as they were listening carefully to every feedback from the early stage. It also helps to make fewer errors in the project.
- XP creates working software faster because it performs regular tests during the development stage, detecting all bugs and errors.[5]

4.2 Software Development Process of Techdojo Limited

- Tech Exploration: For my project, I have learned React.js, Next.js, Node.js, Express.js, and Mongo Db.
- Team Collaboration: Learning about version control systems such as Git.
- SDLC practices: Getting acquainted with agile/XP practice
- Effective Teamwork: Learning methods such as pair programming and code reviews help teams work more successfully and efficiently.
- Customer Feedback Cycle: Weekly development and delivery iterations are delivered.

4.3 Development Tools

For developing ‘Regalia’, I have learned Next.js, Node.js, Express.js, and MongoDB. The technologies listed below have been extensively employed in the learning and development process.

Next.js

Next.js is an open-source web development framework that allows React-based web applications to have the server-side rendering and generate static websites created by Vercel. Its main feature is the use of server-side rendering to reduce the demand on web browsers.Next.js differs from React.js in that it allows the website to be rendered on the server before being delivered to the client. We used this tech stack to develop the front end of my project.[6]

Node.js

Node.js is a back-end JavaScript runtime environment that runs on a JavaScript Engine (i.e. V8 engine) that executes JavaScript code outside of a web browser and was developed to construct scalable network applications. Using Node.js both apps and software can be built. It uses a single-thread event loop and runs asynchronously.[7]

Express.js

Express.js is a framework of Node.js. It is an open-source software used for building Rest APIs with Node.js. It helps us to build web applications and APIs. It also handles many different HTTP requests at a specific URL.[8]

Mongo DB

Mongo is an open-source document-oriented database program. It is also known as a NoSQL database. It has collections but no rows and columns like SQL. It uses JSON-like documents with optional schemas. We are using mongo Db to store the information of our users, products, etc. MongoDB can run over numerous servers, balancing the demand or replicating data to keep the system operational in the event of hardware failure.[9]

Chapter 5

Body of the Project

5.1 Work Description

Regalia is an e-commerce web application that sells used branded clothes. User registers in the system and must have to select the categories according to their choices/preferences. Based on the user's choices, the system will give recommendations of products to the user. In this system, users can post a product for sale. This system solves users' waste of time while finding their desired products from the list of products. Here, users can easily find their desired product recommendations within a short time.

This system consists of nine modules. These are:

1. **Registration and Login:** User can create their account by providing their name, email, gender, and password. Users can also login into the system by providing their registered email and password.
2. **Select Preferred Categories:** When a user registers for the system and becomes registered, there will be a pop-up window in front of the user. Users must have to select at least 2 categories according to their choices from the list of categories displayed in that window. Then he clicks on the 'Save' button

3. **Recommendation for products:** The user gets the recommendation of products on his homepage based on the categories he selected. Every user will have different recommendations of products on his homepage as the recommendation depends on the user-selected categories. A user who sells products also gets a recommendation for products.
4. **Posting Products:** If a user wants to sell products he will have to go to the 'Sell with us' page and must fill up a form. In the form, he will have to provide category, brand, fabric, cloth size, gender for whom this cloth is being posted for selling, condition of the cloth, original price of the cloth, selling price of the cloth, tags of the cloth and image of the cloth. The user will have to provide all these details of the product that he/she wants to sale. After clicking on the 'Submit' button, if all the data are properly given then the user will view the product details on the "My Products" page.
5. **Details of the product:** The user can view the details of each product by clicking on the product displayed on the homepage. Users can view the details without signing up in the system.
6. **Update and Delete product:** The user can edit, delete, and get all the products he has posted for selling on the "My Products" page. By clicking on the 'Edit' button, the user will be able to edit the product details. If the user wants to delete the product from the "My Products" page, he/she will have to click on the 'Delete' button.
7. **Update Selected Preferred Categories:** If a user wants to get new recommendations of products, then he will go to the "My Preference" page. Then he will unclick the categories that he has selected before and then click on the categories that match his preferences. After selecting the categories, he must click on the 'Save' button. Then he will get new recommendations of products on his homepage.
8. **Update Profile:** If a user wants to change his name, and password then he must go to the "My Profile" page. From there, the user can change his name and password.
9. **Count product view:** Total product view will be displayed when a user clicks on the product to view details.

5.2 Requirement Analysis

5.2.1 Rich Picture

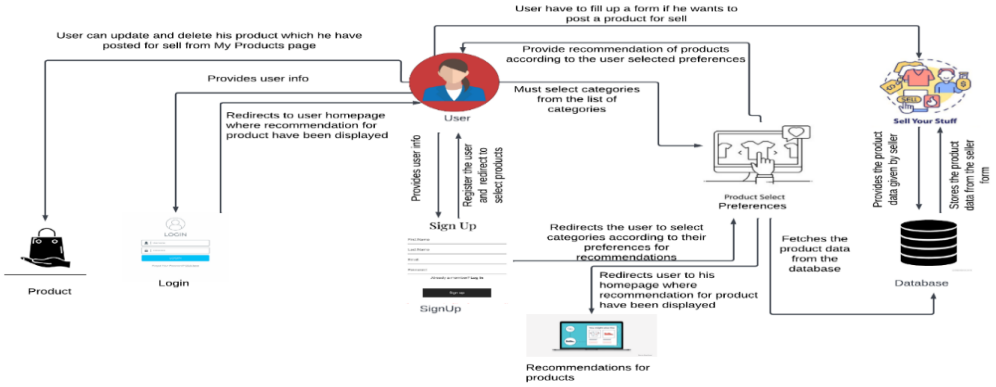


Figure 5.1 Rich picture of Regalia

5.2.2 Functional and Non-Functional Requirements

Functional Requirements

Those requirements that are crucial to the system are known as functional requirements. To help the user in achieving their objectives, the developer must implement these requirements.

Function: The user signs up		
Input: Name, email, gender, password	**Process:** Save sign-up details to the database.	**Output:** New user are created, and their details given during signup is saved in the database.
Precondition: User must have internet access		
Postcondition: The user gets a confirmation message and gets redirected to the preference page		

Table 5.1 Functional Requirement- Sign-up process

Function: Select Preferred Categories		
Input: Select at least two categories from the list of categories given on the preference page.	**Process:** Save the selected preferred categories of the user in the database	**Output:** Recommendations of products will be displayed on the user's homepage.
Precondition: 1. User must have internet access 2. User must sign up		
Postcondition: The user gets recommendations for products on the homepage.		

Table 5.2 Functional Requirement- Select Preferred Products process

Function: Posting Products		
Input: The user must fill up a form where he/she has to provide the product details that the user wants to post for sale.	**Process:** Save the product details in the database	**Output:** Products posted by the seller will be displayed on the 'My products' page and the seller can edit and delete that product as well.
Precondition: 1. User must have internet access		

2. Must be a registered user
Postcondition: The user (Seller) will be able to view the products which he/she has posted for sale on the ‘My Products’ page.

Table 5.3 Functional Requirement- Posting Products process

Function: Update and Delete Products		
Input: 1**.** User (Seller) must click on the edit button and update the details of the product which he has posted for selling. 2. User (Seller) must click on the delete button to delete a product that he has posted for sale.	**Process:** 1. If a product is edited, then save the updated product in the database. 2. If a product is deleted then the database is also updated, and that product is removed from the database	**Output:** 1. The product which has been updated is displayed on the ‘My Products’ page with updated details. 2. The product which has been deleted is removed from the “My Products” page.
Precondition: 1. User must have internet access. 2. Must be a registered user. 3. The product must exist to update and delete.		
Postcondition: The user (Seller) will be able to view his updated products which he/she has posted for sale on the ‘My Products’ page.		

Table 5.4 Functional Requirement- Update and Delete Products process

Function: Update Selected Preferred Categories		
Input: Select at least two categories from the list of categories given on the preference page and can also unselect the previous categories which have been selected before.	**Process:** Save the updated selected preference categories of the user in the database	**Output:** Recommendations for the product will be updated and displayed on the user’s homepage.
Precondition: 1. User must have internet access 2. User must sign up		
Postcondition: The user gets recommendations for products on the homepage.		

Table 5.5 Functional Requirement- Update Selected Preferred Products process

Function: Update Profile		
Input: The user provides a new name or password or both.	**Process:** Save updated user details to the database.	**Output:** The user's name and password have been updated on the "My Profile" page
Precondition: 1. User must have internet access. 2. Must be a registered user.		
Postcondition: The user gets a confirmation message and gets redirected to the 'My Profile page.		

Table 5.6 Functional Requirement- Update Profile process

Function: View details of the Product		
Input: The user must click on the product displayed on the homepage.	**Process:** Products that are clicked on, displays the detail of that product.	**Output:** Displays the detail of the product.
Precondition: The user must have internet access.		
Postcondition: Product details will be displayed		

Table 5.7 Functional Requirement- View details of the Product process

Function: Recommendation for products		
Input: Select at least two categories from the list of categories given on the preference page.	**Process:** 1. Match the user preference tags from the user model and product tags from the product model. 2. Remove that particular user-created product from the recommendation. 3. Calculate the total tags matched in each product. 4. Recommend the product whose total tags matched is greater than or equal to two.	**Output:** Recommendations of products will be displayed on the user's homepage.
Precondition: 1. User must have internet access		

2. User must select preferred categories
Postcondition: The user gets recommendations for products on the homepage.

Table 5.8 Functional Requirement- Recommendation for Products process

Non-Functional Requirements

Non-functional requirements are those requirements that help the system become user-friendly and easy to use. A non-functional requirement describes criteria rather than specific behaviors that can be used to evaluate how a system performs. Functional requirements, which specify specific behavior or functions for a given system or application, contrast with non-functional requirements. Non-functional requirements come in many different forms, including those related to performance, security, scalability, information, efficiency, etc.

Here are some non-functional requirements:

Performance and Scalability: Performance is a measure of a system's ability to execute any action within a specific time frame, whereas scalability is a measure of a system's capacity to handle increases in load without degrading performance or quickly adding resources. The response time of this system is quite fast. When the user register and login for the system, the system responds within a short time. When the user who wants to sell products, fills up the form for posting products, the product is posted within a short interval. Other functions like updating products, selecting preferred products, updating selected preferred products, updating profiles, viewing recommendations for the products, and viewing details of the product, etc. also respond very fast. The site of the system is responsive on every device and the functions of the system also work properly on every device.

Portability and Compatibility: Regalia can be accessed from any web browser or operating system. To access this web application, the internet is a must. The portal is compatible with every device.

Reliability, Availability, and Maintainability: The system has also undergone numerous performance tests, leading to the conclusion that it will function properly for a very long time. The system has backups, so when the primary system is undergoing maintenance, the backup system can be used. This makes maintenance simple.

Security: The user’s account credentials are saved in the database properly. The user’s password is securely encrypted, and the encrypted password is saved in the database.

Usability: Regalia is designed so that users can use it without difficulty. The system was created with user-friendliness in mind.

