

**Nextile - AI-Driven Textile Dashboard with Inspection & Market  
Insights (Web App)**

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## **DECLARATION**

We hereby declare that this project report entitled “Nextile - AI-Driven Textile Dashboard with Inspection & Market Insights (Web App)” is written by us and is our own effort and that no part has been copied or taken without a mentioning reference of source.

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## **Abstract**

This document describes Nextile, a web application that connects textile buyers, suppliers, and inspection teams. The major challenge in the textile industry is finding the right buyers, suppliers, and inspection teams for their business, so Nextile aims to create a central platform that makes this process faster and simpler. This app not only connects users but also provides AI features. Users can get data analysis and AI-based insights and recommendations about their textile export data. Users can now perform AI-based textile-related searches that include buyers, suppliers, inspection teams, and the latest news in the textile industry. Users can also get AI-based predictions about their textile export data for making better decisions in the future.

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## List of Abbreviations

Abbreviation	Explanation
AI	Artificial Intelligence
EDA	Exploratory Data Analysis
API	Application Programming Interface
UI	User Interface
UX	User Experience
CSV	Comma-Separated Values
PDF	Portable Document Format
B2B	Business-to-Business
DB	Database
ODM	Object Data Modeling
SMTP	Simple Mail Transfer Protocol
CRUD	Create, Read, Update, Delete (implied but not explicitly mentioned)
UML	Unified Modeling Language
TC	Test Case (used in TC01, TC02... TC15)

# Chapter 1

## 1. Introduction

The textile industry operates as a vast global network where buyers and suppliers must communicate and collaborate seamlessly. This partnership is essential for moving materials, fabrics, and finished goods through every stage of production and delivery. Despite the industry's massive scale, finding trustworthy suppliers or buyers remains challenging. Many companies rely on traditional methods such as manual searches, personal referrals, or attending trade shows to identify potential partners. While some utilize platforms like LinkedIn, these general-purpose tools aren't designed to address the textile industry's specific requirements. Without specialized solutions, businesses waste valuable time, miss opportunities, and struggle to verify the reliability of potential partners.

Nextile addresses these challenges with a custom web application designed specifically for textile professionals. Rather than relying on generic directories or social networks, Nextile focuses exclusively on connecting buyers, suppliers, and inspection teams within the textile industry. The platform enables users to quickly identify partners who match their exact product requirements, making the entire process more efficient and reliable.

Upon registration, each user type on the Nextile platform gains immediate visibility into relevant connections. Suppliers can view all registered buyers, enabling them to explore potential business opportunities. Likewise, buyers gain access to a comprehensive list of suppliers. Additionally, when inspection teams join the platform, they are granted visibility of all buyers, allowing for easier coordination and collaboration within the textile supply chain. Each supplier on Nextile maintains a comprehensive profile showcasing their products and quality certifications, promoting transparency and helping buyers make informed decisions while building trust.

Nextile provides a unique communication opportunity for textile buyers, suppliers, and inspection teams through detailed inquiry forms that other platforms don't offer. This communication is facilitated using inquiry forms sent via email directly from the Nextile platform, ensuring all parties can connect and exchange information efficiently.

Beyond traditional networking, Nextile provides advanced AI-powered features including data analysis and insights on textile export data. Users can perform intelligent textile-related searches covering buyers, suppliers, inspection teams, and industry news. The platform also offers AI-based predictions on textile export data to support better future decision-making.

## **1.1 Problem Statement**

The textile industry is one of the biggest and fastest-moving markets worldwide, but it still doesn't have a dedicated online platform that truly meets the needs of buyers and suppliers. While there are plenty of generic websites for networking or shopping, most aren't designed for the textile sector's specific challenges. They either cover too many industries or lack tools that make buying and selling textiles efficient. Because of this, companies waste time searching for the right partners, miss out on opportunities, and face delays in their supply chains.

Many current platforms are built for general business deals or online shopping. They don't have the detailed profiles which include certifications, product catalogs, or organized ways to communicate that textile businesses need. Without a focused solution, companies end up relying on slow, old-fashioned methods like manual research, attending trade shows, or browsing generic directories that don't offer up-to-date data or personalized results. This disorganized process drags out deals and makes it harder for businesses to prove they're trustworthy.

## **1.2 Purpose**

Nextile is a modern online platform built to transform how textile buyers and suppliers find and work with each other. Currently, businesses in this field struggle to connect with the right partners because there's no single hub designed specifically for the textile industry. Finding materials or trustworthy suppliers often means endless online searches, attending trade shows, or using generic websites that don't understand the industry's needs. These outdated methods waste time, create delays, and increase the risk of partnering with unreliable companies, which can hurt profits and operations.

Nextile addresses these issues by making textile transactions faster and more transparent. Instead of jumping between multiple platforms, users get a single space where they can quickly find partners that fit their exact needs. Unlike basic directories, Nextile's AI analyzes product types,

buyer preferences, and market shifts to recommend the best matches. For example, if a buyer needs organic cotton, the system instantly suggests suppliers, eliminating hours of manual work.

Trust is a major focus for Nextile. Every supplier on the platform is required to create a comprehensive company profile that includes valid certifications, business licenses, industry reputation, and product catalogs. This requirement ensures buyers only deal with credible partners, reducing the risk of scams or poor-quality products.

But Nextile isn't just about connecting people, it also helps businesses grow. The platform includes tools like export analysis reports, which show trends in global demand, pricing, and new market opportunities. Suppliers can use this data to adjust their strategies, target international buyers, and boost sales. By combining AI-powered matching with market insights, Nextile transforms the messy, slow process of textile sourcing into something efficient, trustworthy, and ready for growth.

### **1.3 Project Objectives**

- To create a user-friendly platform with AI-powered search functionalities.
- To predict market demand based on export data and sales trends.
- To provide an export analysis feature that helps identify key markets through exploratory data analysis (EDA).
- To provide an inspection team for the buyer to check the product before it is sold

### **1.4 Research Goals**

Our main focus with this research was to understand what's really going wrong in the textile industry and figure out how we could build a digital tool that actually helps textile buyers, suppliers, inspection teams, and analysts do their jobs better. What we discovered is that there's no proper platform built just for textile professionals, which means people waste tons of time trying to find the right business partners, they can't get reliable information about companies they want to work with, they're stuck using old-fashioned ways to communicate, and they're missing out on good business deals all the time.

Here's what we kept hearing: buyers can't find suppliers they can trust who have all their information laid out clearly, and suppliers are having a hard time getting in front of the right

buyers. Meanwhile, inspection teams don't have anywhere to show off their work or connect with businesses that need their services.

Sure, there are websites like Textilepages that try to connect buyers and suppliers, but they're pretty basic. They don't really help inspection teams get noticed, they don't give you detailed information about companies, and they don't have smart tools for communication. That's where Nextile comes in differently we're putting together complete company profiles that show certifications, registration numbers, who they've worked with before, what equipment they have, and their full product range. We've also created a detailed inquiry system where people can specify exactly what they need quantities, deadlines, payment preferences, quality standards so everyone's on the same page from the start.

What makes Nextile special is how we're bringing artificial intelligence into the mix. We've got smart search features, tools that can predict export trends, ways to analyze data, and AI that gives business recommendations. This means users can get predictions about their export numbers and make smarter business decisions based on real data.

We built everything using current technology Next.js for the main framework, React Bootstrap to make it look good on any device, MongoDB Atlas and Mongoose for storing all the data, Cloudinary for handling files and images, bcrypt to keep passwords secure, NextAuth for user login, Formidable for processing files, Nodemailer for sending emails, and Swiper for those sliding image displays. The AI features work through the Gemini API, which powers our search and recommendation tools.

Before we started building anything, we knew we had to do our homework. We talked to people in the industry to understand their daily struggles, figured out what features each type of user would actually need, made sure we understood compliance requirements like certification verification, and studied other platforms to see where they were falling short. This groundwork helped us create something that doesn't just solve the obvious problems but also brings some real innovation to how the textile supply chain operates.

## **1.5 Project Scope**

The Nextile project is focused on building a user-friendly, web-based platform that brings together textile buyers, suppliers, and inspection teams on one centralized system. It aims to fix common issues in the textile industry such as the struggle to find reliable business partners, the lack of transparent company information, outdated communication methods, and missed chances for growth.

Users can sign up under roles that match their profession whether they are buyers, suppliers, or inspection teams and each role comes with its own tailored tools and access. Once registered, users will be able to set up comprehensive company profiles that include important details like certifications, registration numbers, product catalogs, client references, and equipment information. Inspection teams can also upload verified inspection documents and buyer endorsements to build trust and credibility.

To make the platform more helpful and intelligent, AI features are being added. These include smart search tools, automated export data analysis, business predictions, and personalized insights that help users make more informed decisions. The platform will be fully responsive, using React Bootstrap to ensure smooth performance on all devices. Visual elements like animations and sliders will be handled using AOS and Swiper libraries to improve the user experience.

The backend is built using Next.js API routes, with MongoDB Atlas and Mongoose for database operations. Files like certificates and catalogs will be stored using Cloudinary, and user security is handled through tools like bcrypt for password hashing, NextAuth for authentication, Formidable for file uploads, and Nodemailer for sending emails. All AI functionality will be powered by the Gemini API.

At this stage, features such as a mobile version, support for multiple languages, online payments, and real-time messaging are not included but may be considered in future versions based on user feedback and project direction.

## **1.6 Proposed Solution**

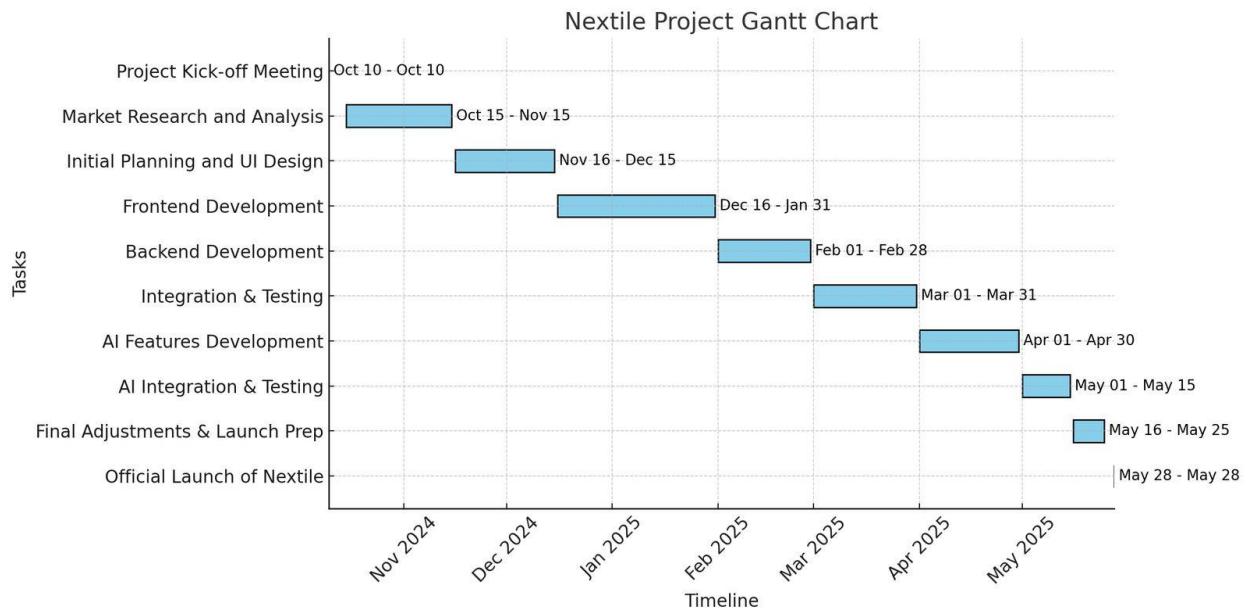
The proposed solution is to develop Nextile, a specialized web platform designed to enhance the textile trading process by connecting buyers, suppliers and Inspection teams effectively. The key features of Nextile include:

