



**DOUGLAS COLLEGE**

**CSIS 4495 – 002**

**(Applied Research Project)**

**Title: EcoTots**

**(MERN Stack Website for the Exchange of Gently Used kid's Clothing)**

**Midterm Report**

[https://drive.google.com/file/d/1S-HFbICV7PEl5AOWUnXSqjprWqelW7n/view?usp=drive\\_link](https://drive.google.com/file/d/1S-HFbICV7PEl5AOWUnXSqjprWqelW7n/view?usp=drive_link)

**(Video Link)**

**Submitted To:**

Prof. Padmapriya Arasanipalai Kandhadai

**Team Members:**

Lovish Dhanda (Team Lead) - 300377652

Gurkanwal Singh - 300375339

# 1. Introduction

## 1.1 Background and Context of the Research

The rising costs of children's clothing are a major concern for families, especially given the rapid rate at which children grow. It's not uncommon for parents to purchase new clothes every few months, only for their children to outgrow them soon after. According to research, children can outgrow up to 7 clothing sizes in a single year during their first few years of life, leading to the constant need for replacements. This cycle not only places a strain on household budgets but also contributes significantly to environmental issues, such as textile waste. The textile industry is one of the most polluting industries worldwide, contributing billions of tons of waste annually. When children's clothing is discarded because it no longer fits, it adds to the landfill problem, often taking hundreds of years to decompose.

In response to this challenge, online platforms that facilitate the reuse of clothing can offer both an environmentally and financially beneficial solution. These platforms allow parents to either sell or donate outgrown clothing to others in need, helping families avoid purchasing new items while also promoting a more circular economy. This research aims to explore how an online platform can provide a solution to the problems posed by the rapid turnover of children's wardrobes, allowing for the exchange of gently used clothing in a seamless, trusted, and user-friendly environment.

By focusing on children's clothing, a niche yet crucial area, this platform will address a gap in existing marketplaces like eBay or Facebook Marketplace, which are not specifically designed to cater to the needs of parents. Additionally, by providing affordable clothing alternatives and reducing waste, the platform will contribute to sustainability, benefiting not just families but also the broader community and the environment.

---

## 1.2 Problem Statement

Parents often find themselves in a difficult position when their children outgrow clothing. The obvious choice for many is to donate or discard the clothes, but often, these garments are still in good condition. Simultaneously, families in need struggle to afford new clothing, especially for children who grow so quickly. As a result, the problem of discarded yet usable children's clothing continues to grow, while many parents are left searching for affordable alternatives.

The problem is compounded by the limitations of existing e-commerce platforms. While platforms like eBay and Facebook Marketplace facilitate the exchange of items, they are highly generalized, featuring a wide array of products that can make it difficult for parents to locate children's clothing specifically. The search process can be cumbersome and time-consuming, with irrelevant categories or listings overwhelming users. Moreover, these platforms are not designed

with children's clothing in mind, and the process of listing, buying, or donating items is not optimized for the needs of families.

This research proposes the creation of a specialized platform aimed at addressing these issues by focusing exclusively on children's clothing. It aims to create a space where parents can easily buy, sell, or donate gently used clothing in a secure, trusted, and seamless manner, providing an affordable and sustainable solution for families. The platform will work to ensure that high-quality, gently used clothing is circulated efficiently, benefiting both parents and the environment.

---

### **1.3 Research Questions**

To guide the development of this platform, the research will address several critical questions that explore both the functional and user-centric aspects of the platform. These questions will help us understand the challenges parents face, the features that would make the platform successful, and the logistical and security measures necessary for a seamless user experience.

#### **1.3.1 How can a website effectively facilitate the exchange of gently used children's clothing, ensuring families can trust the platform and engage meaningfully?**

One of the core objectives of the platform is to foster trust between users. Parents need to feel confident that they are engaging with other reliable users who are offering quality clothing that meets specific standards. To facilitate trust, the platform should implement features such as verified user profiles, ratings and reviews for both buyers and sellers, and a clear system for assessing the quality of the clothing. Additionally, effective communication tools between buyers and sellers will be important, ensuring both parties can discuss and negotiate the exchange with transparency.

#### **1.3.2 What features should the platform include to create an intuitive, user-friendly experience for diverse users?**

A key challenge will be designing a platform that meets the needs of diverse parents, from tech-savvy individuals to those with limited experience using online marketplaces. Features like easy navigation, advanced search filters (e.g., by clothing type, size, age, or gender), user-friendly listing options, and clear instructions for uploading items will be essential. Additionally, the platform should offer a smooth and engaging mobile experience, as many parents will likely access the platform on their smartphones.