5.3 System Analysis

System analysis is the process of gathering and interpreting data, determining issues, and breaking down a system into its constituent parts. It is carried out to study a system or its components to determine its goals. [10]

5.3.1 Six-Element Analysis

Process	**System Roles**				
	Human	**Computing Hardware**	**Software**	**Database**	**Communication & Networks**
Landing Page	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN
Signup/ Login	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN
Select Preferred Categories	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN
View Recommendations for products	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN
View details of the product	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN
Posting products for sell	User (Seller)	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN
Update and delete products	User (Seller)	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN
Update Selected Preferred Categories	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN

Update Profile	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN
View total product count view	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge	MongoDB	WAN/LAN

Table 5.9 Six-Element Analysis of Regalia

5.3.2 Feasibility Analysis

Any proposed project or plan's initial design phase includes a feasibility study. It is done to assess the viability of a proposed project or software that the company already uses. It can help in determining and evaluating the chances of success, the resources required for the project, and any opportunities and threats present in the surrounding environment. [11]

There are some parts of the feasibility analysis. These are:

1. **Technical Feasibility:** Technical Feasibility analyzes and evaluates the project's present resources, including hardware, software, and necessary technology. This technical feasibility analysis provides information on whether the technologies and resources needed to develop the project are indeed available.[12]
   Regalia has been developed using Node.js, Express.js, and MongoDB. For the front end, Next Js the framework of React.js has been used. Node.js is known for its higher performance and easy scalability. Additionally, these technologies are extensively used by a developing community and are very well-liked in the existing industry.
2. **Operational Feasibility:** The degree to which a proposed system addresses issues, seizes opportunities discovered during scope definition, and satisfies requirements found during the requirements analysis stage of system development is referred to as operational feasibility.[13]
   Regalia is developed in such a way that people can use it without any difficulty. It saves people’s time and makes shopping easier for users. People need not have the technical knowledge to use this system. People of all ages can use this web application to find their desired product within a short period. Moreover, people will also get recommendations for products based on their preferences.
3. **Economic Feasibility:** The cost and benefit of the project are examined in the economic feasibility study. This means that as part of the feasibility study, a thorough analysis is done to determine the project's development costs, which include all expenses necessary for the project's final development, such as the cost of the design and development

process as well as any operational expenses. After that, it is determined whether the project will be profitable for the organization financially or not. [14]
Regalia was built so that people can save their energy and time while finding clothes in a short time. Moreover, it is cost-effective for people as they buy reused branded clothes at low prices. So, if this web application reaches the user, it will be economically beneficial.

5.3.3 Problem Solution Analysis

The problem a web developer faced during the web development process is that the requirements of the web application are changing frequently. As a result, these create a lot of problems as the web developer have to keep track of the frequently changing requirements. It's a challenging task to gather the requirements before starting any project.

The solution to this problem is:

1. Plan everything beforehand
2. Understand every scope of the project
3. Write in detail the project scope
4. Set a deadline for the task
5. Make sure the clients are involved from the start of the project
6. Communication between the team and the client is necessary.

Project Management: It's very important to plan the tasks. Sometimes, multitasking delays the work and we fall behind our deadline. It's better to keep track of the task and prioritize the task according to priority. A well-planned task helps us to understand the features and the requirements of the project.

Adapting to current market trends: Technology is improving, and new technologies are developing now and then. It's very important to keep track of the new technologies as along with the technology, the number of users is also increasing. As people are getting adapted to new technology. So, we should also learn new technologies and keep ourselves updated. We also have to think about the users, their perspectives and how could we develop a system so that users could easily use that system.

5.3.4 Effect and Constraints Analysis

Effect: Earlier, people didn't have any chance to sell their used clothes. People used to keep their used clothes in their wardrobes and didn't use them. There were hardly any software/web applications used to sell branded used clothes. Because of software, it has become easier for people to sell their used clothes and now they can even get their desired products within a short period. Moreover, they also get recommendations for products based on their preferences. The data are stored in the database and the software is user-friendly. There is no need to keep track of paper documents. The user (seller) can easily view the products that they have posted for sale.

Before this software, all the tasks were done manually, this system helped the company to keep track of the products, users, and their preferences.

Constraint: Many difficulties were faced to find the solution to developing a system that helps people to save time and money while looking for reused branded clothes. To develop the system, the cost of the budget was higher. To reduce the budget, we have to minimize the functionalities of the system so that the system can be developed within the budget and period. This software was beneficial for the company. It saves a lot of the workload of the company.

5.4 System Design

5.4.1 UML Diagrams

Use Case diagrams of the Regalia System are given below:

Module- 1: Registration and Login

Actors: User

Goal in context: The diagram shown in the figure: 5.2 represents the Registration and Login process of the Regalia system.

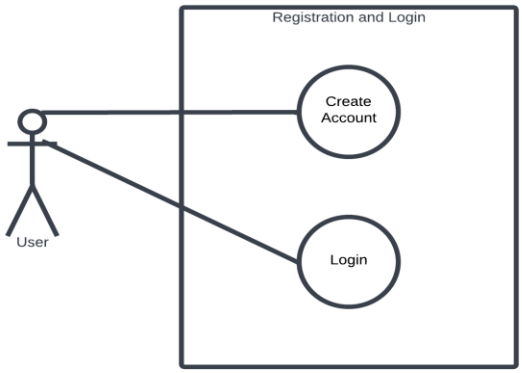


Figure 5.2 Registration and Login process of Regalia

Module- 2: Create Product

Actors: User

Goal in context: The diagram shown in the figure: 5.3 represents the Create Product process of the Regalia system.

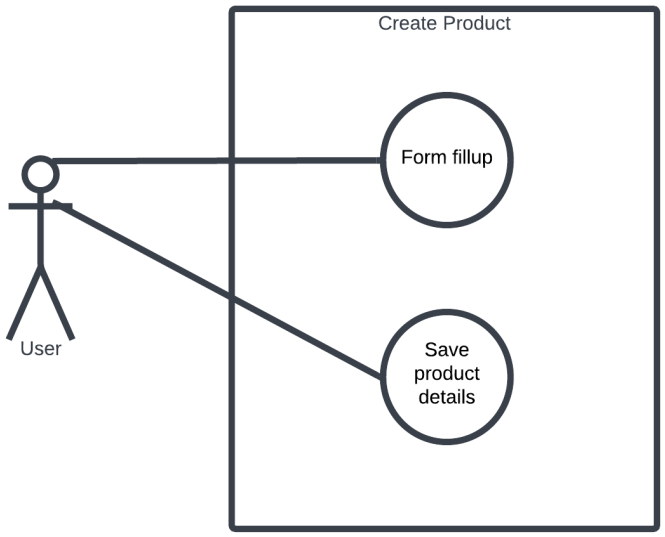


Figure 5.3 Create Product process of Regalia

Module- 3: Update Products

Actors: User

Goal in context: The diagram shown in the figure: 5.4 represents the Update Products process of the Regalia system.

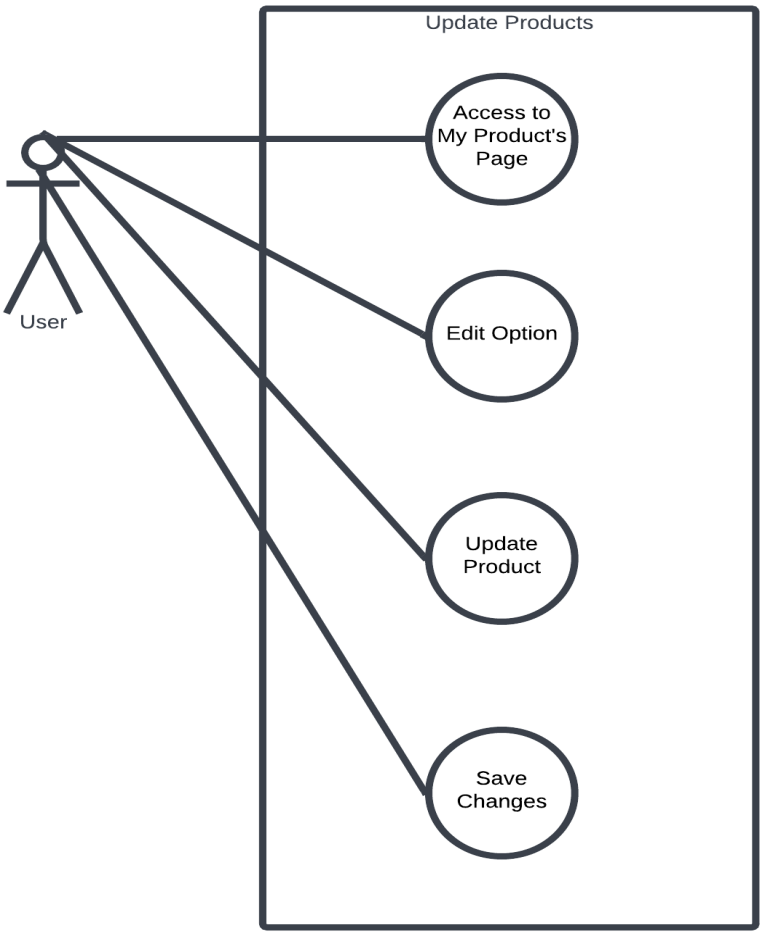


Figure 5.4 Update Products process of Regalia

Module- 4: Select Preferred Categories

Actors: User

Goal in context: The diagram shown in the figure: 5.5 represents the Select Preferred Products process of the Regalia system.

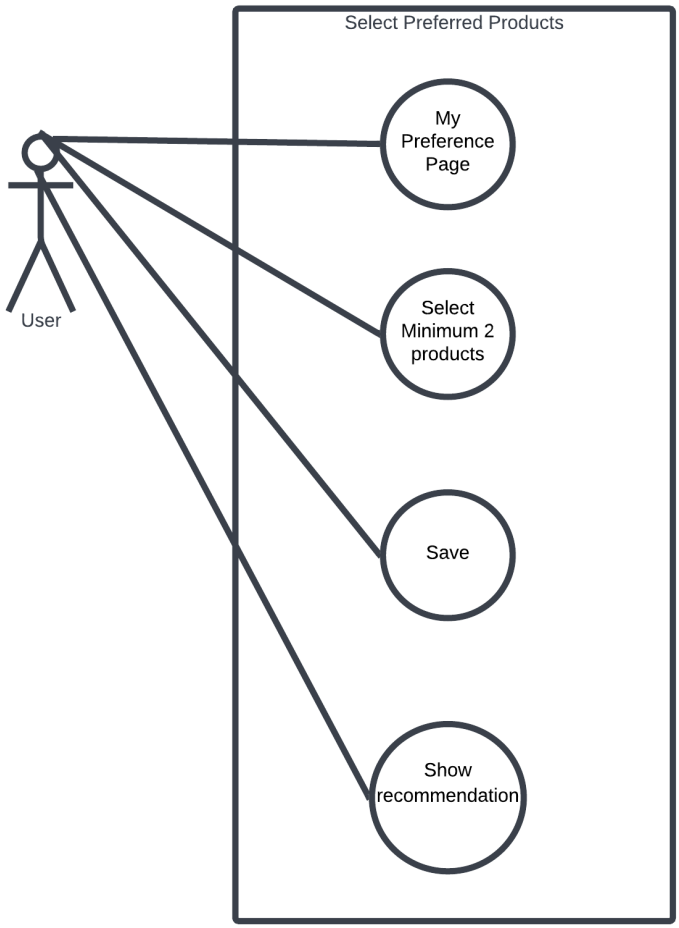


Figure 5.5 Select Preferred Categories process of Regalia

Module- 5: Update Selected Preferred Products

Actors: User

Goal in context: The diagram shown in the figure: 5.6 represents the Update Selected Preferred Products process of the Regalia system.