- Dedicated Textile Buyer-Supplier Network: Nextile will act as a centralized hub for textile professionals, allowing buyers and suppliers to easily discover and collaborate with each other. Free registration on the platform will simplify transactions and partnerships.
- AI-Powered Searching: The platform will use advanced AI to deliver customized search results. Users can filter options based on product type, quality standards, pricing, and other criteria to find the best-matched partners for their needs including latest textile news.
- Export Data Analysis with Predictive Insights: Nextile will offer a free tool where users can explore export data, understand pricing trends, track market opportunities, and get predictions based on their queries. This helps businesses make better strategic decisions using real-time insights.
- AI-Based Exploratory Data Analysis (EDA): Users will be able to upload their own export data and receive automated analysis powered by AI. The platform will generate clear insights and actionable recommendations based on this data helping businesses understand performance and plan ahead.
- Quality Assurance via Verified Inspectors: To minimize risks, Nextile will enable buyers to hire professional inspection teams directly through the platform. Inspection teams worldwide can register on the platform, and buyers can negotiate terms with local inspectors using inquiry forms. This ensures product quality is verified before purchases are finalized.

By integrating these features, Nextile aims to streamline the textile trading process, enhance trust between users, and ultimately contribute to a more efficient and reliable marketplace in the textile industry.

## 1.7 Project Scheduling

The project shall be developed over several phases: research and design, platform development, integration of AI features, testing, and deployment. Each phase shall be completed in line with the project's timeline to ensure a smooth progression from concept to final product.



*Figure 1.1 Gant Chart*

# **Chapter 2**

## **2. Literature Review**

The textile industry, despite being one of the oldest and most globally integrated sectors, still relies on outdated business practices such as trade shows, phone calls, and manual supplier discovery. While some platforms exist to support global textile commerce, they often lack features tailored specifically to the needs of buyers, suppliers, and inspection teams. This literature review explores the current digital landscape, identifies key gaps, and highlights the opportunities that Nextile aims to address.

### **2.1 Existing Platforms in Textile Trade**

Digital marketplaces like Textilepages, Fibre2Fashion, and GoSourcing365 provide basic functionality for connecting exporters, manufacturers, and buyers. They typically offer product catalogs, company profiles, and trade leads. However, their functionality is often limited to listings and messaging, with no structured inquiry process, no verification system for inspection teams, and no integration of AI-powered tools for enhanced business decision-making.

### **2.2 Gaps Identified in Current Solutions**

While these platforms serve as digital directories, several critical limitations remain:

- Limited Support for Inspection Services: Most platforms overlook the inclusion of inspection teams as independent stakeholders. There is no option for inspection experts to showcase their verified work, upload proof of inspections, or connect with buyers needing quality control services.
- Lack of Smart Communication Tools: Communication remains generic and unstructured. Inquiry forms rarely capture essential information such as quantity, lead time, payment terms, and quality requirements, which are crucial for negotiation and transparency.
- No AI-Based Insights: Current platforms do not leverage artificial intelligence to help users make data-driven decisions. There are no predictive insights, trend analyses, or personalized partner suggestions based on historical data or buyer preferences.

- Missing Profile Depth: Most profiles on existing platforms do not include crucial business information such as certifications, registration numbers, machinery details, or past clients, making it difficult to assess the credibility of a potential partner.

### **2.3 Role of AI in Modern Textile Platforms**

Artificial Intelligence is being increasingly adopted in industries like healthcare, fintech, and e-commerce to provide personalization, forecasting, and decision support. In textiles, AI has the potential to:

- Enhance supplier and buyer matching using smart filters
- Predict market trends and pricing patterns
- Offer insights based on uploaded export data
- Enable smarter product searches and discovery

Despite these benefits, AI is rarely seen in textile B2B platforms, which leaves a significant gap for innovation.

### **2.4 Need for Verified, Transparent Business Information**

Trust and verification are crucial in textile trade, especially for international transactions. Buyers need assurance that suppliers meet certain standards, have valid certifications, and have worked with credible partners. Likewise, inspection teams require a way to build trust by showing previous inspection reports and endorsements. A platform that encourages verified profiles and document uploads such as certificates and catalogs can drastically reduce uncertainty in deal-making.

### **2.5 The Importance of Structured Inquiries**

Structured inquiry systems ensure that every detail of a potential transaction is communicated clearly. Unlike standard “contact us” forms, a well-designed inquiry form should allow users to include fields such as:

- Product Description
- Quantity
- Lead Time

- Payment Terms
- Quality Requirements
- Additional Notes

This reduces back-and-forth messages and creates a professional, efficient starting point for negotiation.

## **2.6 Justification for Building Nextile**

Nextile is designed to fill the gaps identified in this review. Unlike existing platforms, it offers:

- Role-based user onboarding (Buyer, Supplier, Inspection Team)
- AI-powered search, recommendation, and prediction tools
- Verified business profiles with detailed information
- Free upload and analysis of export data for insights and forecasting
- Structured communication tools through smart inquiry forms
- Dedicated space for inspection teams to showcase their verified work and connect with buyers

Nextile brings together everything missing in current textile B2B solutions under one intelligent and user-friendly web app.

## **2.7 Conclusion**

The literature review highlights a clear gap between the needs of textile professionals and the capabilities of existing platforms. While basic platforms exist for supplier discovery, they fall short in enabling intelligent communication, decision-making, and quality assurance. With its AI-driven tools, verified profiles, and structured features, Nextile is positioned as a next-generation platform that responds directly to these limitations and supports the future of digital textile trade.

# **Chapter 3**

## **3 System Requirements**

This chapter outlines the essential system requirements for Nextile, ensuring that the platform meets functional needs, maintains high performance, and adheres to security and usability standards. The system requirements are categorized into functional and non-functional requirements, followed by the use case diagrams for different user roles. A server with sufficient processing power and memory to handle multiple user requests simultaneously. Reliable internet connection for hosting the web application and ensuring smooth user access. Web server software to host the application. Database management system for storing user data, supplier information, and market analysis data. Programming languages and frameworks for front-end and back-end development. AI libraries and tools for implementing AI functionalities.

### **3.1 Functional Requirements**

Nextile is designed to provide a seamless experience for buyers, suppliers, inspection teams, and administrators. The following functionalities are essential for system operation:

#### **3.1.1 User Registration and Login**

- Users can register as either a Buyer, Supplier or Inspection Team.
- The system must validate user credentials during login.
- Passwords must be securely hashed and stored.
- Users must receive verification and notification emails upon registration.

#### **3.1.2 Role-Based Access Control**

- Buyers, Suppliers, and Inspection Teams should have different dashboards and permissions.
- Each role can only access features relevant to them.

#### **3.1.3 Company Profile Management**

- Users can create and update their company profile.

- Profiles must support the upload of PDFs such as:
  - Business certifications
  - Product catalogs
  - Inspection reports
- Buyers can view supplier profiles; inspection teams can view buyer profiles.

### **3.1.4 Inquiry System**

- Users can send structured inquiries with fields like:
  - Product description
  - Quantity
  - Lead time
  - Payment terms
  - Quality requirements
- Inquiries must be routed to the correct user type based on the context.

### **3.1.5 AI-Powered Features**

Users can:

- Search buyers, suppliers, inspection teams, and textile news using AI.
- Upload export data for AI-generated analysis and business insights.
- Get predictive suggestions based on export patterns and market trends.

### **3.1.6 Export Data Upload & Visualization**

- Users can upload export data in CSV format.
- The system generates:
  - Exploratory Data Analysis (EDA) reports
  - Predictive visualizations
  - AI-based recommendations

### **3.1.7 Document Handling**

- Upload and view:
  - Product catalogs
  - Certificates
  - Inspection proofs
- Files are stored securely on Cloudinary.

### **3.1.8 Email Notifications**

- Email alerts for:
  - Registration confirmation
  - Inquiry responses
  - Profile updates

## **3.2 Non-Functional Requirements**

These requirements define the performance, usability, and reliability of the system.

### **3.2.1 Performance**

- The platform must load within 3 seconds on standard internet connections.
- Search and AI response times must remain under 5 seconds.

### **3.2.2 Security**

- User passwords must be encrypted using bcrypt.
- Data must be securely stored in MongoDB Atlas.
- Only authorized users should be able to access specific features based on their roles.

### **3.2.3 Usability**

- The platform must be user-friendly and easy to navigate for all three user types.
- Responsive design should support use on mobile, tablet, and desktop.

### **3.2.4 Availability**

- The platform should be available 24/7 with minimal downtime.
- Automatic recovery mechanisms should be in place in case of server failure.

### **3.2.5 Scalability**

- The system must be able to handle:
  - A growing number of user registrations
  - Large file uploads (certificates, catalogs)
  - Increased data requests for AI analytics

### **3.2.6 Maintainability**

- The codebase should be modular and documented for easy updates and bug fixes.
- Components should be reusable and follow modern development practices.

### **3.2.7 Compatibility**

- The application should support:
  - Latest versions of major browsers (Chrome, Firefox, Edge)
  - All modern devices (desktop, tablet, mobile)

## **3.3 Use Case Diagram**

Use case diagrams, a type of UML, are the most suitable method for visually representing how different actors interact with the components of the Nextile App. These diagrams illustrate which system functionalities each actor can access or perform. In the context of Nextile, the key actors include Buyers, Suppliers, Administrators, AI Engine, and Inspection Teams, each playing a distinct role in the system. These diagrams help in understanding user interactions, ensuring clarity in system design and functionality.