Incorporating features like personalized recommendations based on previous purchases or donations, as well as notifications about new listings matching their preferences, will increase user engagement. Furthermore, the design should be vibrant and visually appealing, especially to create a comfortable experience for parents shopping for their children's clothes.

### 1.3.3 How can safety and privacy be addressed to build trust among users?

Safety and privacy are major concerns when users exchange personal items online. The platform should ensure that all transactions are secure and that sensitive user data is protected. This can be achieved by implementing secure payment gateways, data encryption, and ensuring that the platform complies with privacy regulations (e.g., GDPR or CCPA). Additionally, the platform should have clear policies regarding the protection of user information, such as not sharing personal details like home addresses or contact numbers without user consent.

To further build trust, the platform could introduce a system for reporting suspicious activity and offer a dispute resolution process in case of issues between buyers and sellers. Transparency in how data is used, stored, and shared will be key to ensuring users feel secure.

### 1.3.4 What incentives can encourage active participation in the exchange process?

Incentivizing parents to donate or sell gently used clothing will be vital for the platform's success. Some potential incentives include offering points or credits for each successful transaction, which can then be redeemed for discounts on future purchases or donated to charity. Alternatively, parents could earn rewards for referring new users or for listing high-quality items.

Providing social recognition—such as badges or status levels for top sellers or donors—could also encourage greater participation. Furthermore, creating a community feel with user-generated content, such as success stories or reviews of the clothing exchanged, could foster a sense of camaraderie and encourage users to engage more.

### 1.3.5 How can the platform address logistical challenges like shipping, pick-up, or drop-off?

Shipping, pick-up, and drop-off logistics can be a significant barrier to the smooth exchange of clothing between parents. The platform could facilitate these processes by offering integration with third-party shipping services that allow users to easily generate prepaid shipping labels. This would make it more convenient for sellers to send out items and for buyers to receive them.

---

## 1.4 Literature Review and Knowledge Gaps

Several studies have explored the **growth of second-hand clothing markets** and the **environmental benefits of clothing reuse**. For example, a study by Niinimäki et al. (2020) emphasizes the **negative environmental impact of fast fashion** and promotes second-hand markets as a sustainable alternative. Similarly, 2018 highlight how textile waste reduction is essential for mitigating climate change. These studies confirm that reusing children's clothing can **contribute to sustainability goals and financial savings for families**.

Moreover, research on consumer behavior in second-hand clothing markets (Guiot & Roux, 2010) suggests that while cost-saving and environmental awareness drive many users, factors such as trust, ease of use, and convenience significantly influence adoption. However, existing literature

fails to address the specific needs of parents who require a specialized platform for children's clothing, including considerations such as sizing filters, safety, hygiene assurances, and easy logistics.

Another knowledge gap exists in the effectiveness of online platforms for second-hand children's clothing exchange. While large-scale marketplaces such as eBay and Facebook Marketplace are widely used, studies suggest that these platforms are often cumbersome for niche markets, as they lack personalized features tailored to parents' needs. Furthermore, research has not sufficiently explored trust mechanisms (such as user verification, rating systems, and secure transactions) that could encourage participation in such exchanges.

This research aims to address these gaps by designing a platform that incorporates features specifically tailored to parents and offers a seamless, trusted, and user-friendly experience.

---

## 1.5 Initial Hypotheses and Assumptions

Based on prior research and existing market trends, this study operates under the following **hypotheses and assumptions**:

### Hypotheses

1. A specialized platform for children's clothing exchange will **increase participation rates** compared to generalized marketplaces.
2. **Trust-building features** (e.g., verified profiles, ratings, secure transactions) will enhance user confidence and engagement.
3. Offering **convenient logistical options** (such as integrated shipping and local meet-up facilitation) will **increase adoption and retention**.
4. **Incentive mechanisms** (e.g., reward points, discounts, donation benefits) will motivate users to **actively list and exchange clothing**.
5. An easy-to-use and visually appealing platform will significantly improve **user satisfaction and engagement**.

### Assumptions

- Parents are willing to exchange second-hand clothing if the process is **convenient, safe, and cost-effective**.
- Users will **prioritize trust and hygiene** when selecting second-hand clothing for their children.
- The platform's **success depends on intuitive navigation, transparency, and seamless transactions**.

- Families will prefer a **mobile-friendly interface**, as many parents browse shopping platforms via smartphones.
- 

## 1.6 Potential Benefits of the Research

The development of an **online children's clothing exchange platform** has the potential to generate several key benefits:

### 1. Financial Savings for Families

- By reducing the need for frequent new purchases, parents can **save money** while still accessing quality clothing for their children.

### 2. Environmental Sustainability

- Promoting **reuse over disposal** contributes to waste reduction, minimizing the negative impact of fast fashion on the environment.