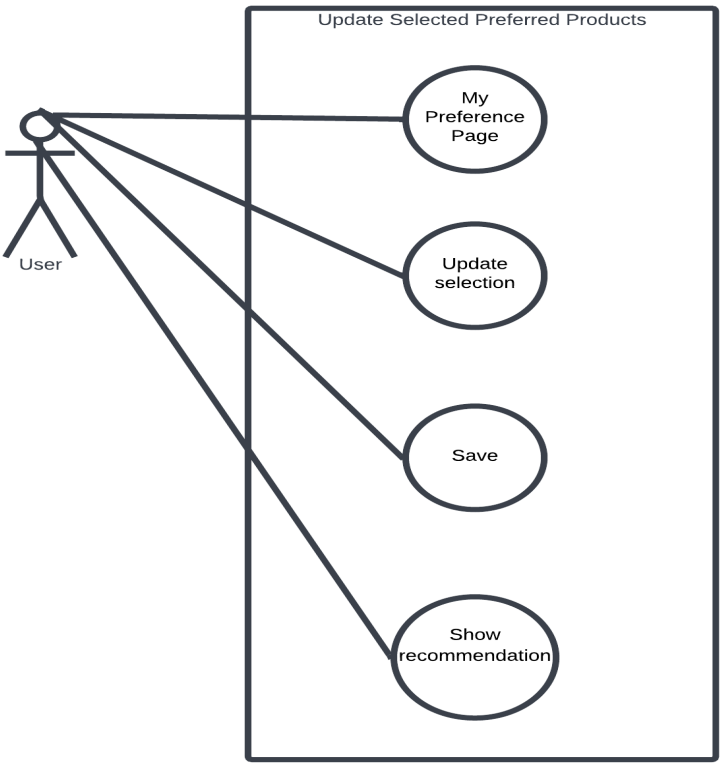


Figure 5.6 Update Select Preferred Categories process of Regalia

Module- 6: Update Profile

Actors: User

Goal in context: The diagram shown in the figure: 5.7 represents the Update Profile process of the Regalia system.

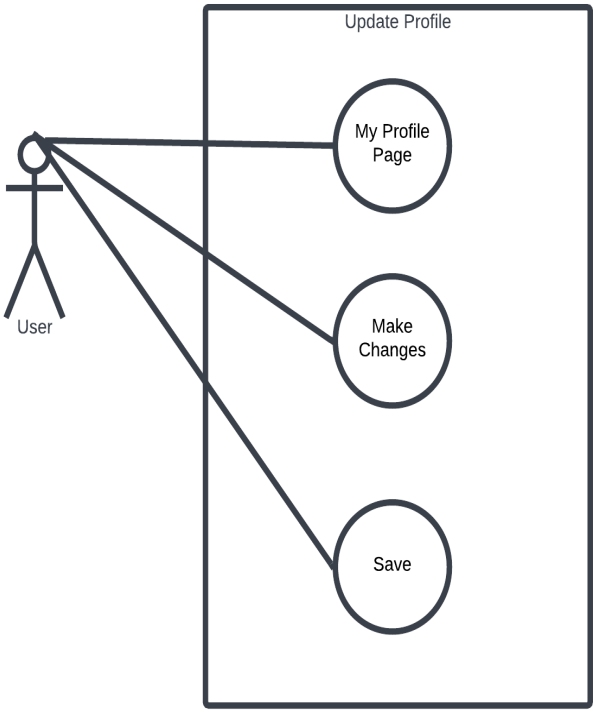


Figure 5.7 Update Profile process of Regalia

Module- 7: View Product Details

Actors: User

Goal in context: The diagram shown in the figure: 5.8 represents the View Product Details process of the Regalia system.

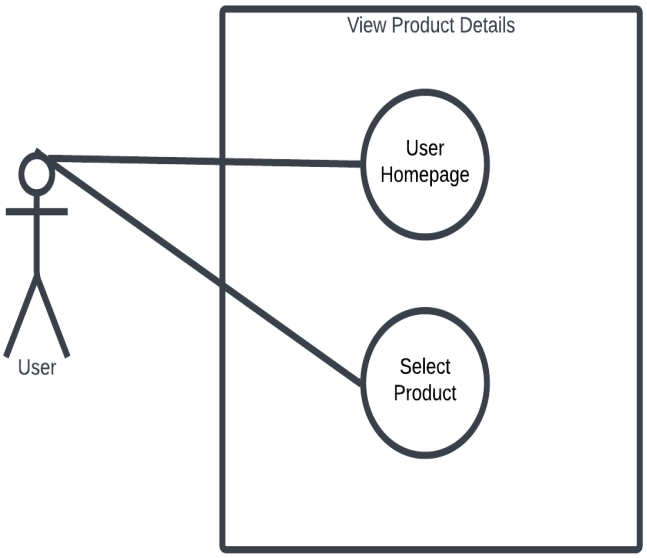


Figure 5.8 View Product Details process of Regalia

5.4.2 Architecture

A system's architecture acts as a blueprint. It establishes a communication and coordination mechanism between components and offers an abstraction to manage the complexity of the system. [15]

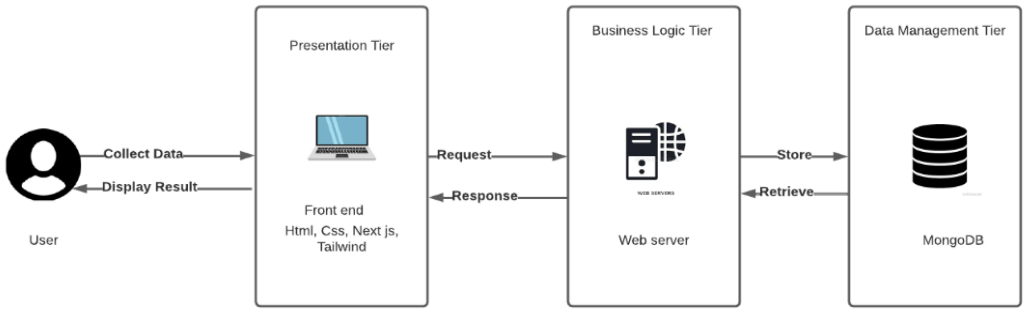


Figure 5.9 Website Architecture of Regalia

I've talked about the project's architecture that I have created. The user engages with the system's front end. Only the front end is visible to the user, who issues requests or gives commands to the front end. The web server then retrieves and stores the data in the database after receiving the requests or commands from the front. The data is then returned to the front end for the users as a response by the web server.

5.4.3 Entity Relationship Diagram

The ERD of the Regalia system is given below:

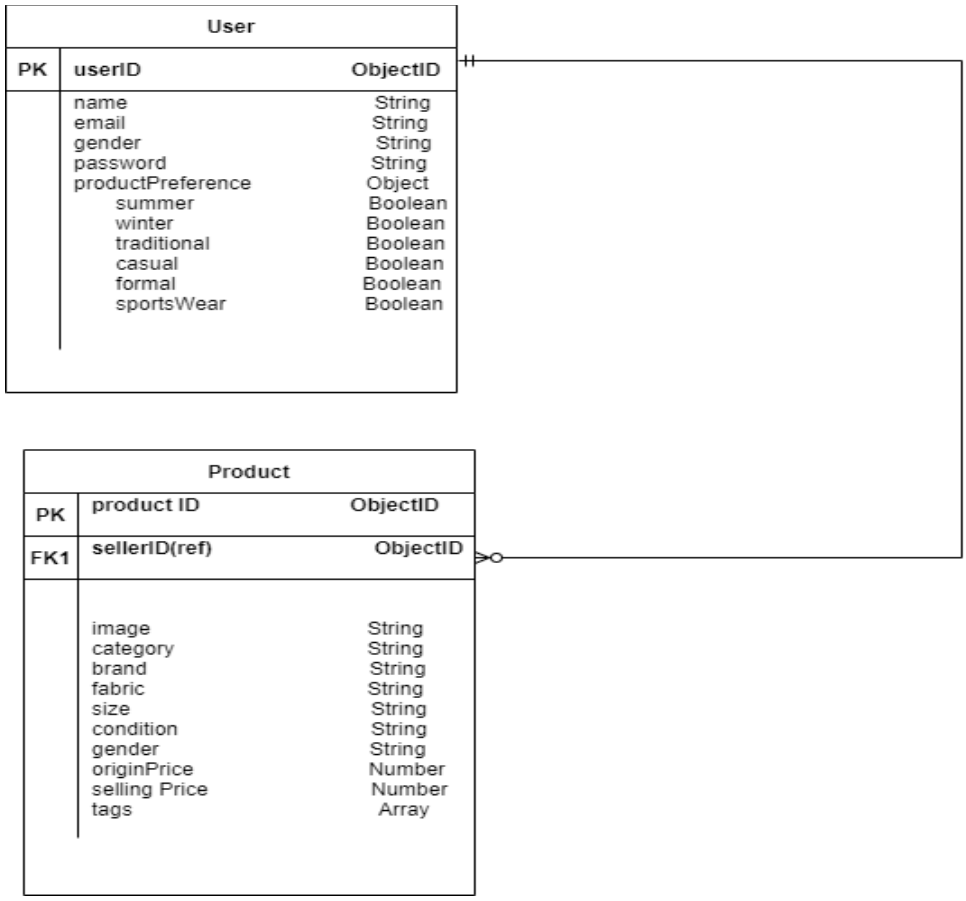


Figure 5.10 Entity Relationship Diagram of Regalia

5.5 Implementation

- User needs to sign up for the system and will be redirected to the selected preferred categories.
- User will choose at least 2 preferred categories from the category list and the user will be able to view the recommendations of the product list on their homepage based on the selected categories.

- User if he login into the system, he/she will view the recommendations of the product list on their homepage.
- User if he/she wants to sell products then he/she has to fill up a form providing product details. Then the product he posted for sale is displayed on the ‘My product’ page.
- User can update the details of his/her product from the ‘My product’ page and can delete the product from the ‘My product’ page.
- User can view the details of the product if he clicks on the product from the product list on the homepage.
- User will be able to update his/her name and password from the ‘My profile page.
- Users will be able to view the total number of users visiting a product by clicking on that particular product.

5.6 Testing

5.6.1 Input

The following are the inputs of Regalia:

Inputs of Regalia	
Process	**Fields Type**
Registration	Name- String Email- String Gender- String Password-String
Login	Email- String Password-String
Posting products for sell	Image- String Category- String Brand- String Fabric- String Size- String Condition-String Gender-String Original Price- Number Selling Price- Number Tags- Array
Update Product	Image- String Category- String Brand- String Fabric- String

	Size- String Condition-String Gender-String Original Price- Number Selling Price- Number Tags- Array
Select Preferred Categories	Product Preference- Object Summer- Boolean Winter- Boolean Formal- Boolean Casual – Boolean Traditional- Boolean Sportswear -Boolean
Update Profile	Name- String Password-String
Update Selected Preferred Categories	Product Preference- Object Summer- Boolean Winter- Boolean Formal- Boolean Casual – Boolean Traditional- Boolean Sportswear -Boolean
Total product View	Total Views- Number
Forgot Password	Email- String
Reset Password	Password- String

Table 5.10 Input of Regalia

5.6.2 Output

The following are the outputs of Regalia:

Outputs of Regalia	
Process	**Fields Type**
Registration	On success- Show message: ‘Your account has been created and Redirect to the My Preference page. On failure- Show message: ‘Invalid credentials

Login	On success- Show message: ‘You have been logged in’ and Redirect to the User homepage. On failure- Show message: ‘Invalid credentials
Posting products for sell	On success- Show message: ‘Your product has been posted’ and Redirect to the My Products page. On failure- Show message: ‘Product not posted’
Update Product	On success- Show message: ‘Your product has been updated’ and Redirect to the My Products page. On failure- Show message: ‘Product not updated’
Select Preferred Categories	On success- Show message: ‘Recommendations for the product created’ and Redirect to the User homepage. On failure- Show message: ‘Select at least two categories ‘
Update Profile	On success- Show message: ‘Profile updated’ On failure- Show message: ‘Profile not updated’
Update Selecting Preferred Categories	On success- Show message: ‘Recommendations for the product updated’ and Redirect to the User homepage. On failure- Show message: ‘Select two categories ‘
Total product View	On success- Show the correct number of users On failure- Show incorrect number of users
Forgot Password	On success- Check mail On failure- Try again
Reset Password	On success- Password updated On failure- Try again

Table 5.11 Output of Regalia

5.6.3 Software Testing Result

Software testing is the process of determining whether or not the software is accurate, reliable, and, most importantly, whether it meets the needs of the client. The table below shows the results of the tasks I worked on based on the features of my project.