### 3.3.1 Use Case Diagram for Buyer

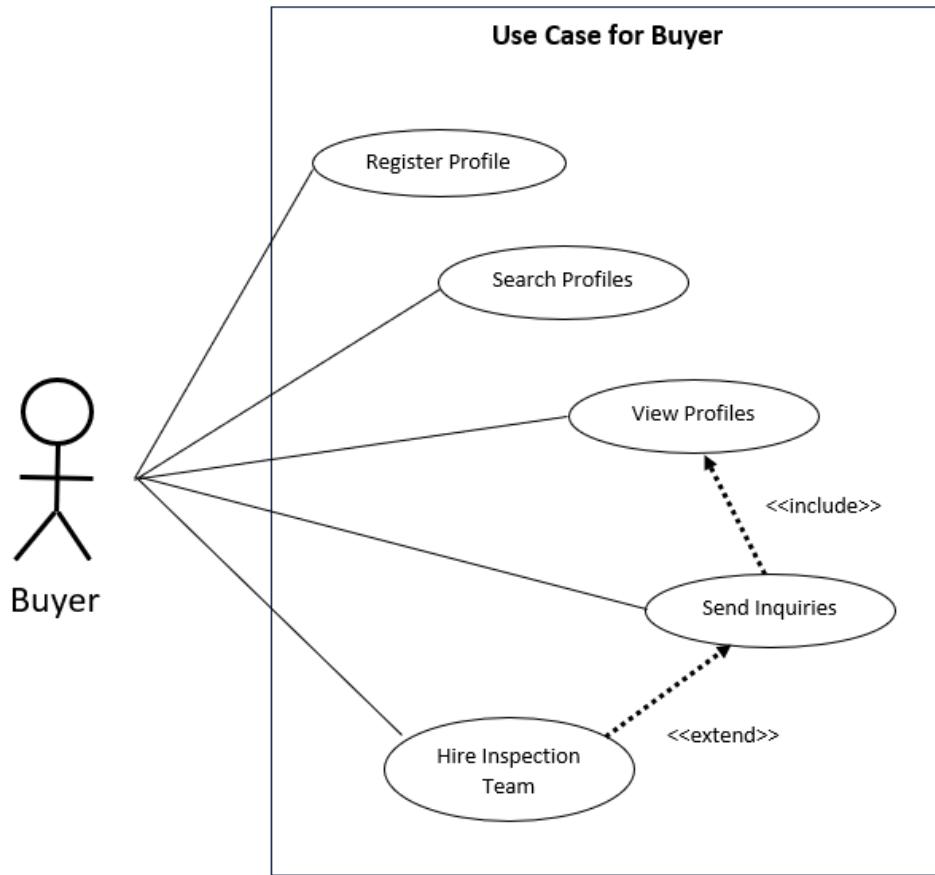


Figure 2 Buyer Use Case

### 3.3.2 Use Case Diagram for Supplier

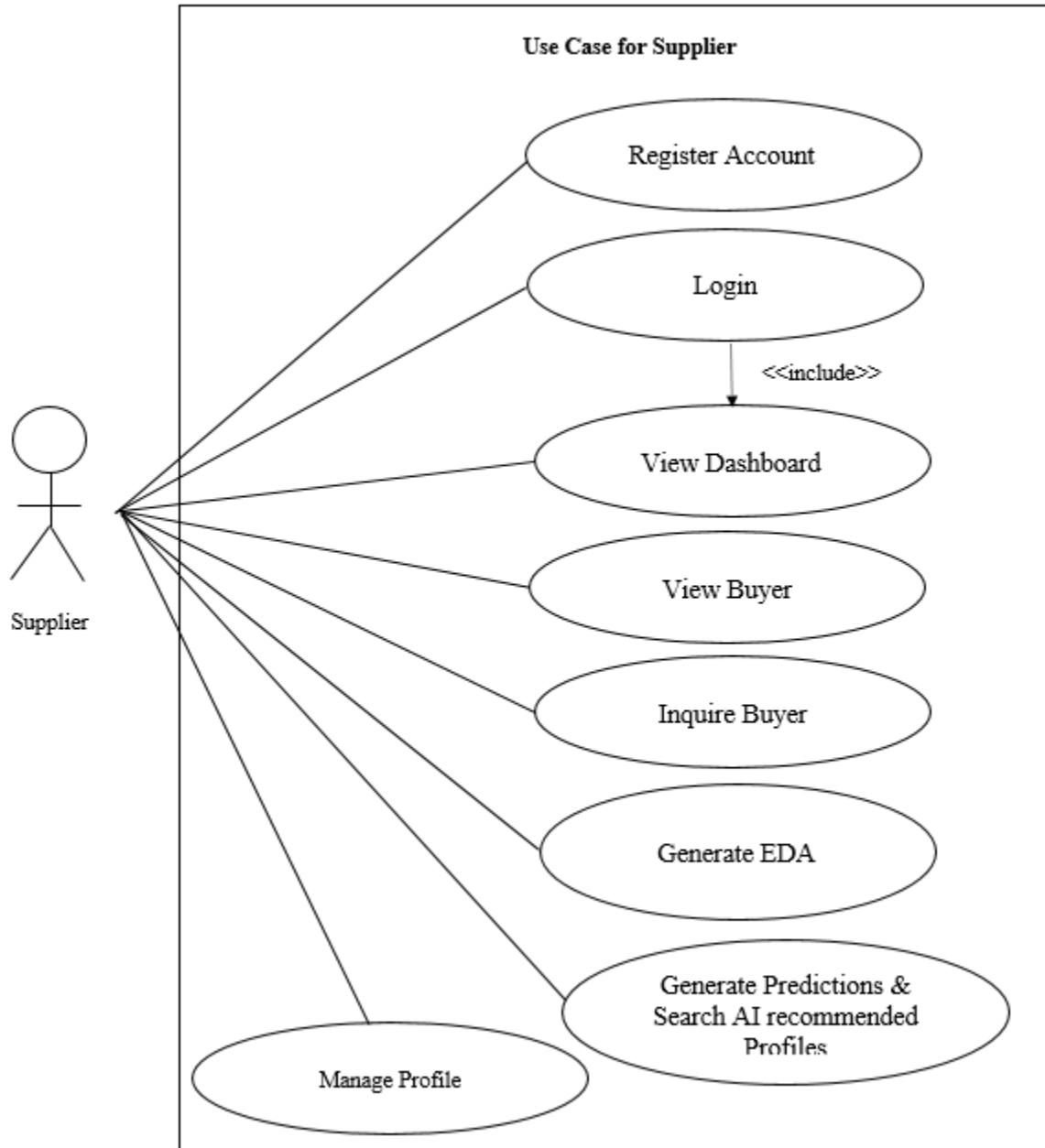


Figure 3 Supplier Use case

### 3.3.4 Use Case Diagram for AI Engine

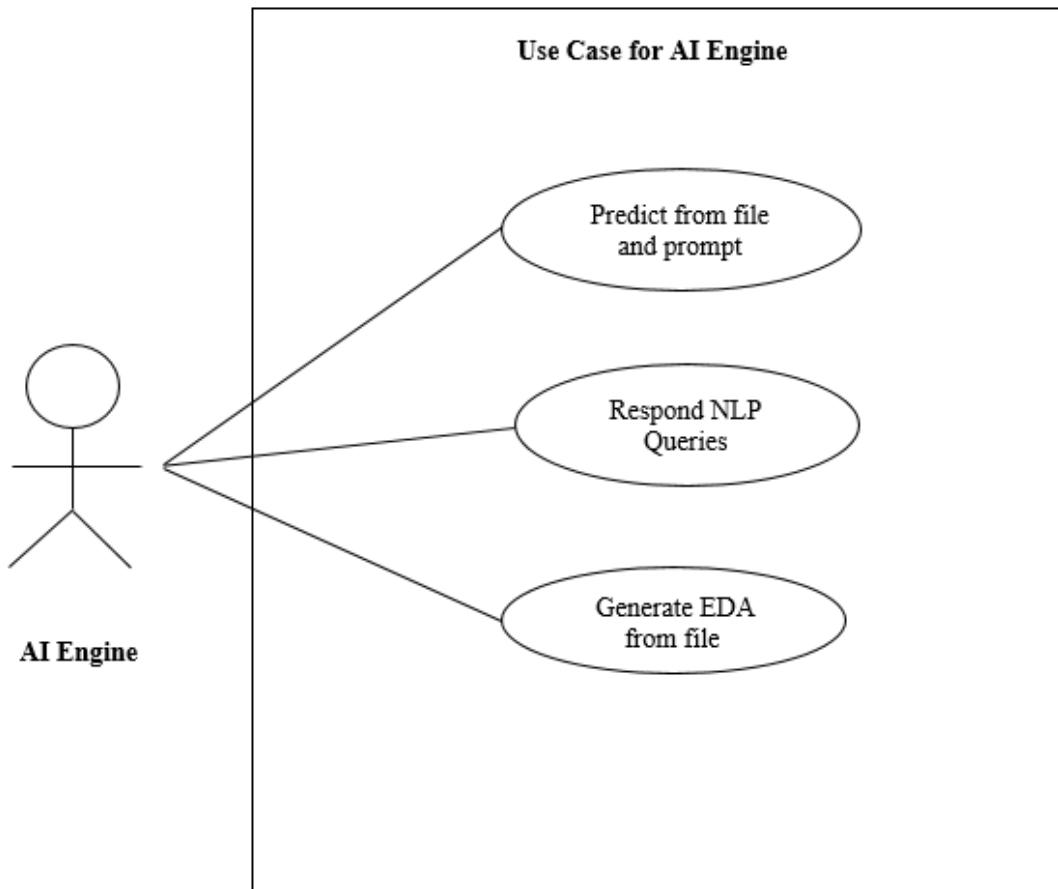


Figure 4 AI Engine Use Case

### 3.3.5 Use Case Diagram for Inspection Team

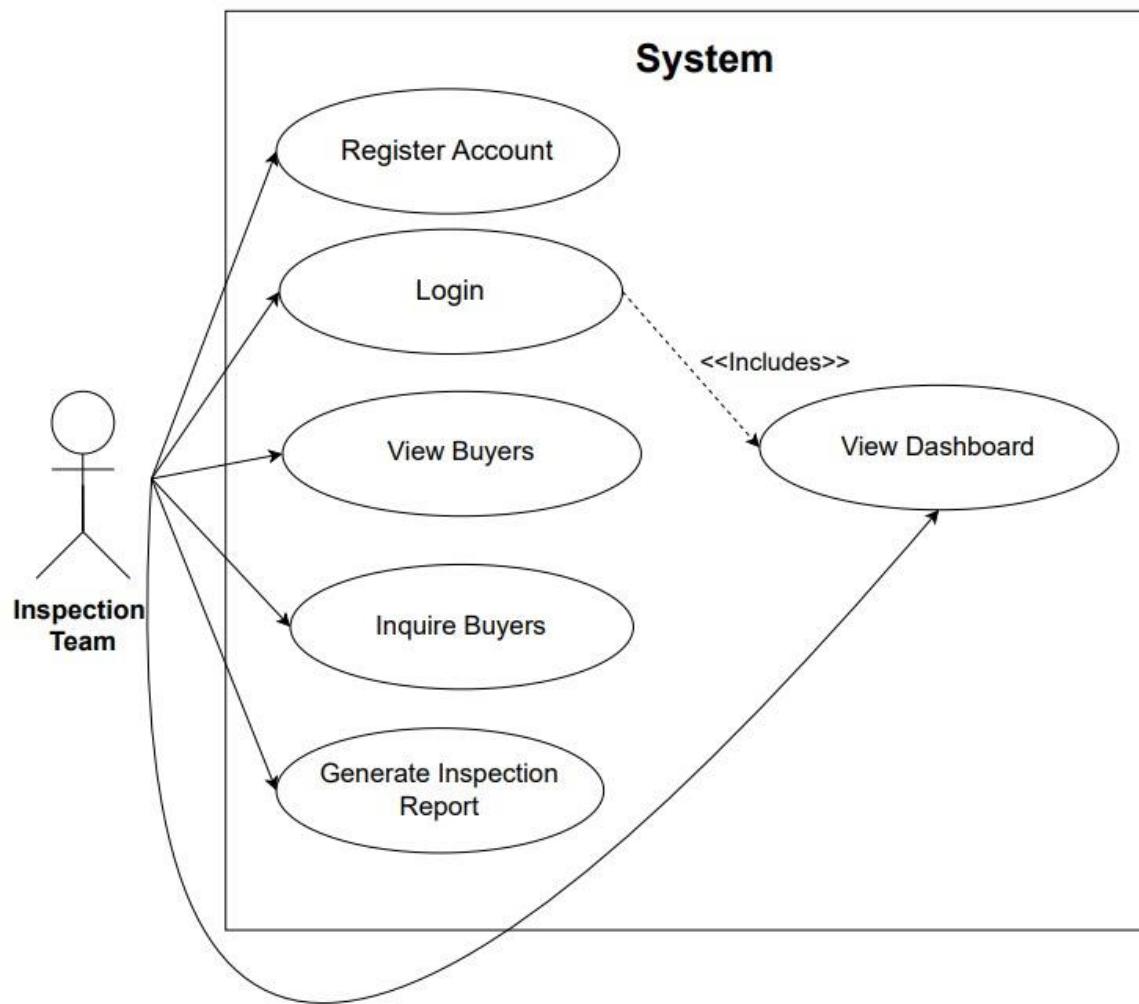


Figure 5 Inspection Team Use Case

### **3.4 Chapter Summary**

This chapter outlined the functional and non-functional requirements of Nextile, ensuring the platform meets the needs of buyers, suppliers, administrators, and inspection teams. The system will integrate AI-powered search, market insights and inspection services to streamline the textile trade process. Additionally, security, performance, availability, and data privacy measures will ensure the platform operates efficiently. The use case diagrams provided a high-level overview of the system's core functionalities for different user roles.