### 3. Convenience and Accessibility

- A well-designed platform will provide a **hassle-free way** for parents to find clothing that fits their child's needs without extensive searching.

### 4. Community and Social Impact

- The platform can encourage a **sense of community** among parents, fostering connections and support among families with similar needs.

### 5. Encouraging Circular Economy Practices

- By shifting consumer behavior towards clothing exchange rather than new purchases, the platform aligns with **sustainability-driven economic models**.

### 6. Promoting Digital Innovation

- This study will contribute to **e-commerce innovation** by exploring how a **niche, user-friendly online marketplace** can effectively serve a specialized market.
-

## 2. Summary of the Initially Proposed Research Project

### 2.1 Research Objectives and Goals

The primary goal of this research was to develop an **online platform that facilitates the exchange of gently used children's clothing**, addressing key concerns related to **cost, sustainability, and convenience** for families. The project aimed to create a **user-friendly, secure, and efficient** system that encourages parents to participate in a circular economy while reducing textile waste.

#### Specific Objectives

1. **Develop a dedicated digital platform** where parents can easily list, search for, and exchange second-hand children's clothing.
  2. **Enhance trust and safety** by incorporating secure user authentication, transaction security, and a rating system.
  3. **Promote sustainability** by encouraging parents to reuse clothing rather than discarding or purchasing new garments.
  4. **Ensure ease of use** through an intuitive UI/UX design, mobile responsiveness, and efficient search filters.
  5. **Address logistical challenges** by integrating options such as local pickup coordination, direct shipping, and drop-off locations.
- 

### 2.2 Justification for the Research

The need for such a platform arises from **the increasing financial burden on families** due to the frequent need to replace children's clothing. Additionally, **fast fashion and textile waste contribute significantly to environmental issues**, with millions of tons of clothing discarded annually. By creating a **dedicated exchange platform**, this research aimed to **bridge the gap between affordability and sustainability**, providing an alternative to wasteful consumption patterns.

Furthermore, while platforms like Facebook Marketplace and eBay facilitate second-hand sales, they are **not optimized for children's clothing exchange**, leading to inefficiencies such as difficulty finding appropriate items and lack of trust mechanisms. The proposed solution would **streamline the process for parents** and ensure a **safe, community-driven** platform.

---

### 2.3 Technology Stack and Development Plan

To develop the platform efficiently and ensure scalability, the research proposed the use of the **MERN stack (MongoDB, Express.js, React, Node.js)** due to its flexibility, efficiency, and ability to support a **real-time, dynamic web application**.

### 2.3.1 Selected Technologies

- **MongoDB:** A NoSQL database chosen for its ability to handle large datasets of user profiles, listings, and transactions.
  - **Express.js:** A lightweight backend framework that facilitates secure and efficient API development.
  - **React.js:** A front-end library that enables a dynamic, responsive, and interactive UI.
  - **Node.js:** A powerful runtime environment for handling server-side logic and real-time interactions.
  - **Firebase Authentication:** Used to provide **secure user login and verification mechanisms**.
  - **Cloud Storage:** For handling **image uploads and storing user-generated content efficiently**.
- 

## 2.5 Development Timeline and Phases

The initial research outlined a structured timeline for developing and launching the platform, divided into four key phases:

### Phase 1: Research and Planning (Week 1-2)

- Conduct a **market analysis** to identify user needs and competitor platforms.
- Define **key platform features** and user interface requirements.
- Finalize **technology stack selection** and create wireframes.

### Phase 2: Development (Week 3-6)

- Build **user authentication, profile management, and listing functionalities**.
- Implement **image upload and AI moderation features**.
- Conduct **internal testing to fix bugs and refine the UI/UX experience**.

### Phase 3: Testing and Refinement (Week 7-8)

- Launch a **beta version** with a small group of users for feedback.
- Address security vulnerabilities and refine **trust-building mechanisms**.



- Optimize performance for **mobile compatibility and fast loading speeds**.

#### Phase 4: Launch and Deployment (Months 9-12)

- Officially launch the platform with **marketing efforts targeting parents and communities**.
  - Continuously gather feedback and introduce **feature updates based on user engagement**.
- 

## 3. Changes to the Proposal

### 3.1 Changes in Features

Initially, the platform was designed as a **simple marketplace** where parents could list and exchange gently used children's clothing. However, as the project progressed and **user feedback from pilot testing** was gathered, several important feature enhancements were introduced to improve usability, engagement, and efficiency.