Test ID	Test Case	Description	Steps to be executed	Expected Result	Actual Result	Pass/Fail
T1	User Sign up	User needs to sign up to select their preferred products	1. Click on the Signup/Login button 2. Go to the Signup page 3. Provide name, email, gender, and password to sign up successfully.	User data will be stored in the database and accounts will be open for the user.	User data is stored in the database and accounts are opened for the user.	**Pass**
T2	User Login	User needs to log in to view the recommendations for products on their homepage.	1. Click on the Sign Up/Login button 2. Go to the Login page 3. Provide email and password to log in successfully.	User data will be checked if data is present in the database. If found login into the system successfully.	User data is checked in the database. If found login into the system successfully.	**Pass**
T3	Select Preferred Categories	User needs to sign up to select preferred categories	1. Click on the Signup/Login button 2. Go to the Signup page 3. Provide name, email,	User-selected preferred data will be stored in the database.	User-selected preferred data is stored in the database.	**Pass**

			gender, and password to sign up successfully. 4. User is redirected to select preferred categories from the list of categories. 5. Clicking on Submit button user is redirected to their homepage.			
T4	View Recommendations for products	User view recommendations for products on their homepage after selecting preferred products.	1. User needs to login into the system. 2. User then views recommendation for their products on their homepage.	Users will view the recommendation for their products on their homepage after login into the system.	Users view the recommendation for their products on their homepage after login into the system.	**Pass**
T5	Posting products for sell	The user needs to fill up a form providing product details then that product will be created.	1. User needs to go to the 'Sell with us page to fill up a form. 2. Provide product details in the form and click on Submit button. 3. User will view that	1. User will fill up a form to post products. 2. The product will be displayed on the 'My products' page.	1. User fills up a form to post products. 2. The product is displayed on the 'My products' page.	**Pass**

			product on the "My Products" page			
T6	Update Product	User can update the product that he has posted for sale from the 'My Products Page'	1. User needs to go to the 'My Products' page. 2. User can edit the details of the product he posted from the 'My Products' page. 3. User can also delete the product.	1. User will edit the details of the product. 2. The product details will be updated. 3. User will be able to delete the product from the 'My Products' page.	1. User can edit the details of the product. 2. The product details are updated. 3. User can delete the product from the 'My Products' page.	**Pass**
T7	Update Selected Preferred Categories	Users can update the selected preferred categories that they have selected before.	1. User needs to go to the 'My Preference' page. 2. User can select new preferred categories. 3. User clicks on the save button. 4. On the user's homepage, recommendations for categories will be updated.	1. User will be able to select new preferred categories. 2. On the user's homepage, recommendations for categories will be updated. 3. Data will be updated in the database.	1. User can select new preferred categories. 2. On the user's homepage, recommendations for products are updated. 3. Data is updated in the database.	**Pass**

T8	Update Profile	User can update their name and password from the ‘My Profile page.	1. User needs to go to the ‘My Profile page. 2. User will update his name and password. 3. Click on submit button.	The user’s data will be updated in the database.	The user’s data is updated in the database.	**Pass**
T9	View Details of the product	The user clicks on the product on the homepage and then the details of the product will be displayed	1. User needs to go to the homepage. 2. Clicks on the product from the product list on the homepage.	User will be able to view the details of the product if he clicks on the product.	User can view the details of the product if he clicks on the product.	**Pass**
T10	Total product View	The user clicks on the product on the homepage and then the total user view count of the product will be displayed	1. User needs to go to the homepage. 2. Clicks on the product from the product list on the homepage.	User will be able to view the total user view count of the product if he clicks on the product.	User can view the total user view count of the product if he clicks on the product.	**Pass**
T11	Forgot Password	User provide his email to reset password	1.If user fails to login, he clicks on forgot password. 2. Provide his email id to reset password.	User’s password will be reset.	User can reset his old password.	**Pass**

T12	Reset Password	User provide new password and confirm password to set his new password.	1. User clicks on the reset password link to reset his password. 2.Provide new password and confirm password to set his new password.	User's new password will be set.	User can set his new password.	**Pass**
T13	Delete Product	User can delete the product that he has posted for sale from the 'My Products Page'	1. User needs to go to the 'My Products' page. 2. User can also delete the product.	User will be able to delete the product from the 'My Products' page.	User can delete the product from the 'My Products' page.	**Pass**

Table 5.12 Test Result of Regalia

Chapter 6

Results and Analysis

6.1 Analysis of the recommendations for the products

The salient feature of Regalia is the recommendation. Here user gets recommendations for products and the seller also gets recommendations for products. The recommendation feature is implemented using the Mongo DB aggregation pipeline.

- User gets recommendations for products based on the categories they select.
- Each category has five tags. So, six categories have thirty tags in total.
- User (seller) has selected at least two or more tags while creating products.
- When a user selects the categories, the tags of the categories are matched with the product tags.
- Moreover, there is a recommendation for the seller as well. When a seller selects the preferred categories, recommendations for the product are displayed on his homepage. But the seller doesn't get his/her own products as recommendations.
- Only those products are shown as recommendations to users, whose total tags matched are greater than or equal to two.

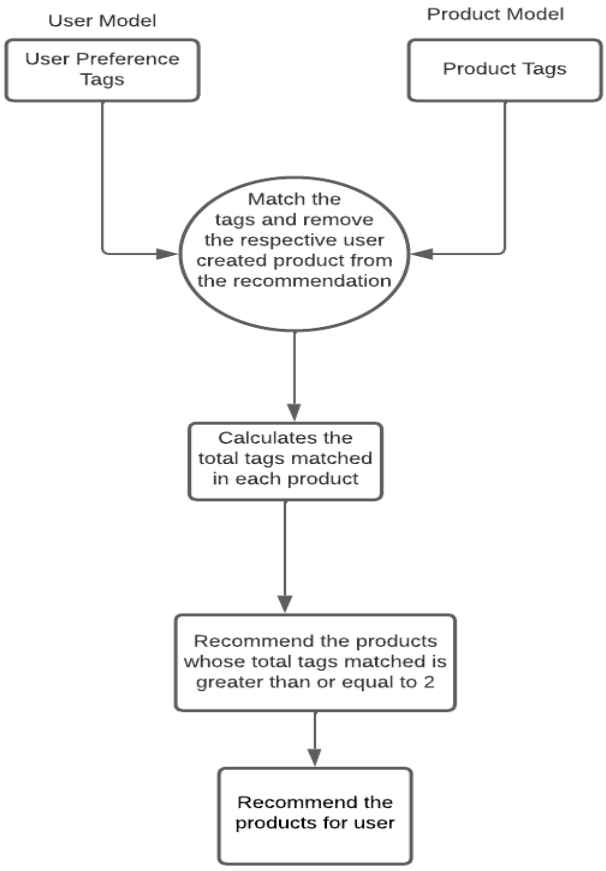


Figure 6.1 Process of recommendation

6.2 Learned from the Project

I spent almost 1.5 months learning the tech stacks needed for the project after beginning my internship with Techdojo Limited. I have learned next.js, react.js and tailwind for the frontend and node.js, express.js for the backend. I am familiar with and have utilized Mongo DB for the project's database. I have also learned to test APIs using Postman. Additionally, I now know about agile/XP approaches used in the SDLC. I now know how to breakdown the tasks for the feature of the project. I gained experience working in teams effectively and successfully. Time management is a crucial skill I've gained while working on this project. This enabled me to complete the project on schedule.

Additionally, I've learnt how to use the project board for creating issues in GitHub and write clean code. In addition, I now know how to create git branches, pull, push, and merge branches.

6.3 Strength

The strength of the project is -

- Recommending products for the user
- Saves user time
- Seller also get recommendations for products
- Seller can create, update and delete his own product

6.4 Limitations

Regalia is a client project. Our main aim was to focus on the recommendation feature. Since it took me about 1.5 months to learn the tech stack, I used the remaining time to implement the regalia's features while focusing more on the recommendation feature, which is also the project's salient feature. One of the limitations is that users can create their own products, therefore we've given them options so they can't provide anything meaningless. Now, in order to develop a product, the user must choose a choice from those possibilities. We have options available so that users won't provide unnecessary information because there is no admin to approve the product once it has been created by a user. There was limitation of time for building this web app as I didn’t have much knowledge for next.js, node.js, express.js and mongo db. So, I have to learn this tech stack as soon as possible to work on my project.

6.5 Overcome the Limitations

To overcome the limitations of the project, I can work on the existing features and improve them. If we create an admin that can approve the product after it has been created by the user than only the valid product will be displayed for sale. Improve the recommendation feature and work on it so that user can get recommendations and their way of shopping gets easier.