# Chapter 4

## 4 Methodology

The development of the Nextile platform followed a structured and thoughtful process, rooted in understanding real-world challenges in the textile industry. Before diving into coding and design, our team focused on defining clear system requirements and use cases. This chapter walks through the development approach, explains the methodology we adopted, and outlines how this strategy helped us deliver a practical and innovative solution.

### 4.1 Methodology for Software Development

Choosing the right development methodology is a critical step in ensuring the success of any software project. It defines how the project is planned, executed, tested, and delivered. For the Nextile platform, which involves multiple user roles, dynamic data handling, AI integration, and continuous feature updates, a flexible and iterative development process was necessary.

### 4.2 Selected Methodology: Agile (Scrum)

The Agile methodology specifically the Scrum framework was selected for the development of the Nextile platform.

Agile focuses on delivering work in small, manageable units called "sprints." Each sprint typically lasts 1 to 2 weeks and includes planning, development, testing, and review. Scrum is well-suited to projects that evolve over time and benefit from user feedback during the development cycle.

#### Key elements of Scrum used in Nextile:

- **Sprints:** Weekly sprints allowed us to break the platform into phases like user registration, profile building, AI features, etc.
- **Daily Stand-ups:** Regular check-ins ensured the team stayed on track and quickly resolved blockers.
- **Backlog Management:** Features were prioritized based on urgency and user value.
- **Sprint Reviews & Retrospectives:** At the end of each sprint, work was reviewed, tested, and adjusted based on feedback.

### **4.3 Reason for Selecting Agile (Scrum)**

The decision to use Scrum was based on several factors:

- **Flexibility:** Requirements in the Nextile project evolved as new challenges and user needs were discovered. Scrum allowed us to adapt quickly without disrupting the entire project.
- **Fast Feedback Cycles:** The ability to test features early like inquiry forms, user roles, and AI modules helped catch issues early and fine-tune user experiences.
- **Collaboration-Friendly:** Scrum supports continuous communication between developers, testers, and stakeholders, which improved the quality and alignment of each feature.
- **Incremental Delivery:** The platform could be built in working parts. Even if the full version wasn't ready, major components like the registration system and AI search could be used and tested early.

### **4.4 Project Summary**

The Nextile project followed an Agile Scrum-based workflow, organized into the following major phases:

#### **4.4.1 Requirement Gathering & Research**

- Studied industry challenges and existing solutions
- Identified user roles, goals, and system requirements

#### **4.4.2 Design & Planning**

- Created wireframes, database schema, and feature roadmaps
- Prioritized features for initial sprints

#### **4.4.3 Development (Sprint-Based)**

- Sprint 1: Authentication and role-based access
- Sprint 2: Profile creation and document upload
- Sprint 3: AI integration and export data analysis
- Sprint 4: Inquiry system and smart search
- Sprint 5: UI polish, optimization, and testing

#### **4.4.4 Testing & Review**

- Manual and automated testing performed at the end of each sprint
- Reviewed performance, data security, and usability

#### **4.4.5 Deployment**

- Final build deployed to production environment
- Ensured backend API, frontend UI, and AI features worked seamlessly

#### **4.4.6 Post-Deployment Feedback & Updates**

- Collected early user feedback
- Identified future improvements (e.g., multilingual support, mobile app)
- This structured yet flexible approach helped ensure that the Nextile platform was built efficiently, adapted to user needs, and delivered a solution that is both functional and forward-thinking for the textile industry.

# Chapter 5

## 5 Architecture and Design

Architecture design plays a crucial role in building a scalable, maintainable, and secure web application. For the Nextile platform, our architecture was carefully planned to ensure smooth interaction between users (buyers, suppliers, and inspection teams), AI-powered tools, and secure data handling. This chapter outlines the architectural decisions, components, and data flow of the system.

### 5.1 Overview of System Architecture

The architecture of Nextile follows a modular and layered approach, separating the system into client-side (frontend), server-side (backend), database, and AI integration layers. This separation helps in improving code reusability, scalability, performance, and security.

Nextile uses a full-stack architecture based on the MERN stack (MongoDB, Express/Next.js, React, Node.js) with the addition of:

- Next.js API routes for backend logic
- Cloudinary for media and document storage
- NextAuth for user authentication
- Gemini API for AI-based features
- React Bootstrap, AOS & Swiper for frontend UI/UX

### 5.2 Frontend Design

- Built using Next.js with React Bootstrap to ensure responsiveness and consistent styling across all devices.
- Incorporates AOS (Animate on Scroll) for smooth animations and Swiper.js for carousels and product sliders.
- Users can register and log in with role-based access (Buyer, Supplier, Inspector).
- Forms for profile creation, export data upload, and AI search inputs are dynamic and user-friendly.

### **5.3 Backend Design**

- Backend is built using Next.js API routes, which serve as controllers for handling business logic, inquiries, file uploads, and database interactions.
- Formidable is used for file parsing during PDF uploads.
- Bcrypt ensures that user passwords are securely hashed.
- NextAuth manages session handling, role verification, and secure sign-in.
- Nodemailer is used to send email notifications after registration or inquiries.

### **5.4 Database Design (MongoDB Atlas)**

- MongoDB Atlas is used as a cloud-based database, and Mongoose handles schema design and object modeling.
- Key collections include:
  - Users: stores registration details, roles, and authentication info
  - Profiles: stores company certifications, catalogs, past clients, etc.
  - Inquiries: detailed messages exchanged between users
  - ExportData: uploaded datasets for AI analysis

### **5.5 File & Media Storage (Cloudinary)**

- Cloudinary is integrated to store large files like:
  - PDF certificates
  - Product catalogs
  - Inspection reports
- These files are retrieved dynamically and attached to user profiles or inquiry details.

### **5.6 AI Integration Layer**

- Gemini API is used to power intelligent features such as:
  - Smart search for suppliers, buyers, inspection teams, and textile news
  - AI-based exploratory data analysis (EDA)

- Business recommendations and export predictions based on user-uploaded data

## **5.7 Security & Role Management**

- User authentication is handled using NextAuth with role-based access (admin, buyer, supplier, inspection team).
- Data is validated before submission using middleware.
- Passwords are hashed with bcrypt.
- Uploads are scanned and securely handled.

## **5.8 Data Flow**

1. User logs in and is authenticated via NextAuth.
2. Depending on the role, the user creates a profile with PDFs uploaded to Cloudinary.
3. User submits export data or performs an AI-based search.
4. Backend handles the request using Next.js API routes.
5. If AI is involved, data is sent to Gemini API, and the results are returned.
6. All data is stored/retrieved from MongoDB Atlas using Mongoose.
7. Users receive results, profiles, or insights via the frontend.

## **5.10 Scalability and Maintainability**

- The modular architecture ensures that each feature or module can be scaled independently.
- AI features are externalized using APIs to reduce processing load on the server.
- Separation of concerns between backend, frontend, and AI logic makes the platform easy to update and maintain.