#### Key Feature Enhancements:

- **AI Chatbot for Customer Support (In Progress)**
  - The project team recognized the need for **better user assistance**, especially for first-time users.
  - Development is still ongoing, with a focus on ensuring **accurate responses and seamless integration**.
- **Personalized Clothing Search Options**
  - Instead of relying solely on **basic search filters**, users will be able to receive **personalized recommendations** based on previous searches, saved preferences, and clothing sizes.
  - This will improve the overall **shopping and exchange experience**, making it more intuitive and efficient.
- **Enhanced Security Features**
  - Originally, user authentication was planned as a **basic email/password login system**.
  - Due to security concerns and the need for **better trust mechanisms**, additional verification steps, such as **two-factor authentication (2FA) and identity verification**, were considered for future implementation.
- **Expanded Transaction Models**

- The platform was initially **limited to direct exchanges** between parents.
  - Based on feedback, additional options such as "**donation-only**" listings and **low-cost selling** were introduced to offer **greater flexibility** for users.
- 

## 3.2 Changes in Technology Stack

The core **MERN (MongoDB, Express.js, React, Node.js)** stack remained the foundation of the platform. However, several adjustments were made to optimize performance and resolve unexpected technical challenges.

### Firebase Integration Challenges & Adjustments

- **Authentication and User Management:**
    - Firebase was chosen for **authentication** due to its ease of integration, but setting up **custom user roles and error handling** required **more effort** than initially estimated.
    - Managing authentication across multiple user types (e.g., buyers, sellers, donors) proved to be **more complex**, necessitating additional security configurations.
  - **Image Upload and Storage:**
    - Originally expected to be a **straightforward implementation**, Firebase Storage presented **issues related to image compression, retrieval delays, and storage limits**.
    - The team had to invest more time in **optimizing file uploads** to ensure smooth performance.
  - **Error Handling & Debugging:**
    - Error handling in Firebase required **customized logging and exception handling mechanisms**, which were **not part of the initial plan**.
    - Unexpected **authentication failures and storage permission issues** led to additional debugging efforts.
- 

## 3.3 Timeline Adjustments

Due to the technical challenges encountered with Firebase authentication and image handling, the project timeline required modifications.

### Key Delays & Adjustments:

1. **Firestore Integration Delays**

- The team underestimated the **complexity of Firestore authentication and error handling**, leading to **longer-than-expected development time**.
- The initial expectation of a **quick setup** had to be revised, pushing other development tasks further down the timeline.

2. **Image Upload Implementation**

- Despite the initial challenges, **the image upload feature was successfully implemented**.
- However, the debugging phase took **more time than anticipated**, delaying further progress on authentication and AI chatbot integration.

3. **Beta Launch Postponement**

- Originally scheduled for launch **two weeks earlier**, the **beta testing phase had to be pushed back** to accommodate these development delays.
- The current focus is on **stabilizing the authentication system** before introducing the **AI chatbot feature**.

Updated Timeline Overview

Phase	Original Timeline	Updated Timeline
Research & Planning	Week 1-2	No Change
Development Start	Week 3	No Change
Firestore Integration	Week 4-5	Extended to Week 6
Image Upload Feature	Week 5	Completed
Authentication Debugging	Week 5-6	Extended to Week 7
AI Chatbot Implementation	Week 7-8	In Progress
Beta Testing & Launch	Week 9	Pushed back by 2 weeks

---

## 4. Project Planning and Timeline (From Current Period to End of Term)

### 4.1 Updated Timeline and Schedule

To ensure the successful completion of the platform, a structured timeline has been established. This updated schedule accounts for the previous delays in Firebase integration and includes the remaining tasks necessary for project completion.

#### Updated Milestones and Timeline

Week	Tasks	Details
Week 1-2	Research & Finalization of Platform Requirements	Conduct thorough research on user needs and sustainability aspects.
Week 3-4	Development Phase 1: Set Up Environment & Initial Coding	Set up the development environment (MERN stack + Firebase). Begin front-end development using React.js (UI components, navigation, and styling). Start back-end development using Node.js/Express.js (API setup, authentication structure).
Week 5-6	Development Phase 2: Integration & Initial Testing	Complete front-end and back-end integration for user authentication and data flow. Implement Firebase authentication and image upload system. Conduct pilot testing with a small group of users to gather initial feedback.
Week 7-8	Feedback Implementation & Final Design Adjustments	Analyze pilot user feedback and make necessary design adjustments. Improve UI elements for a more intuitive user experience. Optimize Firebase authentication and fix errors related to image uploads.
Week 9	Beta Launch & User Feedback Collection	Deploy the beta version of the platform for broader testing. Monitor user interactions and collect feedback on usability, performance, and security.
Week 10	Final Adjustments & Project Submission Preparation	Implement any final adjustments based on beta user feedback. Conduct final round of bug fixes and performance optimizations. Prepare for the project presentation and submission.

### 4.2 Team Responsibilities

Each team member plays a crucial role in the successful development of the platform. The division of responsibilities ensures an efficient workflow and clear accountability for different aspects of the project.