6.6 Graphical User Interface Result

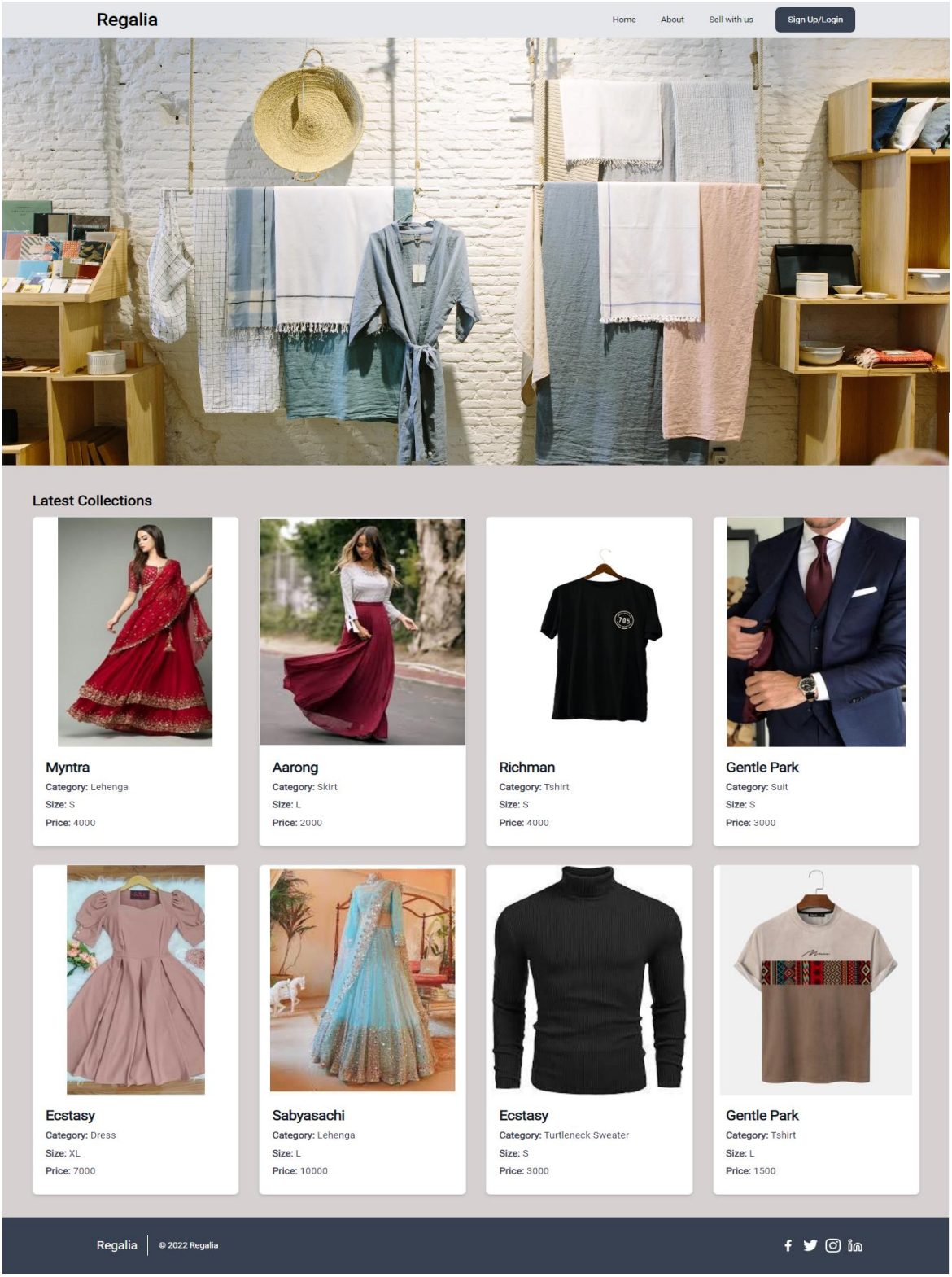


Figure 6.2 Homepage of Regalia

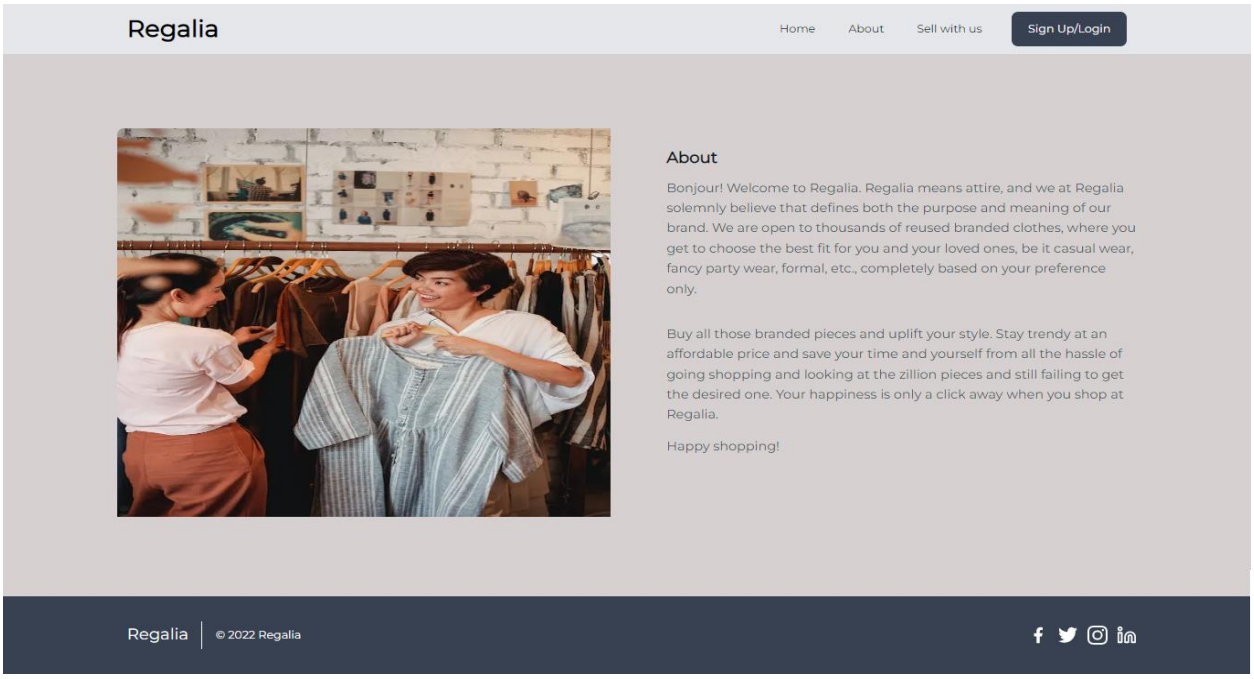


Figure 6.3 About page of Regalia

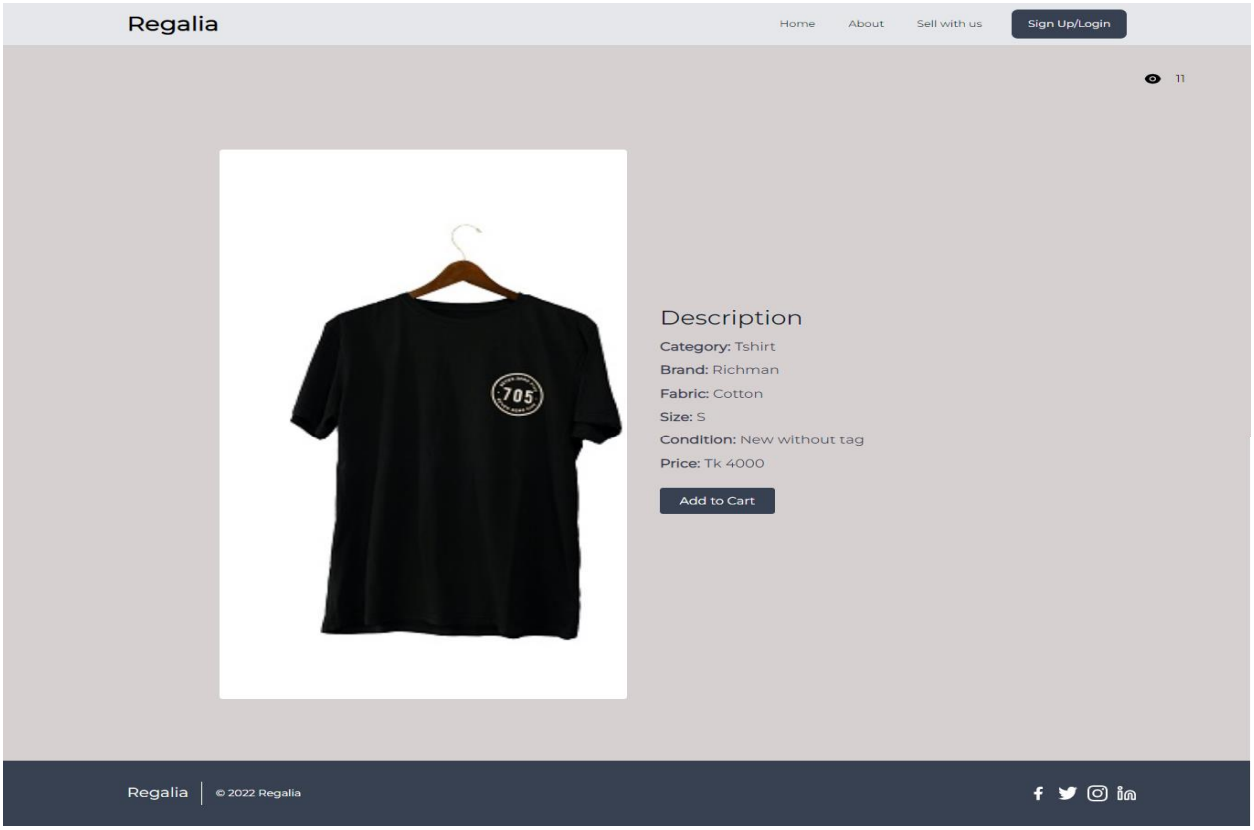


Figure 6.4 Product details page of Regalia

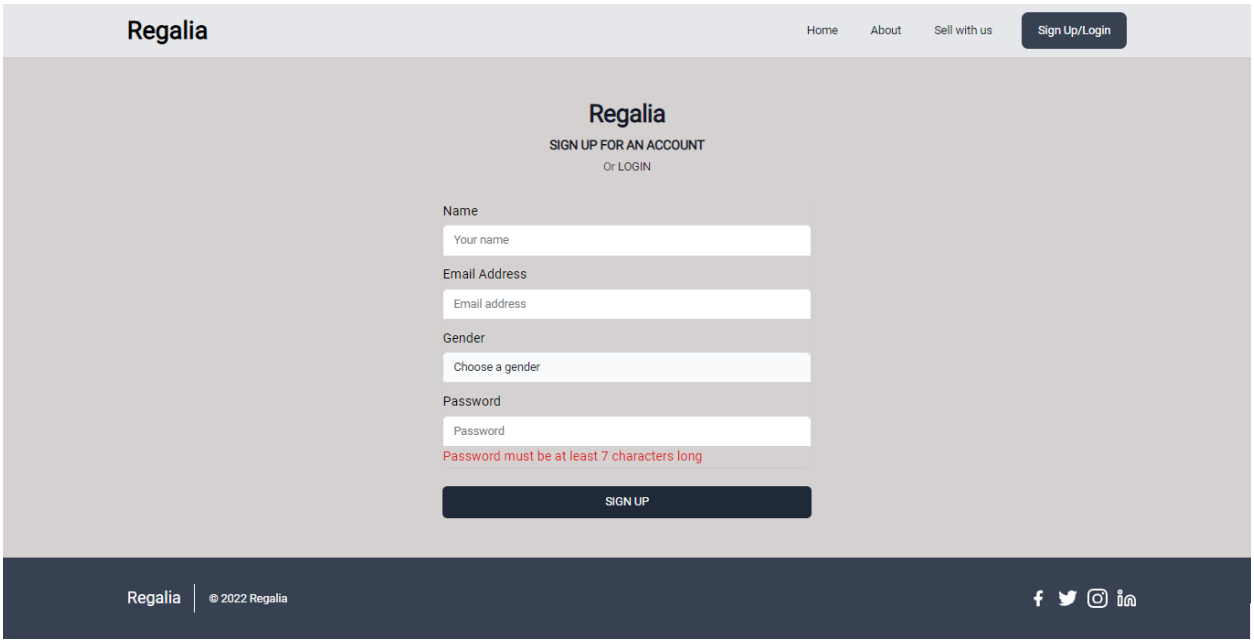