## 5.11 Class Diagram

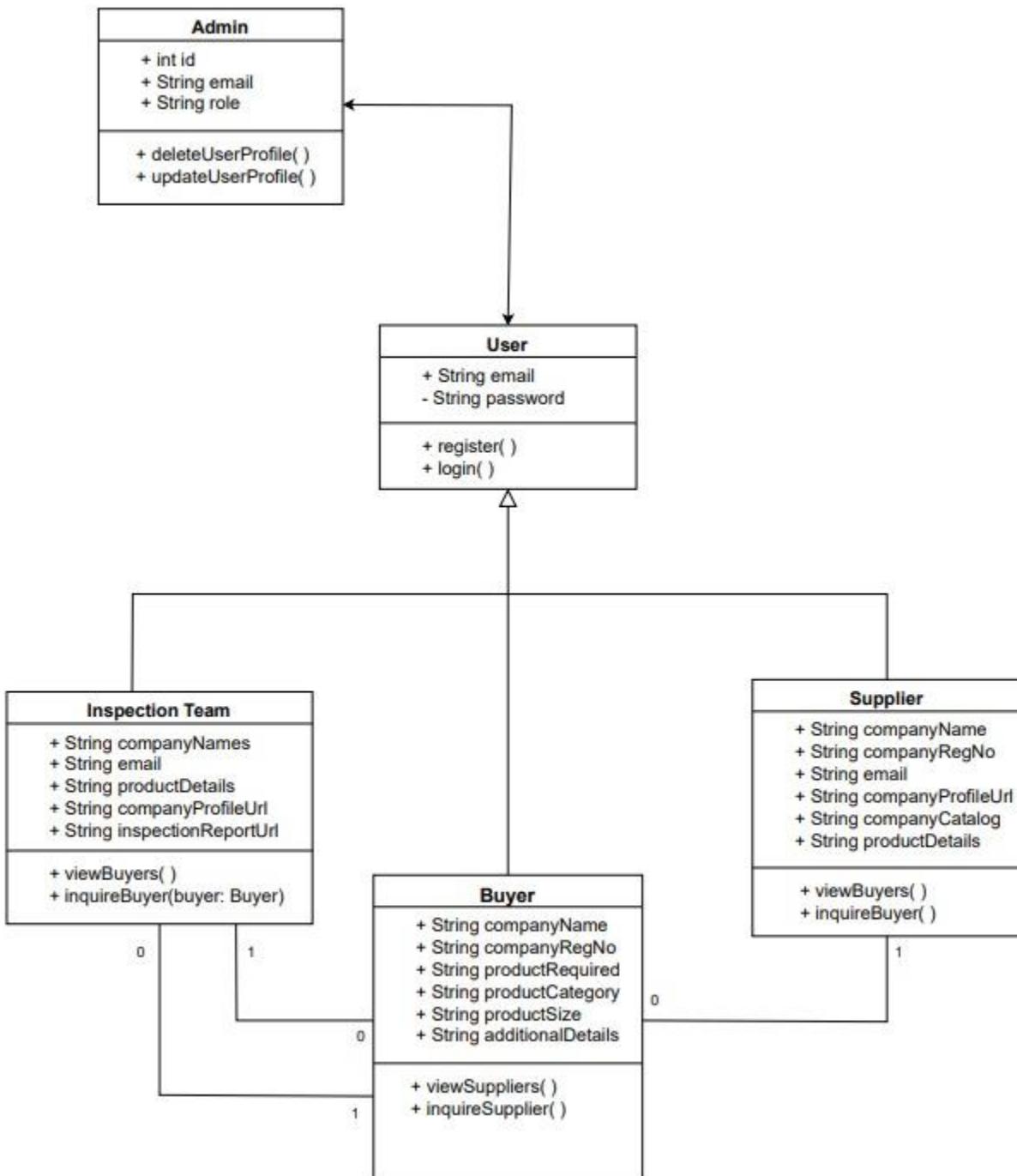


Figure 6 Class Diagram

## 5.12 Activity Diagram

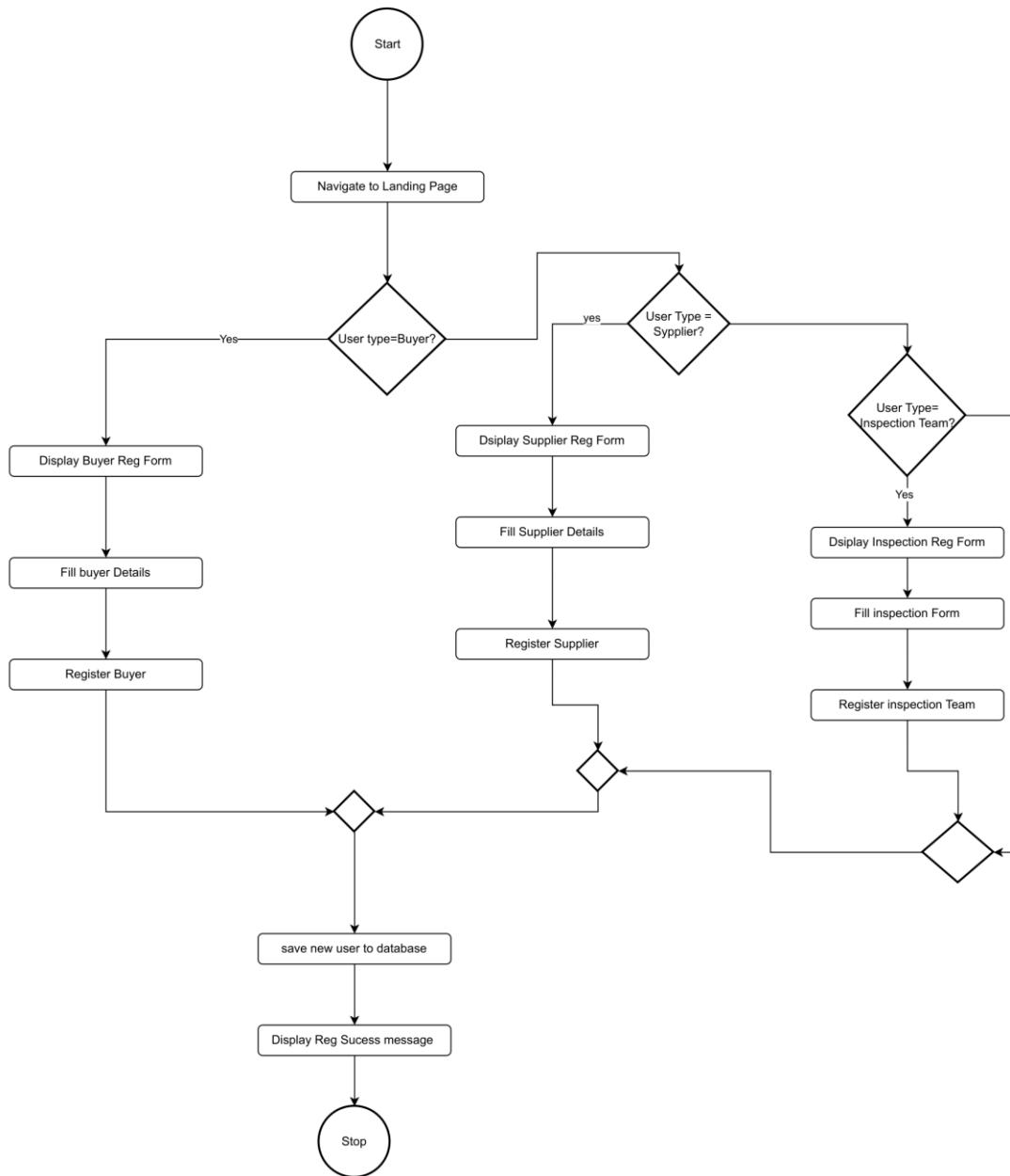
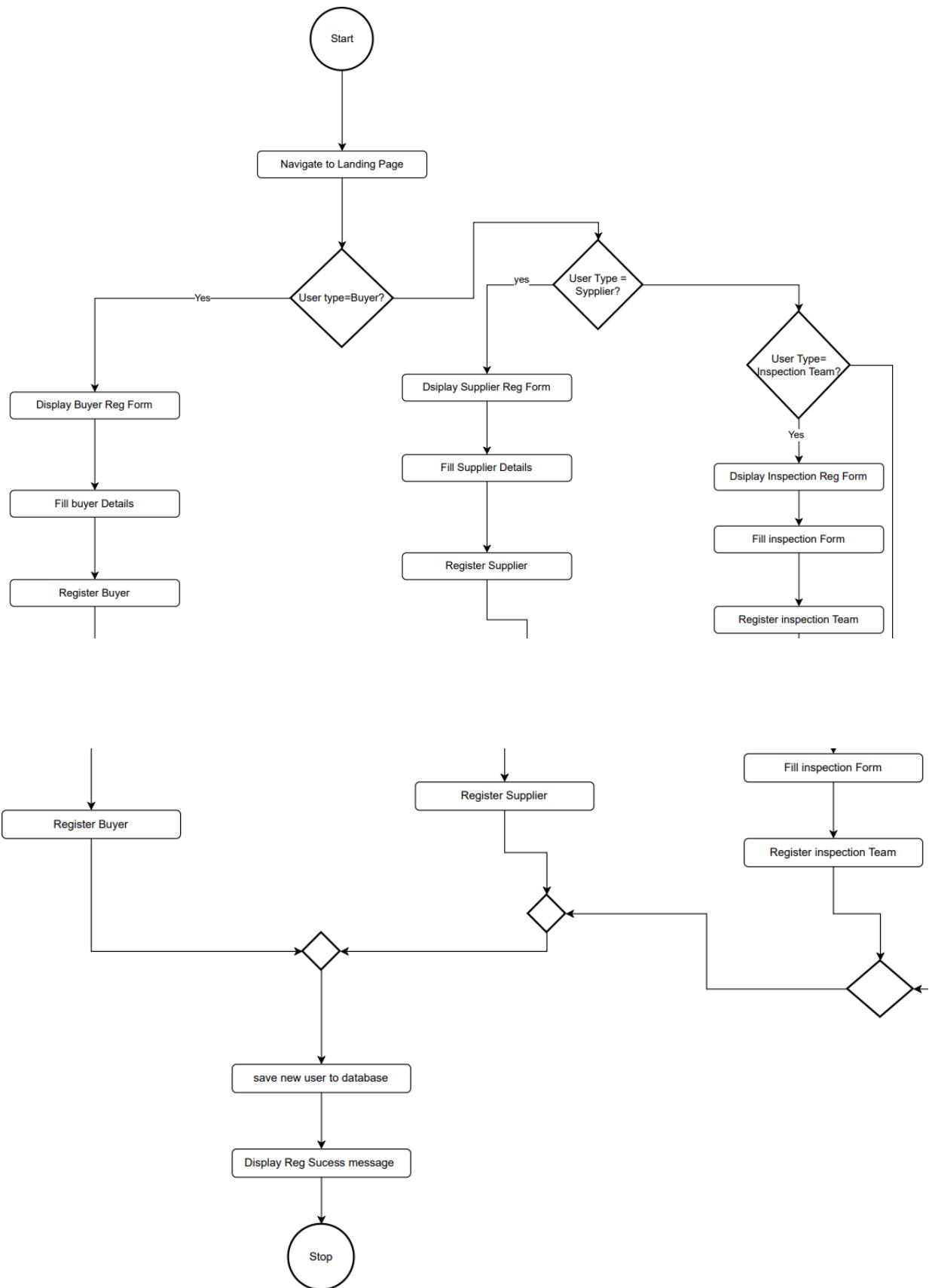