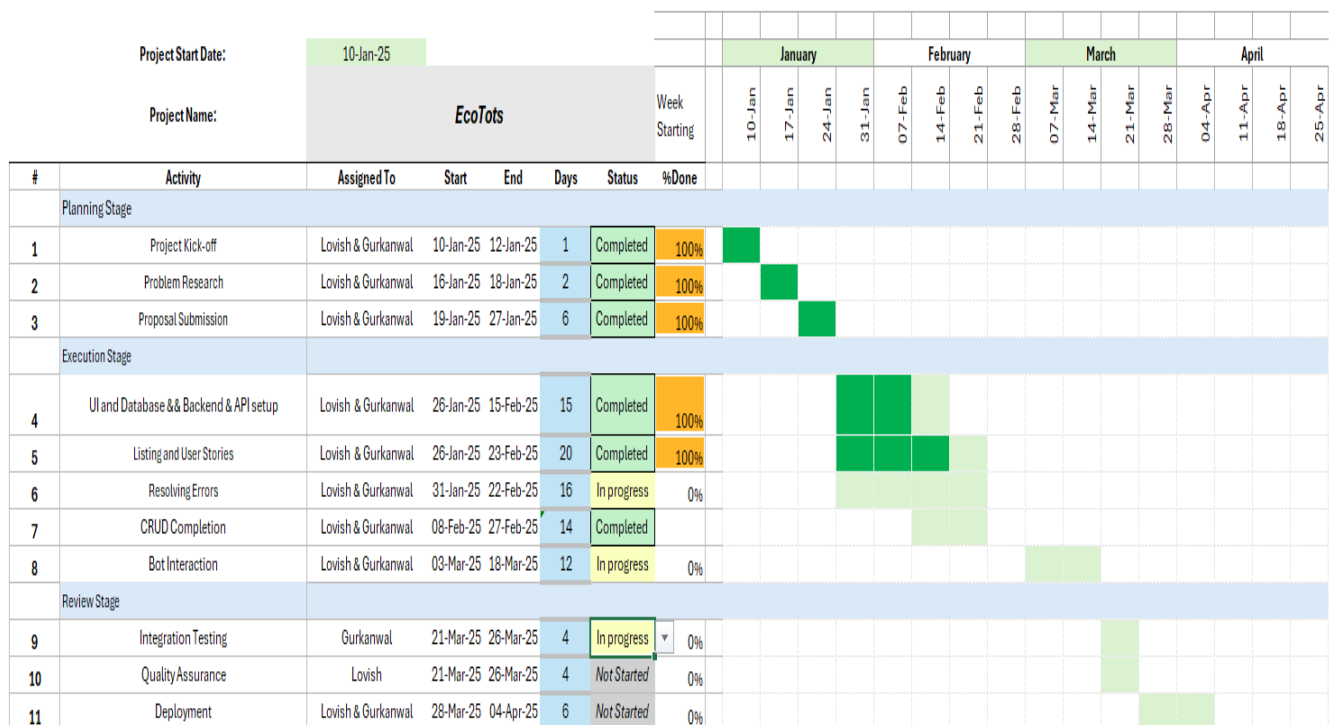
#### Team Members & Responsibilities

- a) Lovish Dhanda (Front-end Development, UI/UX, Firebase Integration)
  - **Front-end Development (React.js)**

- Develop and optimize React components for pages such as homepage, profile, listings, and search.
- Implement responsive design to ensure compatibility across devices.
- Manage state handling and component interactions.
- **UI/UX Design & Wireframing**
  - Create and refine wireframes and prototypes based on user research.
  - Ensure a bright, vibrant design appealing to children and parents.
  - Improve navigation and accessibility for all user types.
- **Firebase Integration & Error Handling**
  - Implement Firebase authentication and user management.
  - Integrate Firebase Storage for image uploads, ensuring smooth processing and retrieval.
  - Debug and handle errors related to authentication, storage, and user sessions.
- b) Gurkanwal Singh (Back-end Development, Database, Firebase Authentication, Platform Testing)
- **Back-end Development (Node.js, Express.js)**
  - Set up and manage the server-side API for user authentication and clothing exchange listings.
  - Develop and secure RESTful API endpoints for platform functionality.
  - Implement middleware for security, validation, and error handling.
- **Database Management (MongoDB)**
  - Design the database schema to efficiently store user profiles, listings, and transaction history.
  - Optimize query performance and ensure data consistency.
  - Implement data validation and security measures.
- **Firebase Authentication & Security**
  - Set up Firebase authentication for user login and registration.
  - Implement additional security measures (e.g., password resets, account verification).

- Ensure role-based access control for users.
- **Platform Testing & Debugging**
  - Conduct unit testing and integration testing to identify and fix bugs.
  - Monitor performance and security vulnerabilities.
  - Perform final testing before beta launch to ensure platform stability.