Figure 6.5 Sign Up page of Regalia

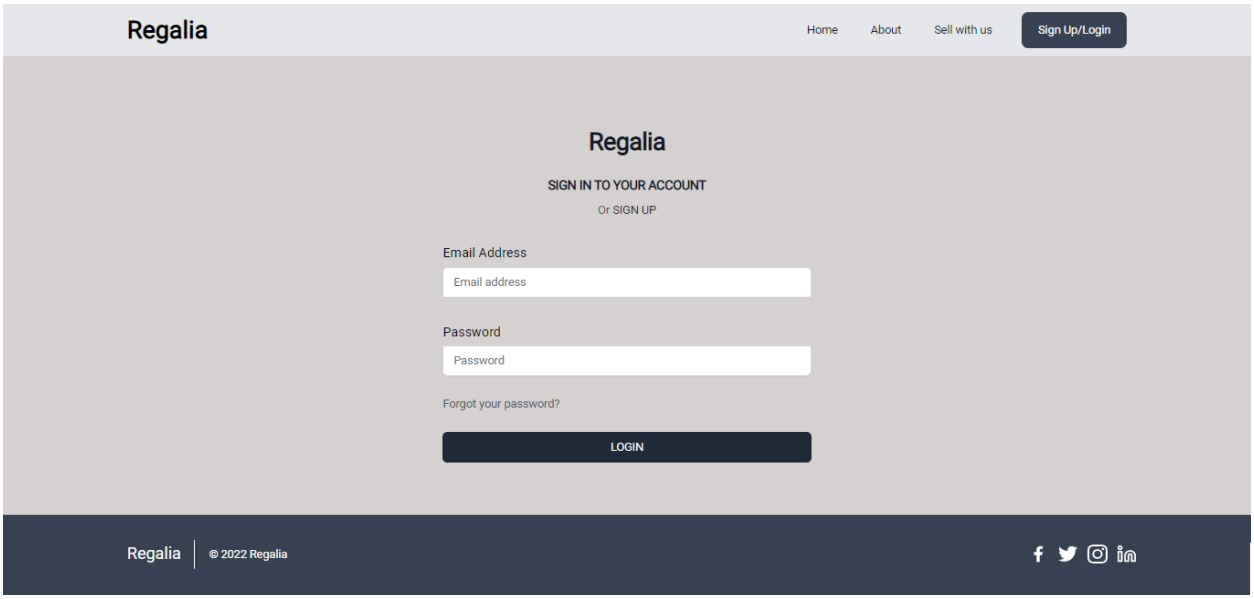


Figure 6.6 Sign In page of Regalia

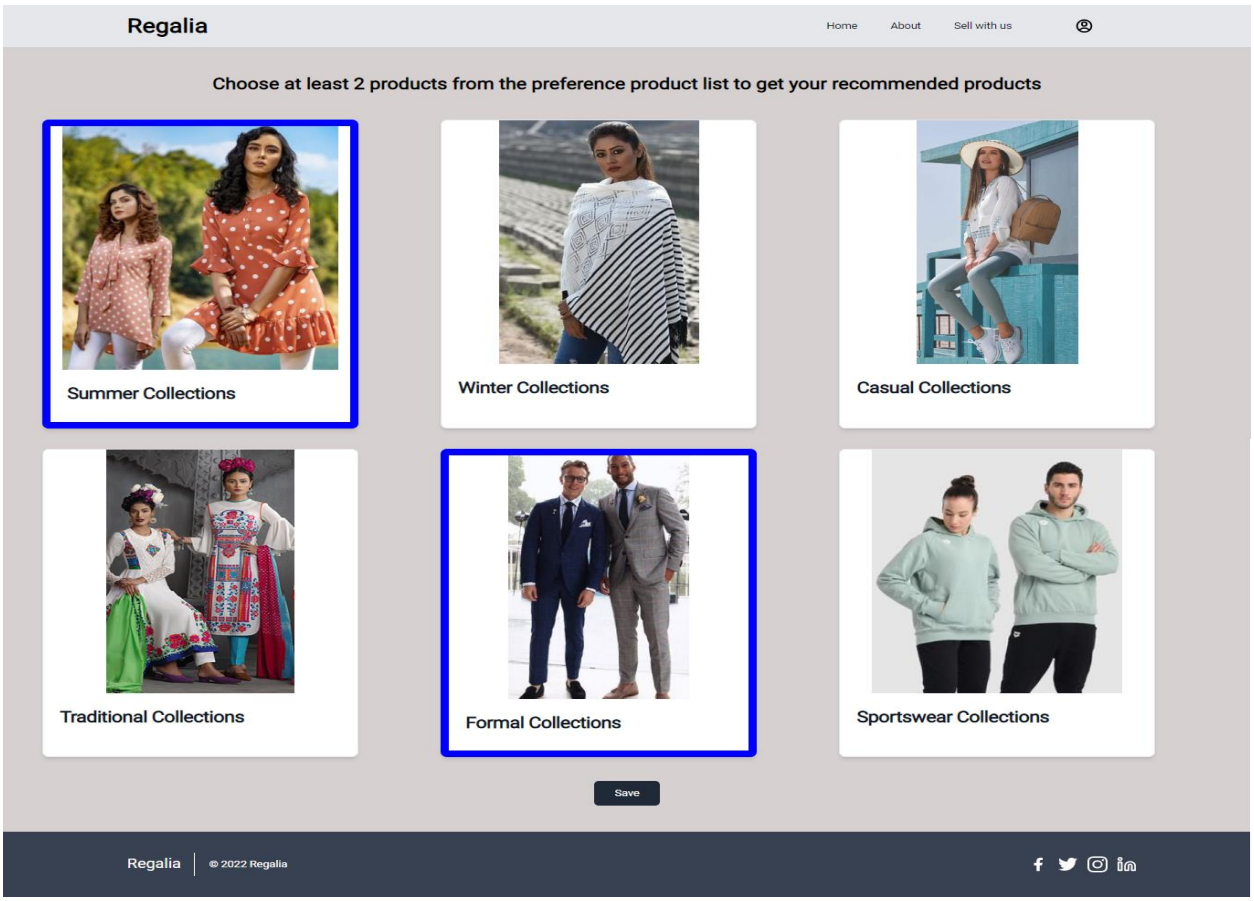


Figure 6.7 My Preference page of Regalia

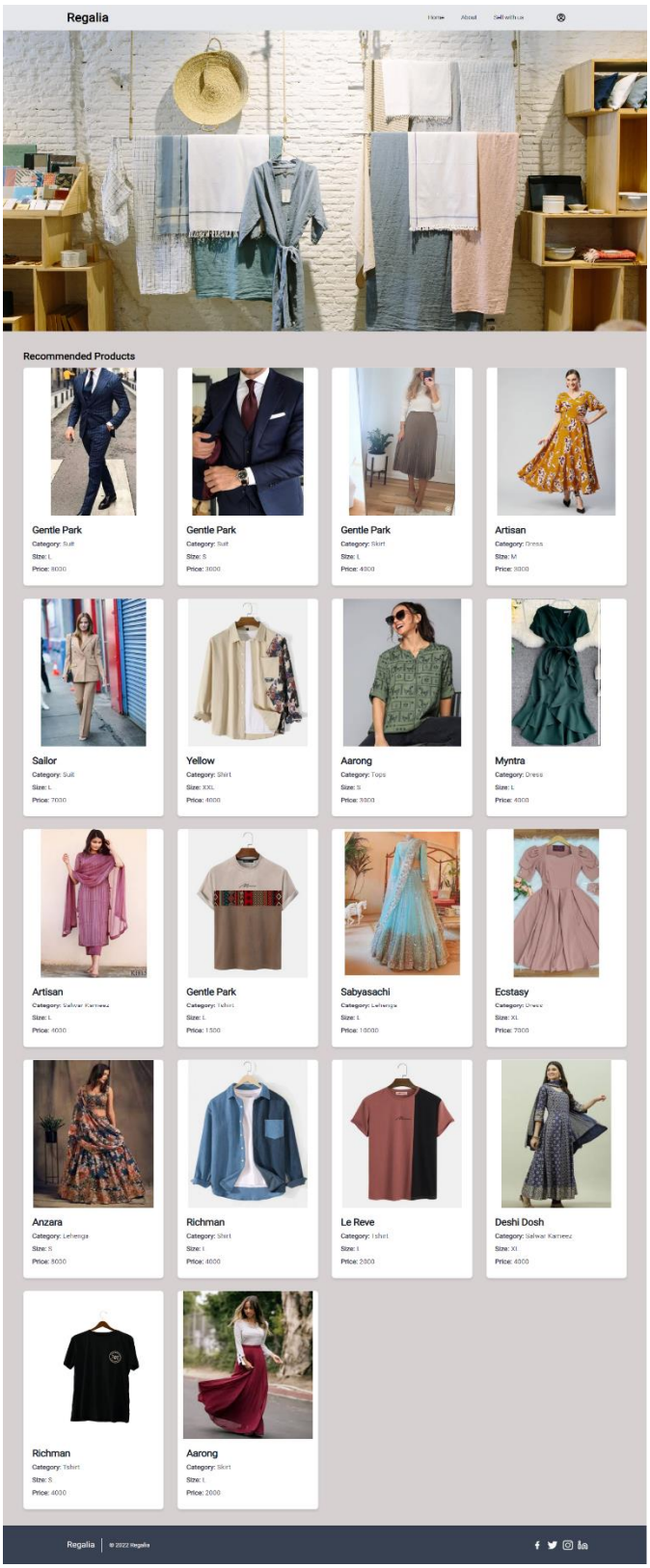


Figure 6.8 User homepage of Regalia (Recommendations)