Figure 7Activity Diagram



### 5.13 Activity Diagram (Buyer)

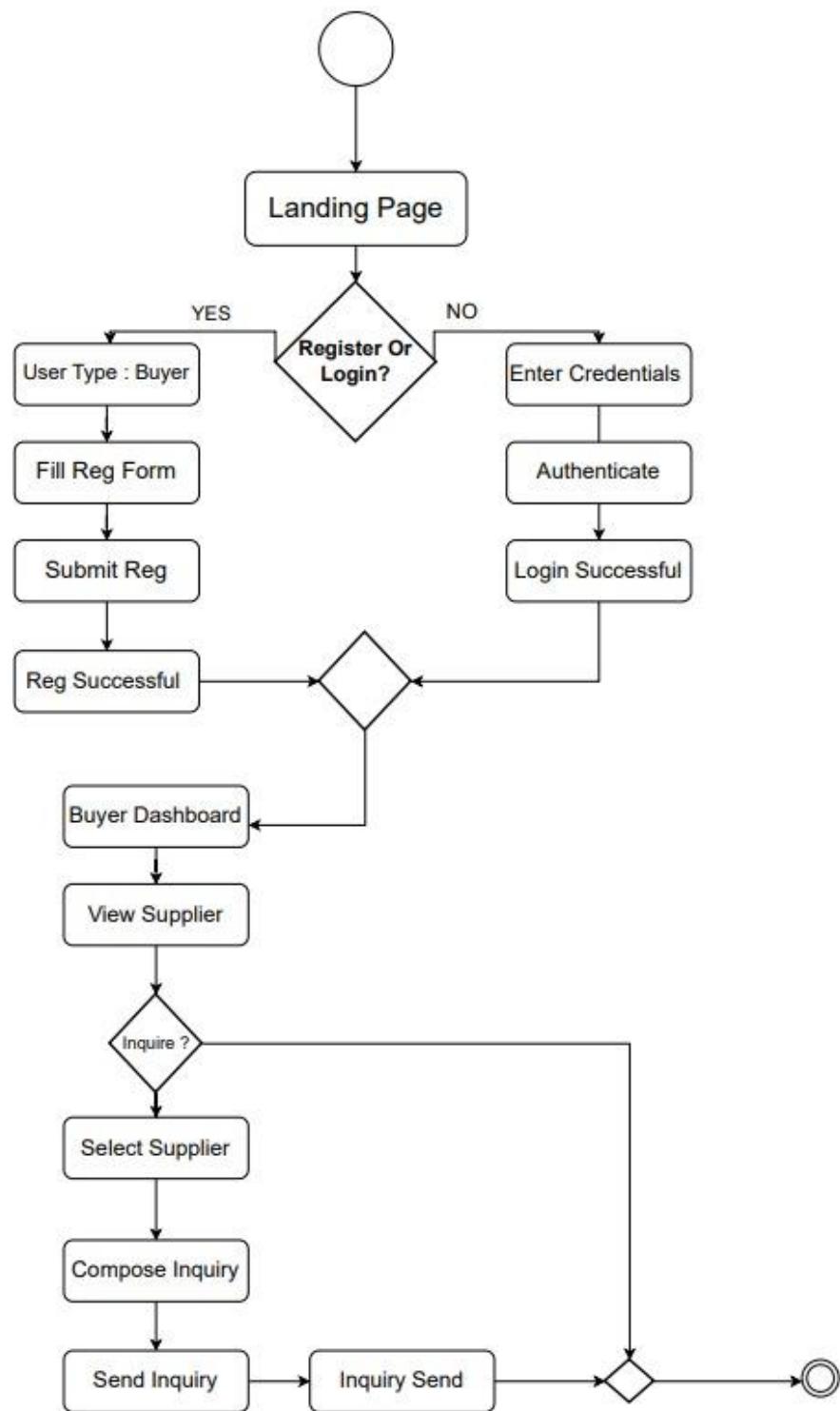


Figure 8 Buyer Activity Diagram

### 5.14 Activity Diagram (Admin)

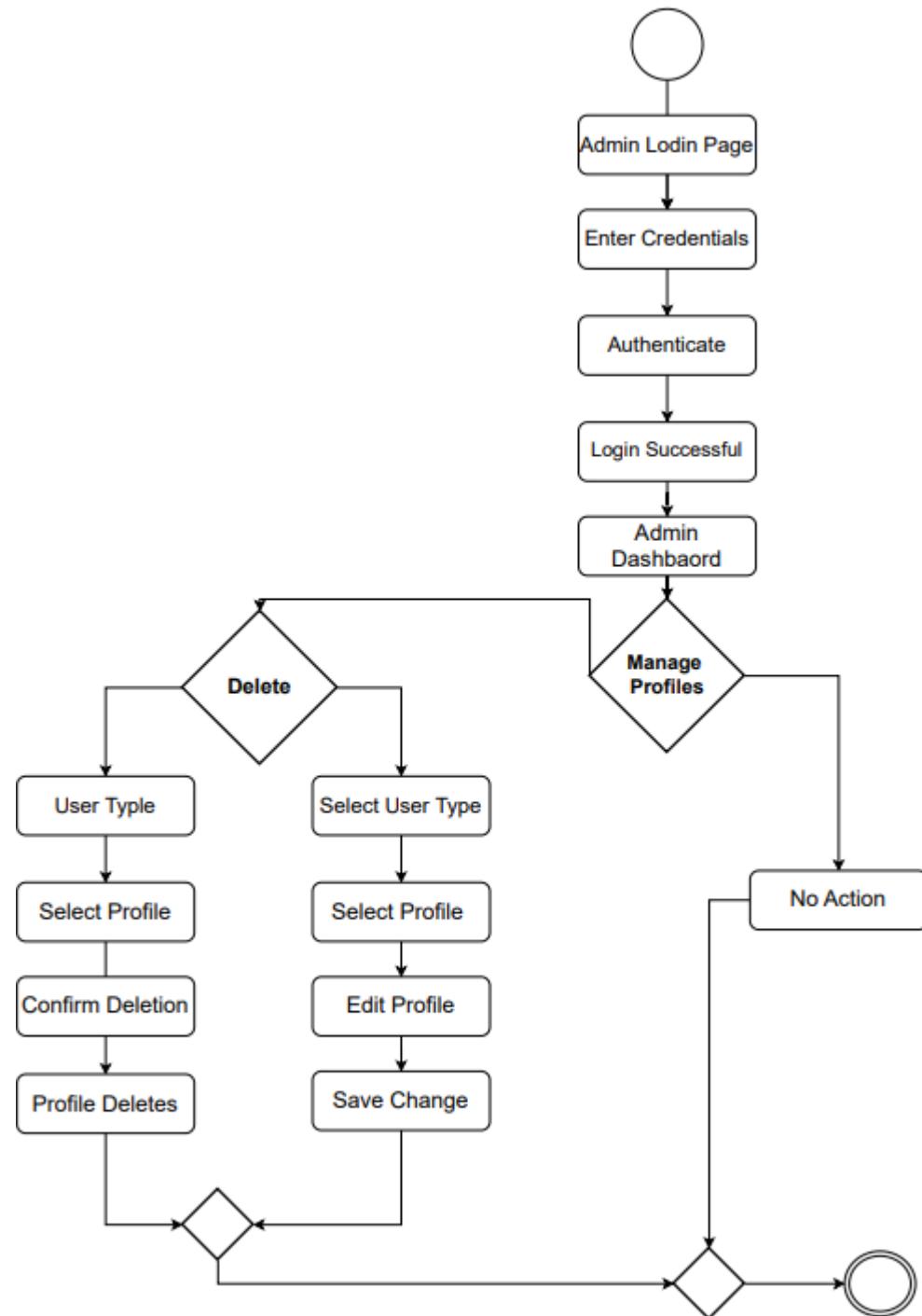


Figure 9 Admin Activity Diagram

### 5.15 Activity Diagram (Inspection Team)

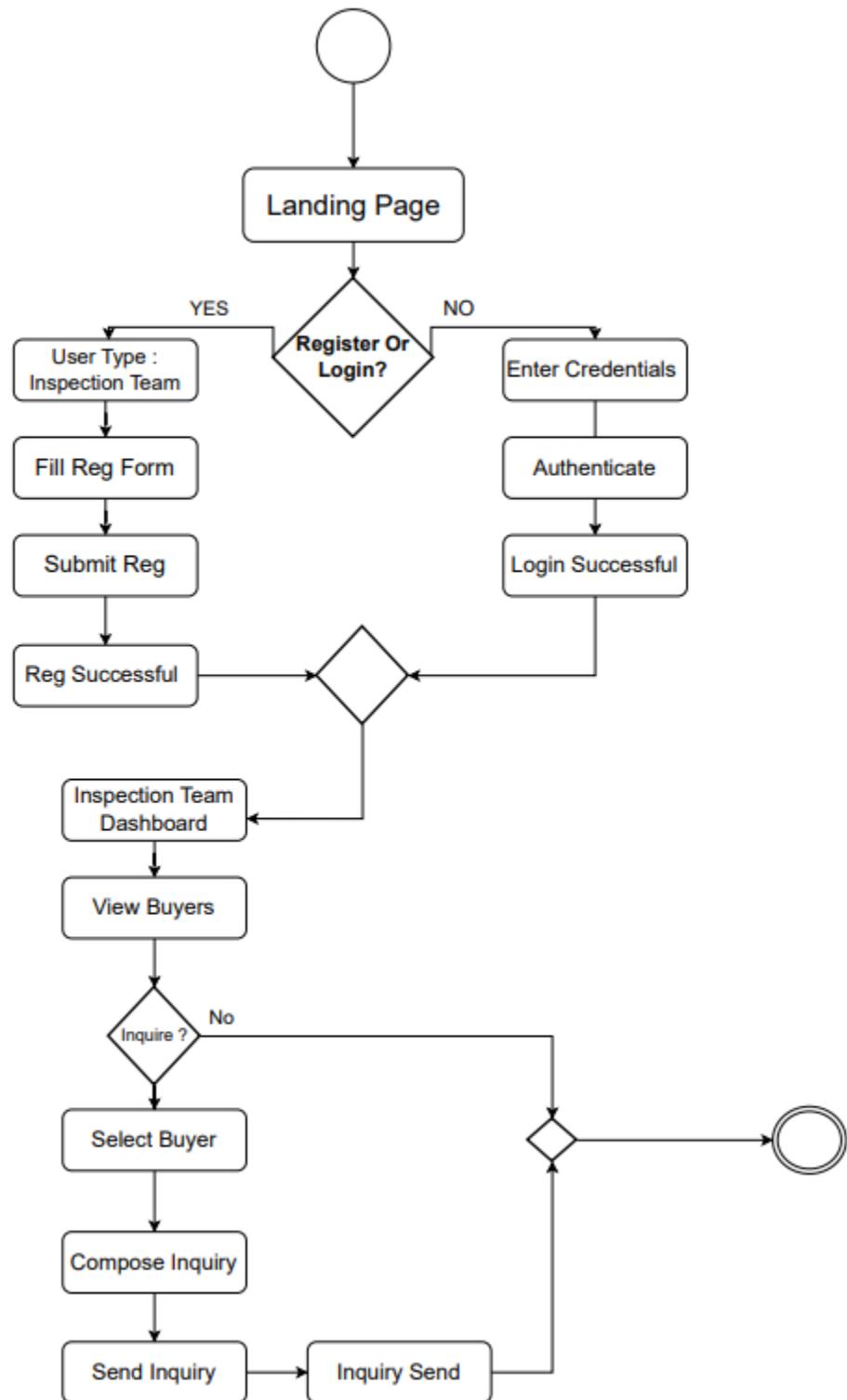