### 4.3 Updated Gantt Chart



### Summary of the Updated Gantt Chart

The Gantt chart provides a clear, visual breakdown of the project's milestones and timeline, offering insights into the structured progression of tasks and their respective deadlines. It highlights the adjustments made to the original timeline, particularly due to delays encountered during Firebase integration.

## 5. Implemented Features

### 5.1 Image Upload Feature

The image upload feature is a critical component of the platform, enabling users to share pictures of gently used children's clothing for sale or donation. This feature integrates seamlessly with Firebase Storage to store images securely and efficiently, providing a reliable cloud storage solution.

#### How It Works:

- **Image Upload Flow:** Users can upload images directly through the platform interface by selecting files from their device. The platform provides easy-to-use options for adding descriptions, setting prices, and choosing item categories. Once uploaded, the images are stored in Firebase Storage, and the image URL is saved in the database for use on the platform.
- **Integration with Firebase:** Firebase provides a secure and scalable way to store images, and its real-time database makes it easy to manage and display uploaded content.

#### Challenges Faced:

- **Firebase Storage Configuration:** Initially, configuring Firebase for image storage presented some difficulties, especially in ensuring that the platform's permissions were set correctly to allow secure uploads while keeping the platform protected from unauthorized access.
- **Error Handling:** Handling errors in case of upload failures or incorrect image formats was a significant challenge. The system needed robust error handling to guide users through the process in case of issues, such as an unsupported file type or slow internet connection during the upload.
  - **Error Messages:** Users are notified with clear, understandable error messages in cases of failed uploads. This prevents confusion and allows for a better overall user experience.

```

const handleImageSubmit = (e) => {
  //e.preventDefault(); not inside the form
  if (files.length > 0 && files.length + formData.imageUrls.length < 7) {
    setUploading(true);
    setImageUploadError(false);
    const promises = []; //more than one asynchronous behaviour

    for (let i = 0; i < files.length; i++) {
      promises.push(storeImage(files[i]));
    }
    Promise.all(promises)
      .then((urls) => {
        setFormData({
          ...formData,
          imageUrls: formData.imageUrls.concat(urls),
        });
        setImageUploadError(false);
        setUploading(false);
      })
      .catch((err) => {
        setImageUploadError("Image upload Failed (2 mb max per image)");
        setUploading(false);
      });
  } else {
    setImageUploadError("You can only upload 6 images per listing");
    setUploading(false);
  }
};

const storeImage = async (file) => {
  return new Promise((resolve, reject) => {
    const storage = getStorage(app);
    const fileName = new Date().getTime() + file.name;
    const storageRef = ref(storage, fileName);
    const uploadTask = uploadBytesResumable(storageRef, file);
    uploadTask.on(
      "state_changed",
      (snapshot) => {
        const progress =
          (snapshot.bytesTransferred / snapshot.totalBytes) * 100;
        console.log("Upload is ${(progress)}% done");
      },
      (error) => {
        reject(error);
      },
      () => {
        getDownloadURL(uploadTask.snapshot.ref).then((downloadURL) => {
          resolve(downloadURL);
        });
      }
    );
  });
};

```

Upload Images

Choose Files 2 files

UPLOAD



Create Listing



## 5.2 Show Listings

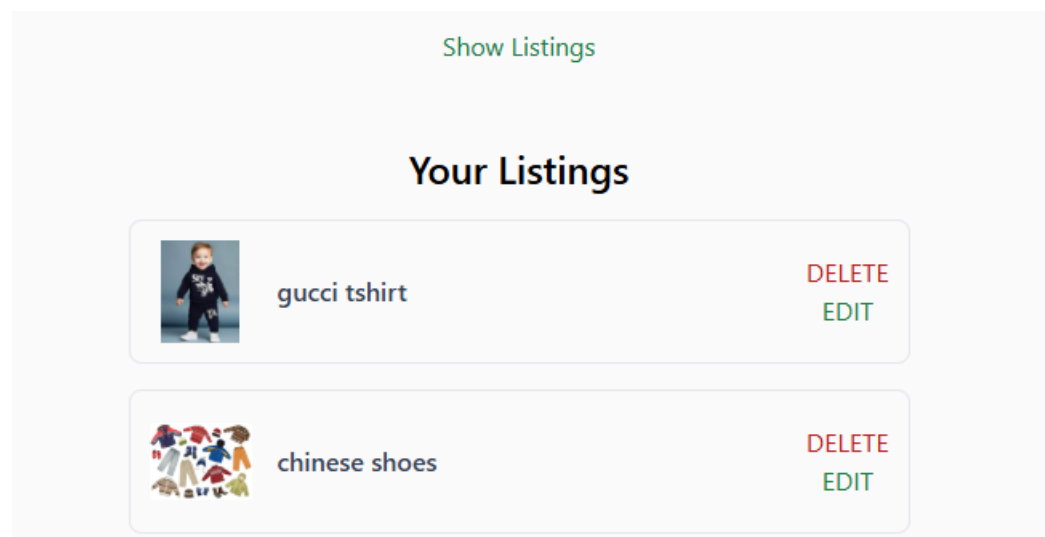
The show listings feature allows users to view all their uploaded listings in one place. This ensures better management of their items and allows for easy modifications or deletions if needed.