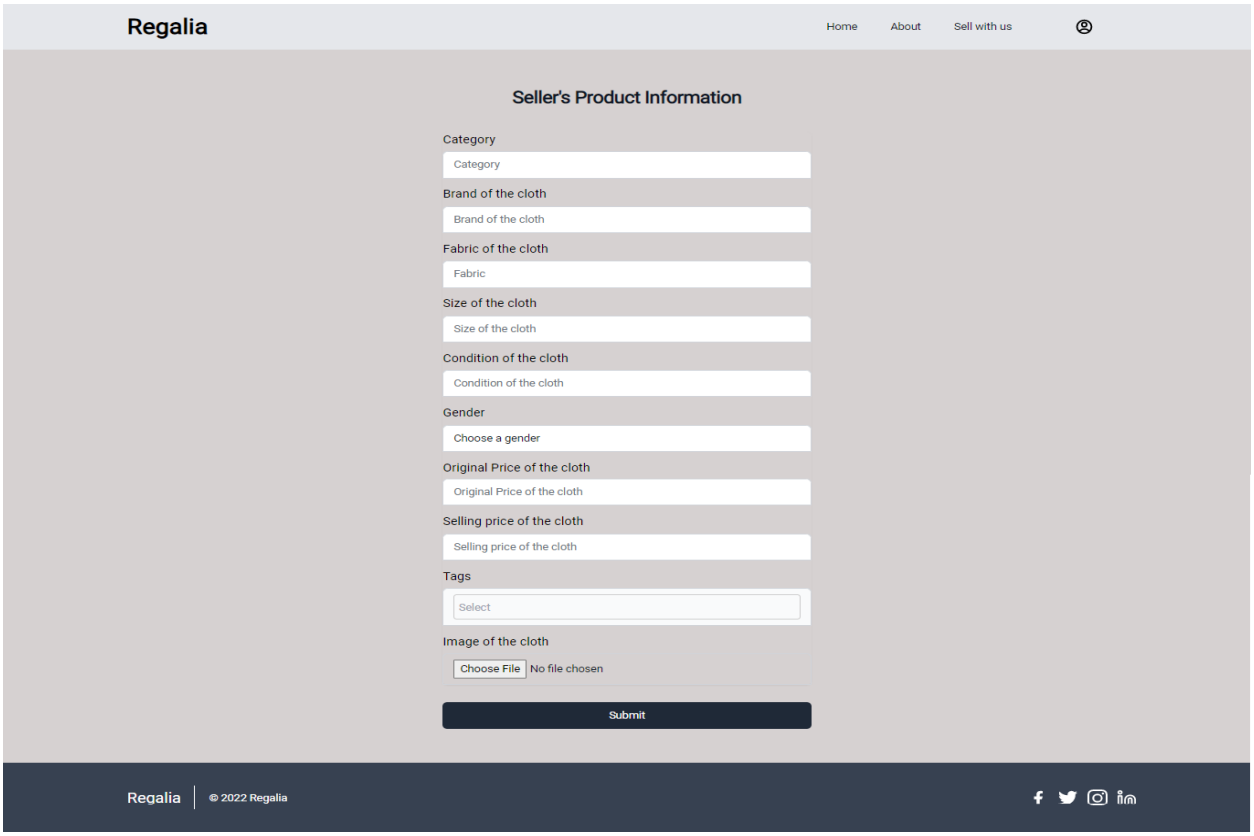


Figure 6.9 Sell with us page of Regalia

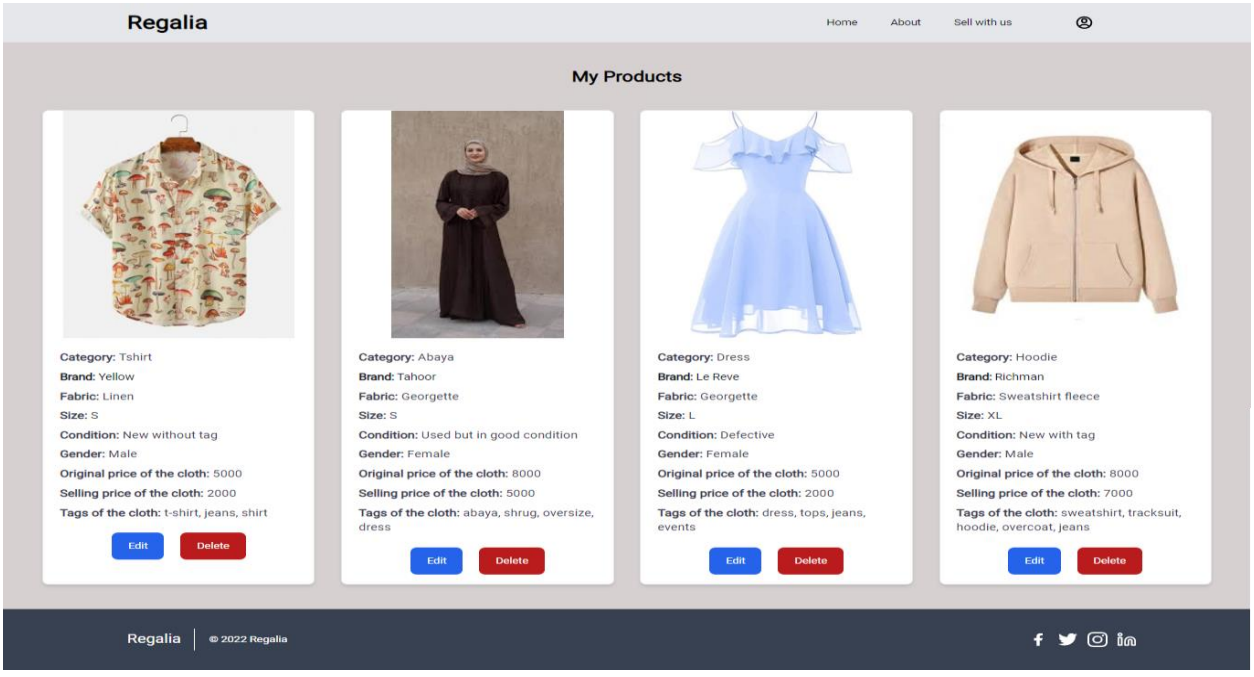


Figure 6.10 My products page of Regalia

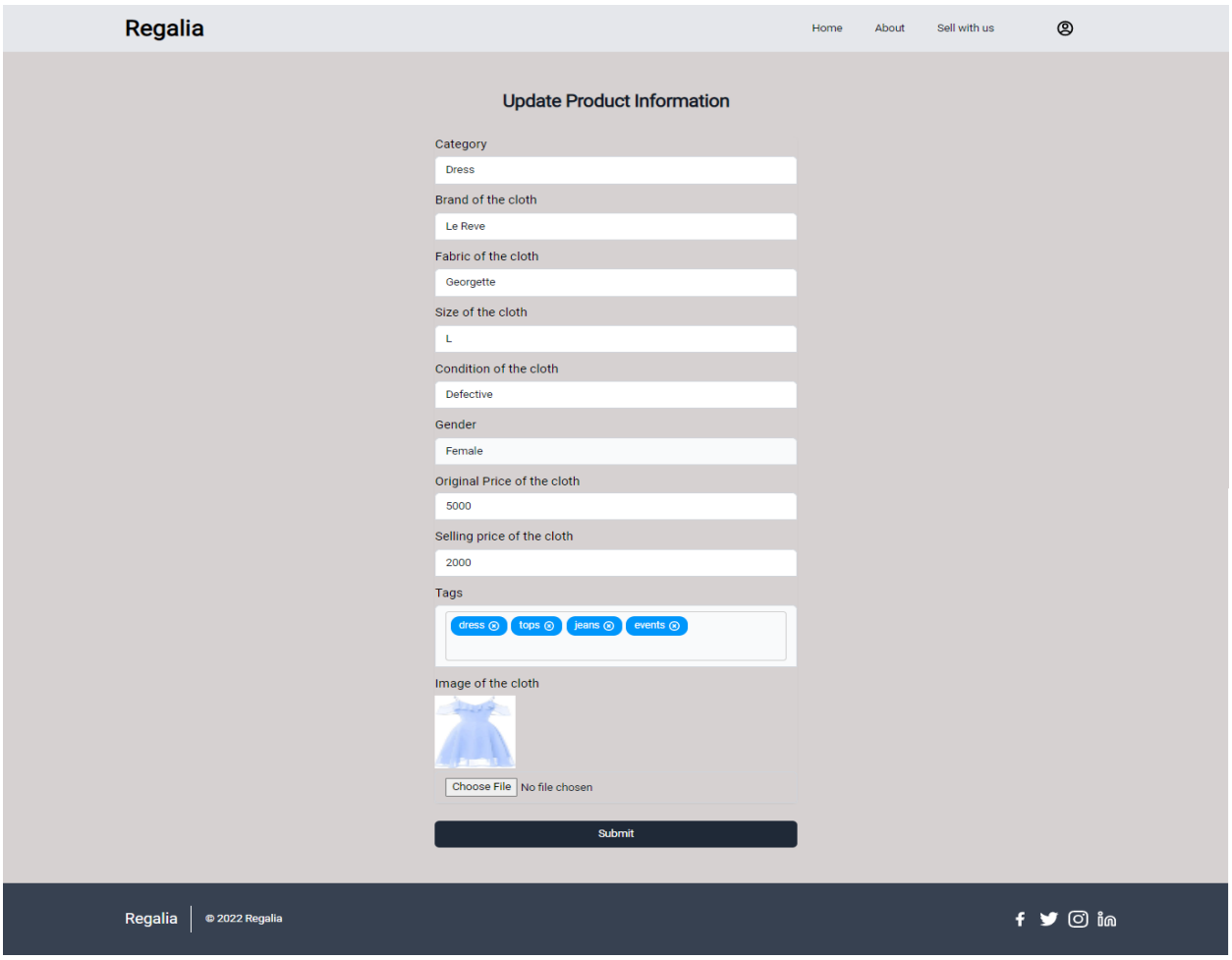


Figure 6.11 Update Product page of Regalia

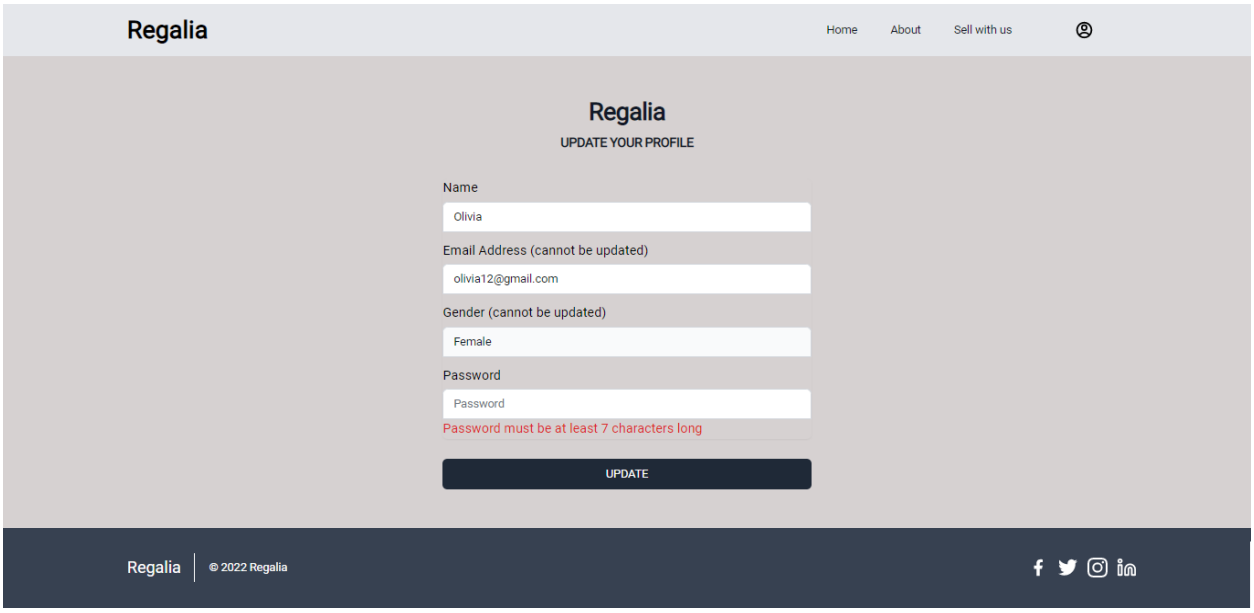


Figure 6.12 My Profile page of Regalia

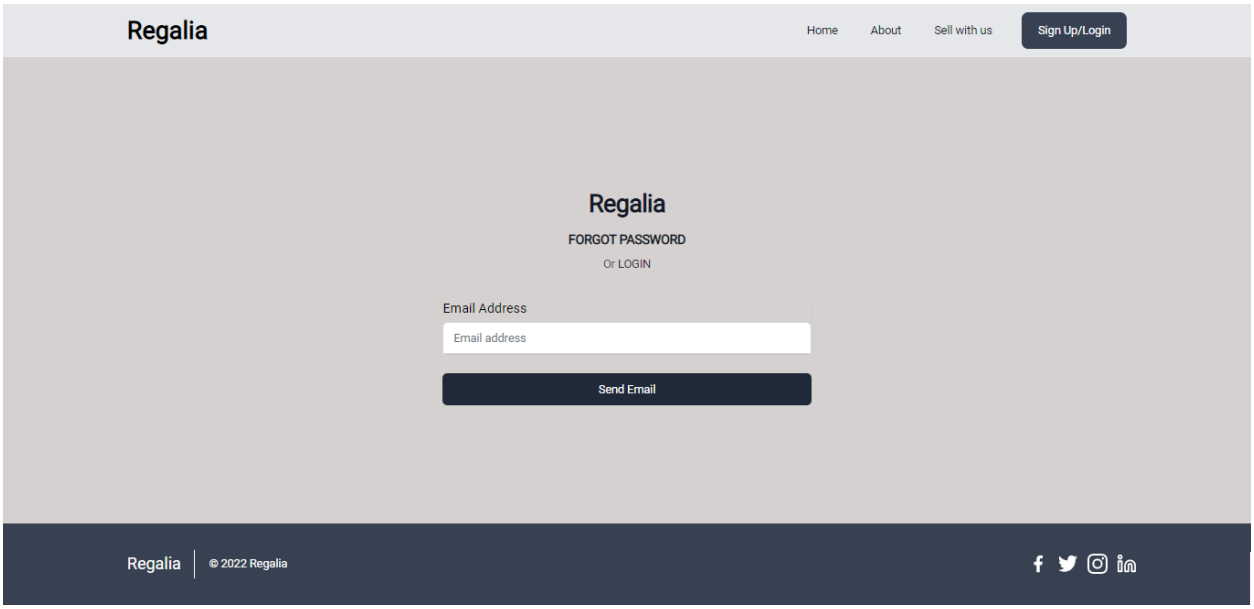


Figure 6.13 Forgot Password page of Regalia

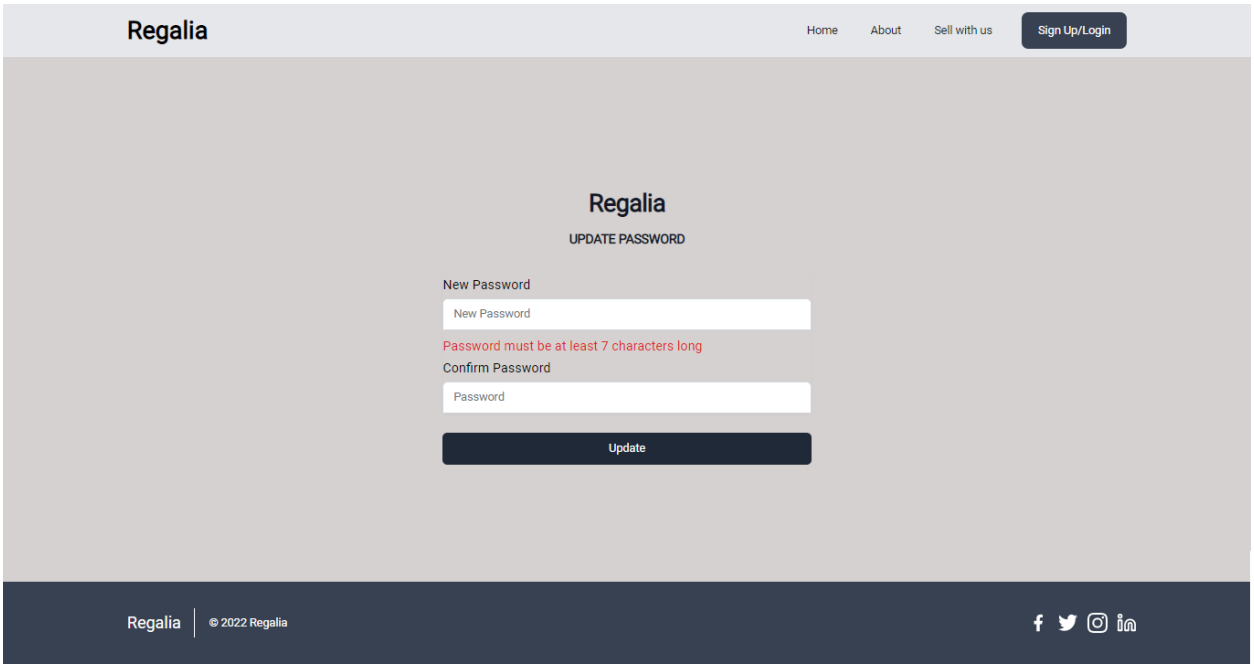


Figure 6.14 Reset Password page of Regalia

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project/Work

A product's sustainability must be updated or maintained to a certain level. After a product is developed, it has to be updated and maintained. If not, the user won't be attracted to use the product over the long run. Three main categories: community, financial, and organizational sustainability - define how sustainable a product can be.

Below are details for each category:

Community Sustainability: Community sustainability for the product will be achieved after the deployment and the official release of the ‘Regalia web application. When users start using this application, they will understand how easily people can buy clothes and get their desired products quickly. After that, they will share this application with the people they know. In this way, a community will be developed and hence it can be said that it is Sustainable in terms of Community.

Financial Sustainability: The ability to maintain an application's financial cost after it has been released officially is known as financial sustainability. Regalia is currently free for users to use. Premium services will be incorporated into the application in the future. Access to the premium services, which will ultimately be used to generate revenue, requires payment from users.

Organizational Sustainability: The sustainability of the organization refers to how it will continue to maintain the application after it has been released. Organizations could desire to increase the team size, improve the application's current functionality, or add new ones. Since the application has further plans, it must be maintained once it is released. The organization's marketing staff additionally advertises the application on social media.

7.2 Social and Environmental Effects and Analysis

Social Effect: Regalia is an e-commerce web application. People's ability to shop has been facilitated by this application. People no longer need to waste time shopping for clothing. This application will help users to get their desired products within a short period. In this application, the seller can also get their desired products if they want to buy clothes and at the same time, they can also sell their clothes. People will also save money as they are getting branded clothes at a cheaper price. E-commerce web applications save both time and money for the user.

Environmental Effect: People buy and sell used clothing in Regalia. People are therefore not discarding their clothing and harming the environment. Instead, they are clearing space in their wardrobe by selling the clothing they are not wearing. Every year, people's disposal and burning

of their clothing harm the environment. As people sell their used clothing, this application helps the environment.

7.3 Addressing Ethics and Ethical Issues

User shares their data while using the application. It’s very important to keep their data safe. So, security is our priority. We have made sure that the user’s data is not shared or leaked.

Data Security: Only the developer has access to the database and the server. Users have to login into the system using their name and password. Moreover, the password is also encrypted in the database. No one will have access to the database as user name and password is used to log in.

Privacy concern: User doesn’t have to share their location while using this application. This application was developed keeping the user’s privacy in mind. Users’ data is saved in a database that is protected so that no one can access it easily.

Fraud and Identity Theft: Since the system does not yet have a payment gateway, the database does not contain any personal information about the user, such as bank account or credit card information. As a result, this system has no possibility of fraud or identity theft.

No Discrimination: There are no distinctions made in "Regalia" based on race, national or social origin, or any other factor.

Chapter 8

Lesson Learned

The internship has taught me a lot of new things. I've gained knowledge about tech stacks like mongo DB, express.js, node.js, react.js, and next.js. My ability to communicate has also improved. I ran into several problems throughout my internship, but I also managed to solve them.

8.1 Problems Faced During this Period

I encountered some challenges during the period of my internship. Following is a list of a few of these:

Adapting to new technologies: I have learned new tech stacks while developing this web application. It took time to learn this tech stack but it was difficult to apply them in real situations.

Listing and managing the tasks: I struggled to achieve weekly deadlines because I was learning the tech stack and then applying it to the project.

Identifying and fixing bugs: Finding and fixing the project's bugs proved challenging. The time it took to find and solve bugs was occasionally longer than three days.

Understanding the requirements: Being a novice to this profession, I found it challenging to comprehend the requirements. Without understanding the requirements, I cannot start working on the project.

8.2 Solution of those Problems

Though the challenges and problems I have faced were difficult for me. But I have managed to find the solution to these problems. Solutions are given below:

Adapting to new technologies: At first, it was difficult for me. With my supervisor's proper guidelines, I could keep myself on track.

Listing and managing the tasks: I have created issues in the GitHub project board. To understand how my project would proceed and keep myself updated on the task; I have also created a weekly plan in advance. So, I have managed the tasks in this way.

Identifying and fixing bugs: I have created issues in the project board. If there are some bugs in the issue and I would label the issue as bugs. Then my senior in the web development team would help me to solve the bugs.

Understanding the requirements: I received assistance in understanding the requirements from my supervisor and the team's senior web developer. I've broken down the requirements first and created a list of the tasks I need to complete to meet the requirements.

Chapter 9

Future Work & Conclusion

9.1 Future Works

Since the project “Regalia” is still in the development phase and there are many features that are planned to be added in the future. The following features can be applied to the future work

- Add to cart feature
- Users can get recommendations for products based on gender
- Users can receive recommendations for the seller whose products have been added to the cart the most.
- Add payment gateway
- Add sold-out feature
- Improving existing features

9.2 Conclusion

I was able to gain practical experience working on full-stack web applications thanks to the internship. I was able to develop my communication abilities and teamwork skills through this internship. I discovered how to efficiently manage my time and create a task plan before getting started on the project. I have the opportunity to explore new technology stacks like mongo DB, express.js, and node.js. While I was employed by Tech Dojo Limited, I was also exposed to many software engineering technologies, tools, and techniques. I'd want to express my gratitude to both my internal and external supervisors, whose direction and inspiration have inspired me to work hard to complete this project successfully and to pursue many such projects in the future.

Bibliography

1. The RealReal |, 2022. [Online]. Available: https://www.therealreal.com/. [Accessed: 13- Oct- 2022].

2. "Findation.com | Foundation color matching for MAC, Revlon, Makeup Forever and more", *Findation.com*, 2022. [Online]. Available: https://findation.com/. [Accessed: 13- Oct- 2022].

3. What is a Work Breakdown Structure (WBS). Accessed on: Oct. 21, 2022. [Online]. Available: https://www.workbreakdownstructure.com/

4. "What is Extreme Programming (XP)?", *Agile Alliance* |, 2022. [Online]. Available: https://www.agilealliance.org/glossary/xp/#q=~(infinite~false~filters~(postType~(~'post~'aa_book~'aa_event_session~'aa_experience_report~'aa_glossary~'aa_research_paper~'aa_video)~tags~(~'XP))~searchTerm~'~sort~false~sortDirection~'asc~page~1). [Accessed: 13- Oct- 2022].

5. "Extreme programming: tips & advantages | Apiumhub", *Apiumhub*, 2022. [Online]. Available: https://apiumhub.com/tech-blog-barcelona/extreme-programming-tips-advantages/. [Accessed: 13- Oct- 2022].

6. "Next.js - Wikipedia", *En.wikipedia.org*, 2022. [Online]. Available: https://en.wikipedia.org/wiki/Next.js. [Accessed: 13- Oct- 2022].

7. "Node.js - Wikipedia", *En.wikipedia.org*, 2022. [Online]. Available: https://en.wikipedia.org/wiki/Node.js. [Accessed: 13- Oct- 2022].

8. "Express.js - Wikipedia", *En.wikipedia.org*, 2022. [Online]. Available: https://en.wikipedia.org/wiki/Express.js. [Accessed: 13- Oct- 2022].

9. "MongoDB - Wikipedia", *En.wikipedia.org*, 2022. [Online]. Available: https://en.wikipedia.org/wiki/MongoDB. [Accessed: 13- Oct- 2022].

10. “System analysis and design - overview,” *Tutorials Point*. [Online]. Available: https://www.tutorialspoint.com/system_analysis_and_design/system_analysis_and_design_overview.htm. [Accessed: 25-Nov-2022].

11. “Define feasibility study in software engineering - tatvasoft blog,” *TatvaSoft*, 29-Aug-2022. [Online]. Available: https://www.tatvasoft.com/outsourcing/2022/08/define-feasibility-study-in-software-engineering.html. [Accessed: 25-Nov-2022].

12. “Types of feasibility study in software project development,” *GeeksforGeeks*, 21-Sep-2021. [Online]. Available: https://www.geeksforgeeks.org/types-of-feasibility-study-in-software-project-development/ [Accessed: 25-Nov-2022].

13. Osarome, “1. technical feasibility 2. operational feasibility 3. economic feasibility,” *1. TECHNICAL FEASIBILITY 2. OPERATIONAL FEASIBILITY 3. ECONOMIC FEASIBILITY*, 07-Oct-2011. [Online]. Available: https://osarome.blogspot.com/2011/10/1-technical-feasibility-2-operational.html [Accessed: 25-Nov-2022].

14. “Types of feasibility study in software project development,” *GeeksforGeeks*, 21-Sep-2021. [Online]. Available: https://www.geeksforgeeks.org/types-of-feasibility-study-in-software-project-development/#:~:text=Economic%20Feasibility%20%E2%80%93&text=Means%20under%20this%20feasibility%20study,operational%20cost%20and%20so%20on. [Accessed: 25-Nov-2022].

15. “Software architecture & design introduction,” *Tutorials Point*. [Online]. Available: https://www.tutorialspoint.com/software_architecture_design/introduction.htm [Accessed: 25-Nov-2022].



An Undergraduate Internship on Regalia

By

Farzana Tabassum

Student ID: **1811014**

Autumn, 2022

Consent from Supervisor

The student modified the internship final report as per the recommendations made by his/her academic supervisor and/or panel members during and/or before final viva, and the department can use this version for archiving as well as the OBE course material for CSE499.

(Signature of the Supervisor)

Name of the Supervisor

Department of Computer Science & Engineering

Independent University, Bangladesh