Figure 10 Inspection Team Activity Diagram

### 5.16 Activity Diagram (Supplier)

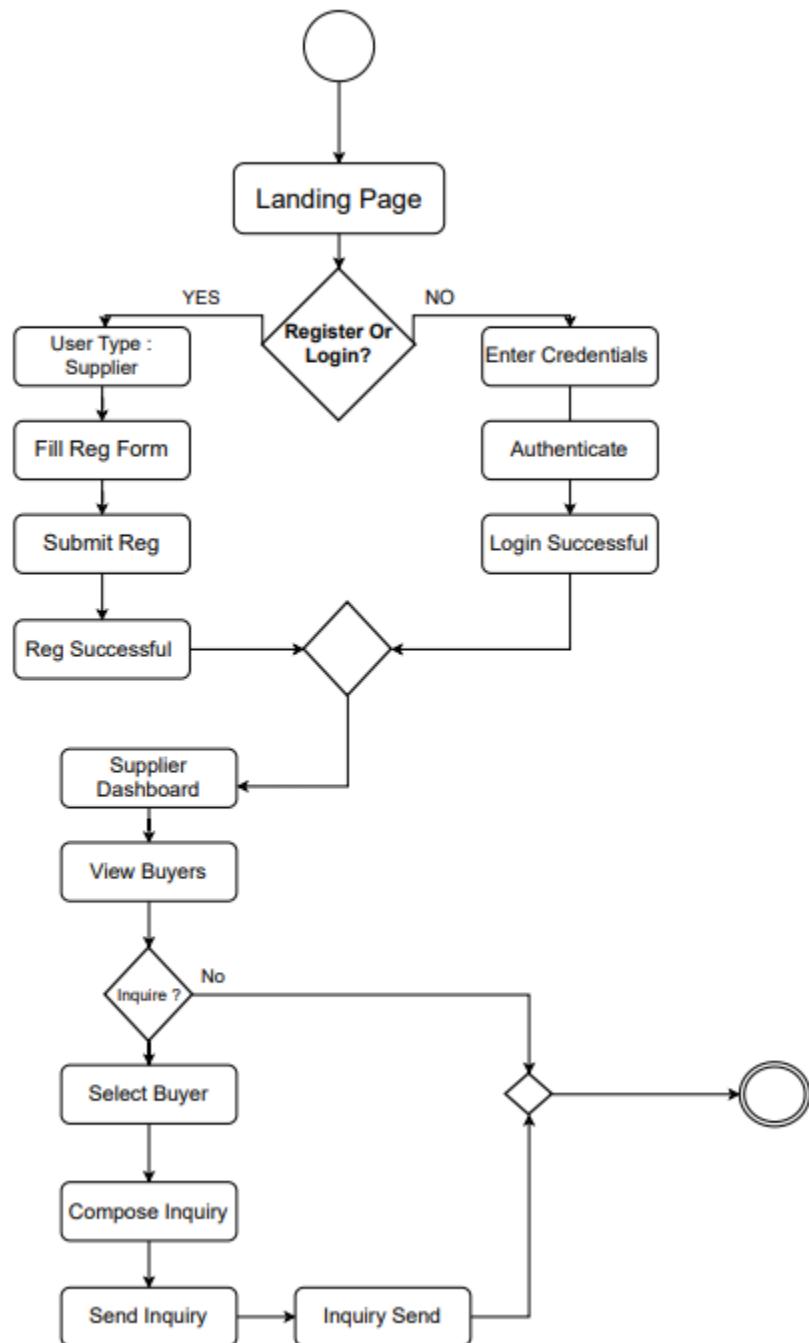


Figure 11 Supplier Activity Diagram

## 5.17 Sequence Diagram (Buyer and Inspection)

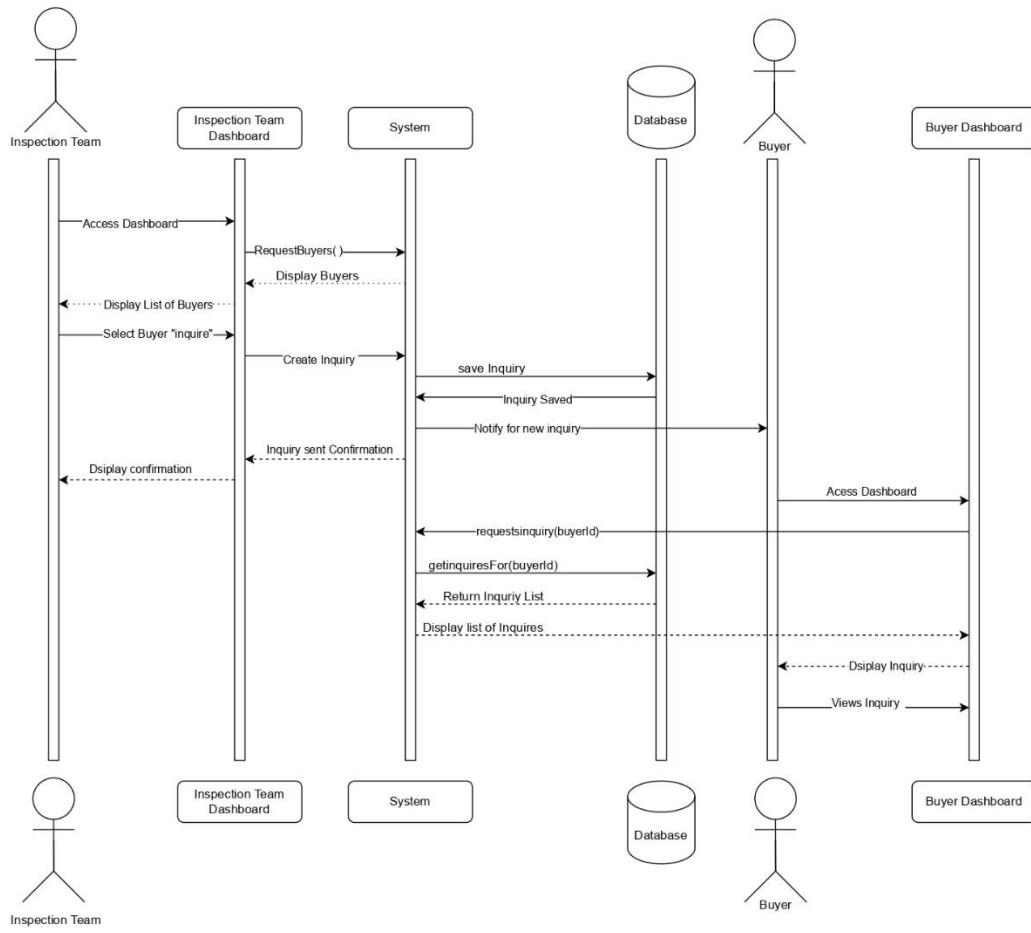
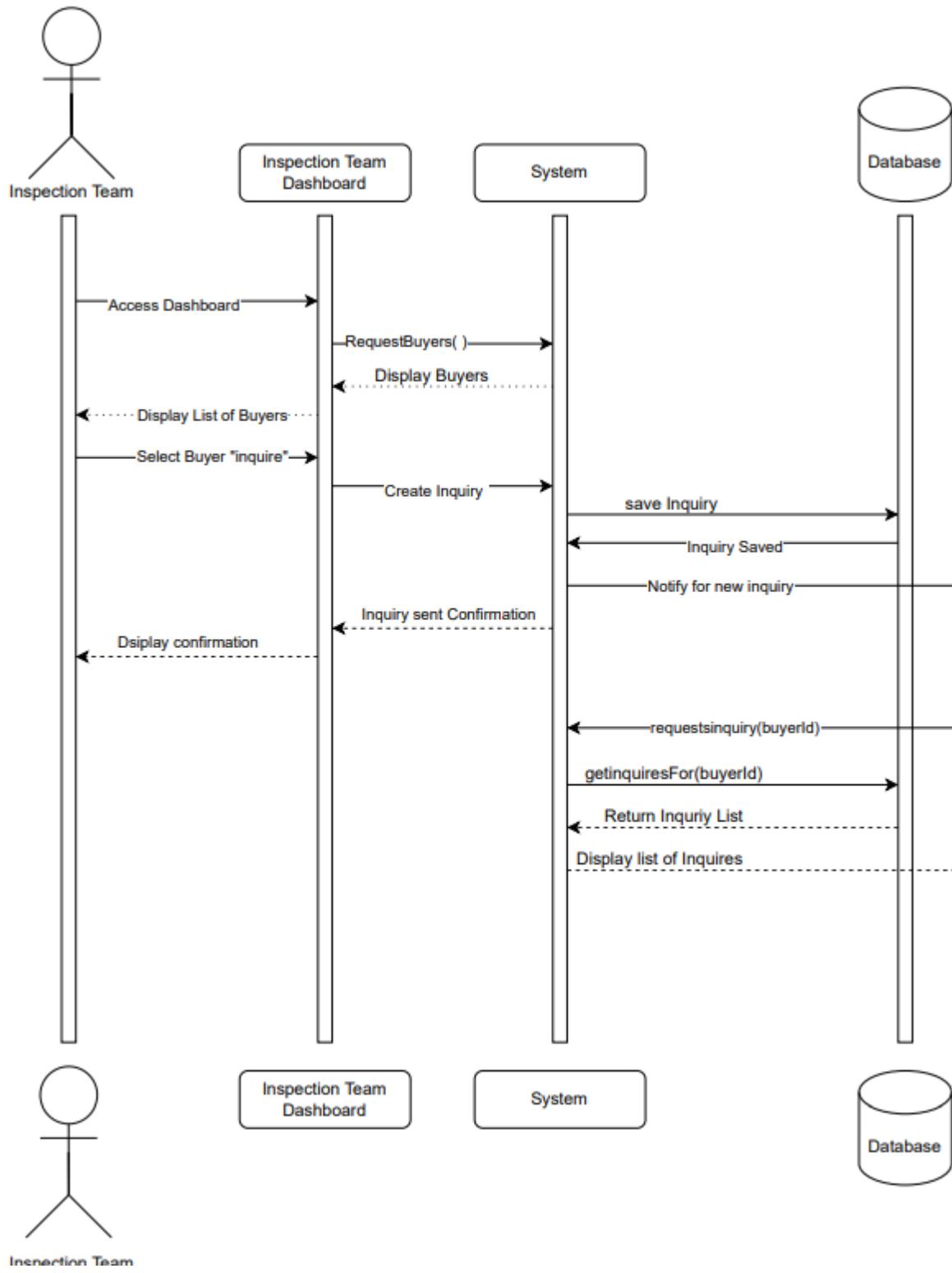
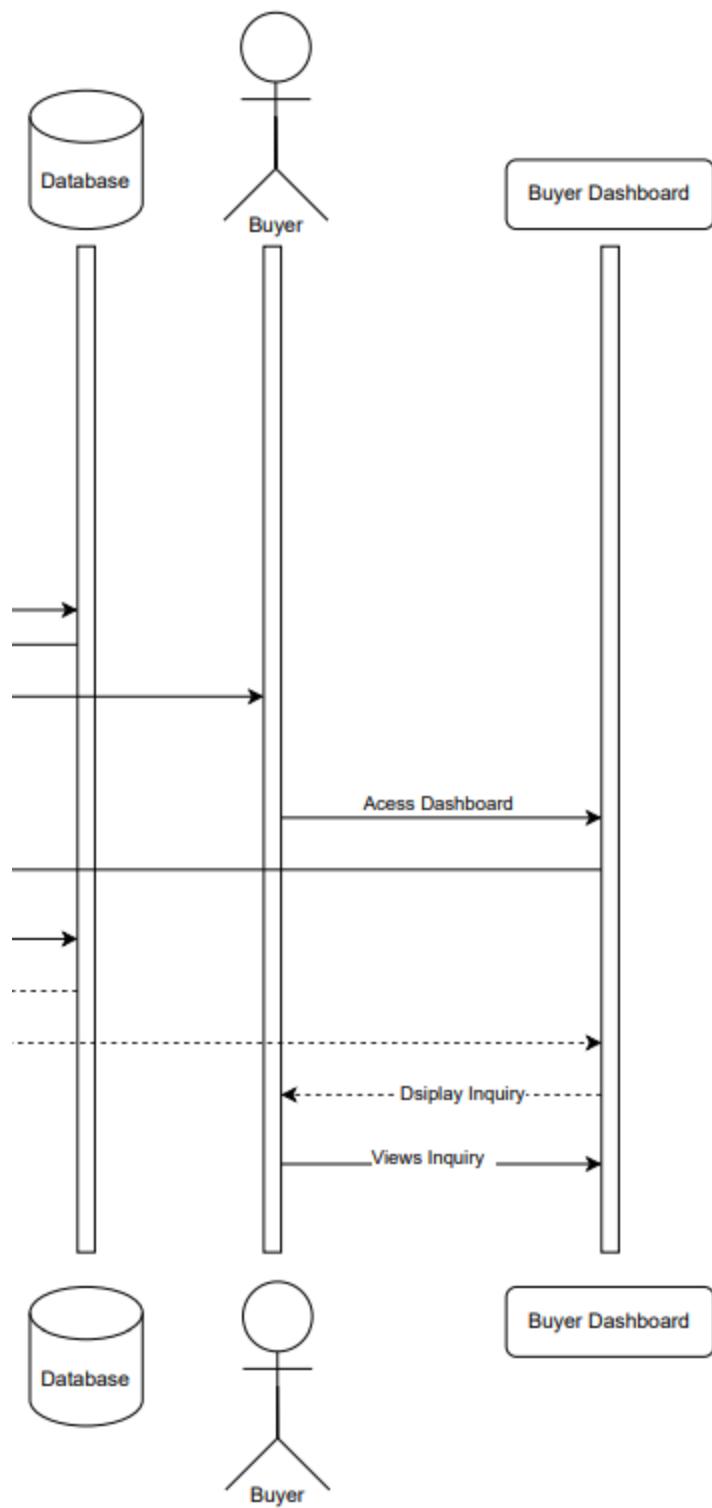