### How It Works:

- **User Dashboard:** Users can navigate to their profile or dashboard to view a list of their active and past listings. Each listing displays the uploaded image, item description, price, and category.
- **Edit and Delete Options:** Users can edit item details or remove listings if the item is no longer available.

### Challenges Faced:

- **Data Synchronization:** Ensuring that newly uploaded listings appear instantly required efficient synchronization with the database.
- **User-Friendly Display:** Designing a clear and intuitive layout for displaying multiple listings without cluttering the interface.
- **Performance Optimization:** Implementing pagination or lazy loading to improve performance when a user has a large number of listings.



### 5.3 AI Chatbot

An AI-powered chatbot is being integrated into the platform to enhance the user experience. The chatbot is designed to provide immediate, automated responses to common questions, guide users through the platform, assist with registration, help find products, and offer general customer support.

#### How It Works:

- **Customer Assistance:** The chatbot assists parents by answering frequently asked questions about the platform, such as how to list items, payment options, shipping, and safety policies. It can also help guide new users through the registration and login process, making the platform more accessible and intuitive for those who may not be as tech-savvy.
  - **Product Search:** The chatbot is equipped with natural language processing (NLP) capabilities to help users search for specific types of clothing based on size, condition, or other preferences.
  - **User Interaction:** The goal of the chatbot is to be friendly and helpful, providing real-time responses while reducing the need for human intervention. It enhances customer support by ensuring immediate answers to simple queries.
- 

## 6. Work Logs

### a) Lovish Dhanda (Team Lead)

Date	Number of Hours	Description of work done
January 13	2.5	Researching real-world problems
January 14	1.5	Identifying potential solutions
January 15	1	Explore the pros and cons of different technologies for the project
January 16	1.5	Look deeper into common challenges faced by consumers
January 17	1.5	Study various tech business models (SaaS, subscription-based, etc.)

January 18	1.5	Learning new frameworks, such as Next.js, or tools like Docker, Kubernetes, etc., based on the project's needs
January 19	2.5	Focus on designing products that solve real user problems and learn about UX/UI design principles
January 20	1	Explored the concept of State in React more deeply.
January 21	1	Went deeper into lifecycle methods with useEffect in functional components.
January 22	1.5	Studied the Context API to manage global state in React
January 23	1	Set up a pipeline for automatic testing and deployment using GitHub Actions.
January 24	0.5	Discussed the chosen problem with the professor and team member to gain overall consent
January 25	1	Discussion with team member about setting up and initializing the app
January 26	0.5	Discussed the basic UI structure of the app with my team member.
January 27	1	Worked on User stories such as User Registration, Browsing and Searching for Items, etc.
January 28	2.5	Initial setup of the GitHub Repository ( <a href="https://github.com/lovishdhanda/W25_4495_S2_LovishD">https://github.com/lovishdhanda/W25_4495_S2_LovishD</a> ) and app, including connecting to MongoDB, tailwind CSS, express and node for the backend.
January 29	1.5	Studied Redux Toolkit and explored Firebase authentication and storage features
January 30	3.5	Created the User model ( <code>user.model.js</code> ) and implemented API routes, a middleware and function to handle possible error and Sign up page UI.
January 31	4	Create Sign In API Route, getting familiar with firebase authentication and debugged and improved error handling across the Sign in page.
February 1	0.5	Discussion with team member of adding Ratings and Reviews for Sellers
February 2	1.5	Explored deeply into authentication tokens, session persistence, and secure sign-out.

February 3	0.5	Understanding Response Time in Network (via Browser Console & DevTools).
February 4	1	Discussion on adding some chatting options between the buyer and seller and use of AI in it.
February 5	4.5	Implemented profile picture upload functionality, created and fixed bugs in the user update API route, added user deletion functionality, and integrated sign-out functionality. Additionally, developed the listing API route.
February 6	3	Completed the UI for the create listing page and finished implementing the functionality to upload listing images. Added delete functionality to the uploaded photos.
February 7	2.5	Test image uploads with different network speeds, implement lazy loading for images in the listings to improve page load times.
February 8	1.5	Working on Progress Report 1, gathering all the previous knowledge and interviewing some parents and taking surveys.
February 9	1.5	Researched accessibility improvements for the platform to make it more user-friendly for parents
February 10	1.5	Started working on Firebase storage permissions to ensure better security and access control for uploaded images.
February 11	2	Fixed issues with profile update functionality, ensuring users can edit details without data loss.
February 12	1.5	Implemented frontend validations for the create listing page to prevent users from submitting incomplete forms.
February 13	1	Conducted UI/UX testing to improve the layout of listing cards and filter options.
February 14	1.5	Began research on AI chatbot frameworks (Dialogflow, OpenAI API, or Rasa) for customer interaction.
February 15	2	Designed an initial flowchart for chatbot interactions, outlining how it will assist users.
February 16	2.5	Explored integration strategies for embedding the chatbot within the React front end.
February 17	2.5	Implemented a basic chatbot UI and connected it with a test API for response handling.
February 18	3	Identified and resolved a Firebase authentication bug that prevented some users from logging in.

February 19	1.5	Improved error messages for failed login attempts and incorrect form submissions.
February 20	1	Conducted extensive mobile responsiveness testing and fixed layout issues on smaller screens.
February 21	1.5	Improved database queries to optimize load times when fetching listings.
February 22	1.5	Worked on improving the AI chatbot's responses by training it on common user queries.
February 23	2	Started finalizing the second progress report, documenting key challenges and solutions.
February 24	2	Working on Midterm Report and gathering all the previous knowledge and interviewing some more parents.

## b) Gurkanwal Singh

Date	Number of Hours	Description of Work done
Jan 17, 2025	2	Searched current real-world problems.
Jan 20, 2025	2	Identified possible solutions and selected project topics.
Jan 23, 2025	1	Discussed selected topics with professor and finalized the topic.
Jan 25, 2025	1	Discussed proposal structure, contributions, and web app setup with team members.
Jan 26, 2025	2	Worked on project proposal and outline of whole project.
Jan 27, 2025	1	Developed project functionalities and user stories for a comprehensive approach.
Feb 1, 2025	1	Studied the Sign-in functionality implemented by a team member.
Feb 2, 2025	3.5	Completed Sign-in functionality started by a team member. Integrated Redux persist for authentication session management.

Feb 3, 2025	3.5	Implemented Google Sign-up and Sign-in using Firebase Authentication.
Feb 4, 2025	1	Designed and developed the Profile Page UI, ensuring responsiveness and styling.
Feb 7, 2025	2	Studied profile picture upload, image handling, and listing page functionalities.
Feb 8, 2025	3	Implemented user input handling, error validation, and form submission functionality for listing creation.
Feb 9, 2025	2.5	Began working on the API route for user listings (not yet uploaded to GitHub).
Feb 10, 2025	3	Implemented on API to get user's own listings.
Feb 11, 2025	3	Finalised and started implementing UI for user's own listings.
Feb 12, 2025	1	Worked on further research to add features to listings page.
Feb 13, 2025	2	Added image slider for listing and handled errors occurred.
Feb 16, 2025	1	Searched for Font Awesome and added the related ones.
Feb 17, 2025	2	Studied the working of location APIs and chatbots.
Feb 18, 2025	1	Researched for more features to make the project more comprehensive.
Feb 21, 2025	2	Completed the listing page for user's own posts.
Feb 23, 2025	3.5	Handled errors faced in Firebase Storage, Worked on the mid term report.
Feb 24, 2025	2.5	Completed the firebase working for image upload, Worked on video representation and finalized the report.

## 7. Closing and References

This project has been a collaborative effort, and we would like to express our sincere gratitude to everyone who contributed to its development. We acknowledge the guidance and support provided by our **Prof. Padmapriya Arasanipalai Kandhadai** whose valuable insights helped refine our approach. Special thanks to the **parents** who participated in our **surveys**, offering firsthand perspectives on their needs and challenges. Additionally, we appreciate the resources and documentation provided by Firebase, React, and MongoDB communities, which played a crucial role in the technical implementation of the platform.

**Below is a list of references used in this report:**

- <https://www.bomberbot.com/react/build-an-ai-chatbot-with-the-mern-stack-a-comprehensive-guide/>
- <https://medium.com/@shubhamraiput252000/how-to-find-the-nearest-location-using-google-maps-in-a-mern-stack-application-81baab1cca1c>
- <https://stackoverflow.com/questions/66757297/real-time-location-system-using-mongodb-nodejs>
- <https://firebase.google.com/>
- <https://www.youtube.com/watch?v=5cPkGoW7MYE>
- <https://www.youtube.com/watch?v=YZCQafLGuz8>
- <https://openai.com/index/chatgpt/>