Figure 12 Buyer Inspection Sequence





### 5.18 Sequence Diagram (Registration)

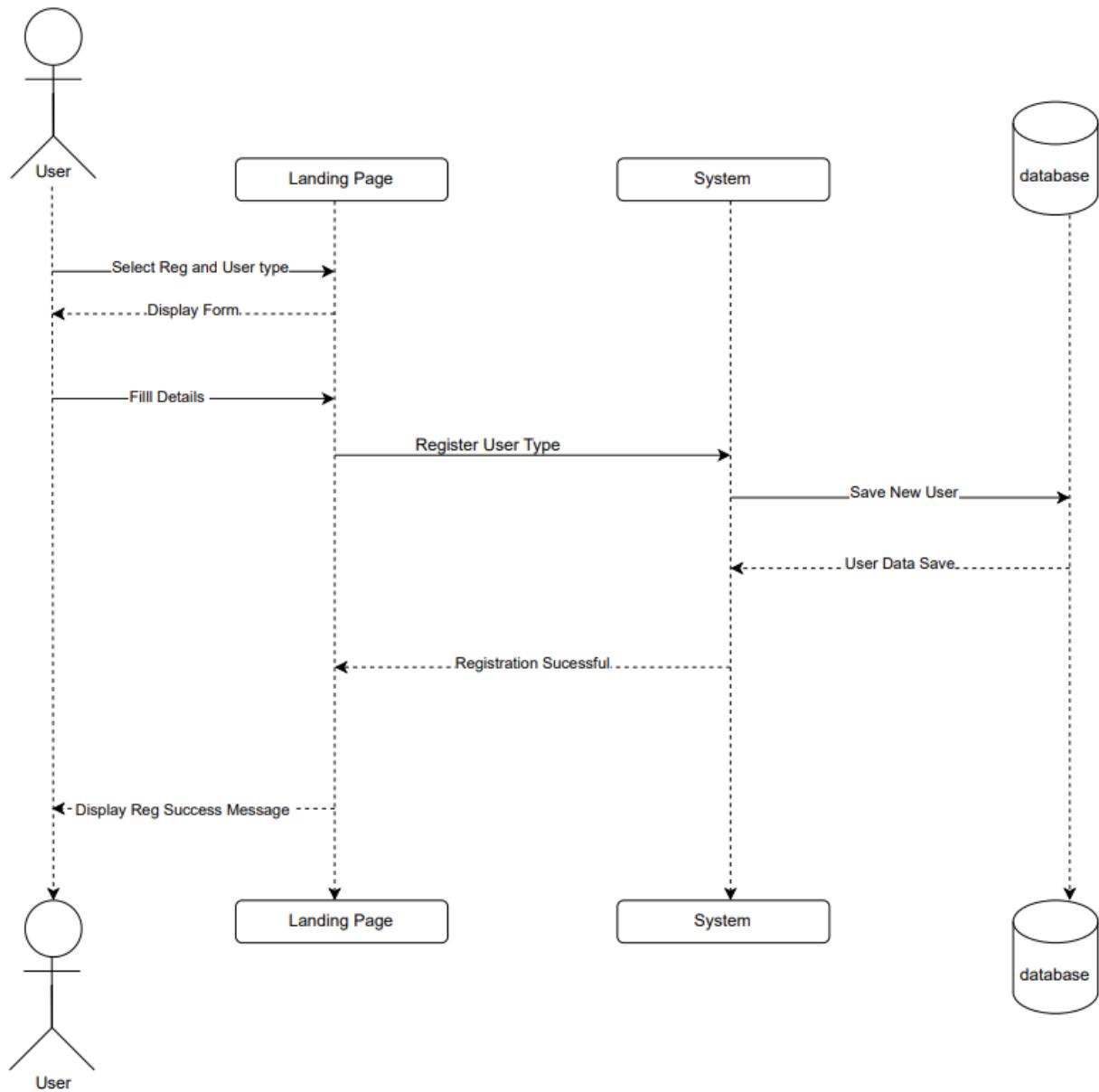


Figure 13 Registration Sequence

### 5.19 Sequence Diagram (Administration)

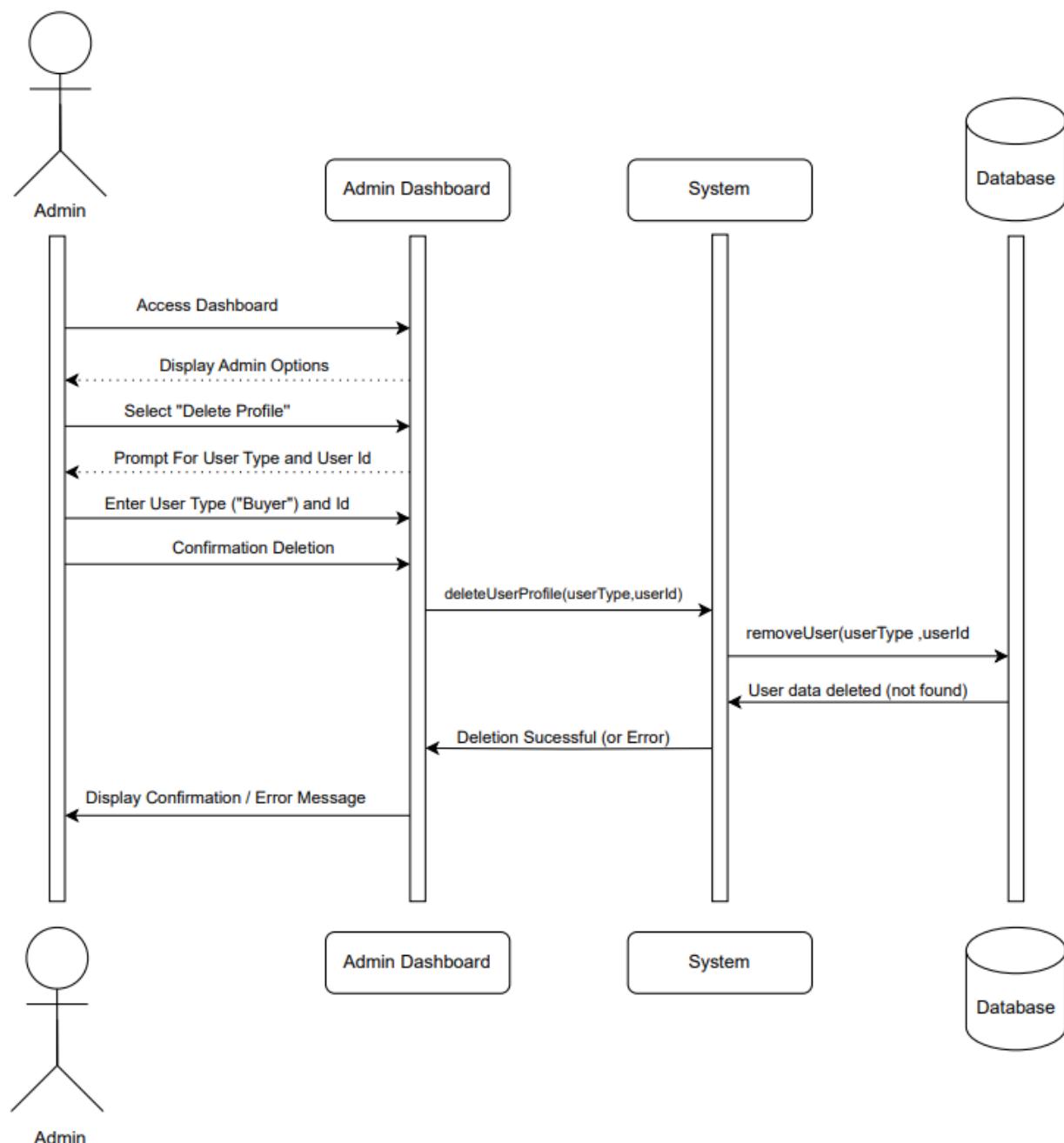


Figure 14 Admin Sequence

## 5.20 Sequence Diagram (Login)

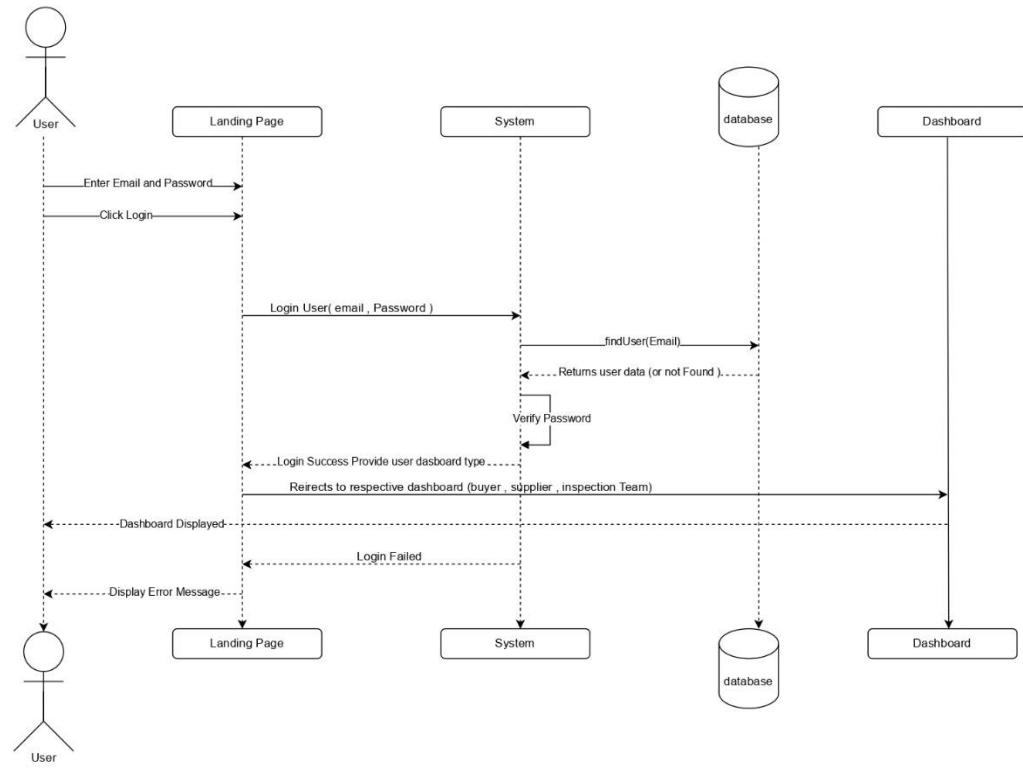
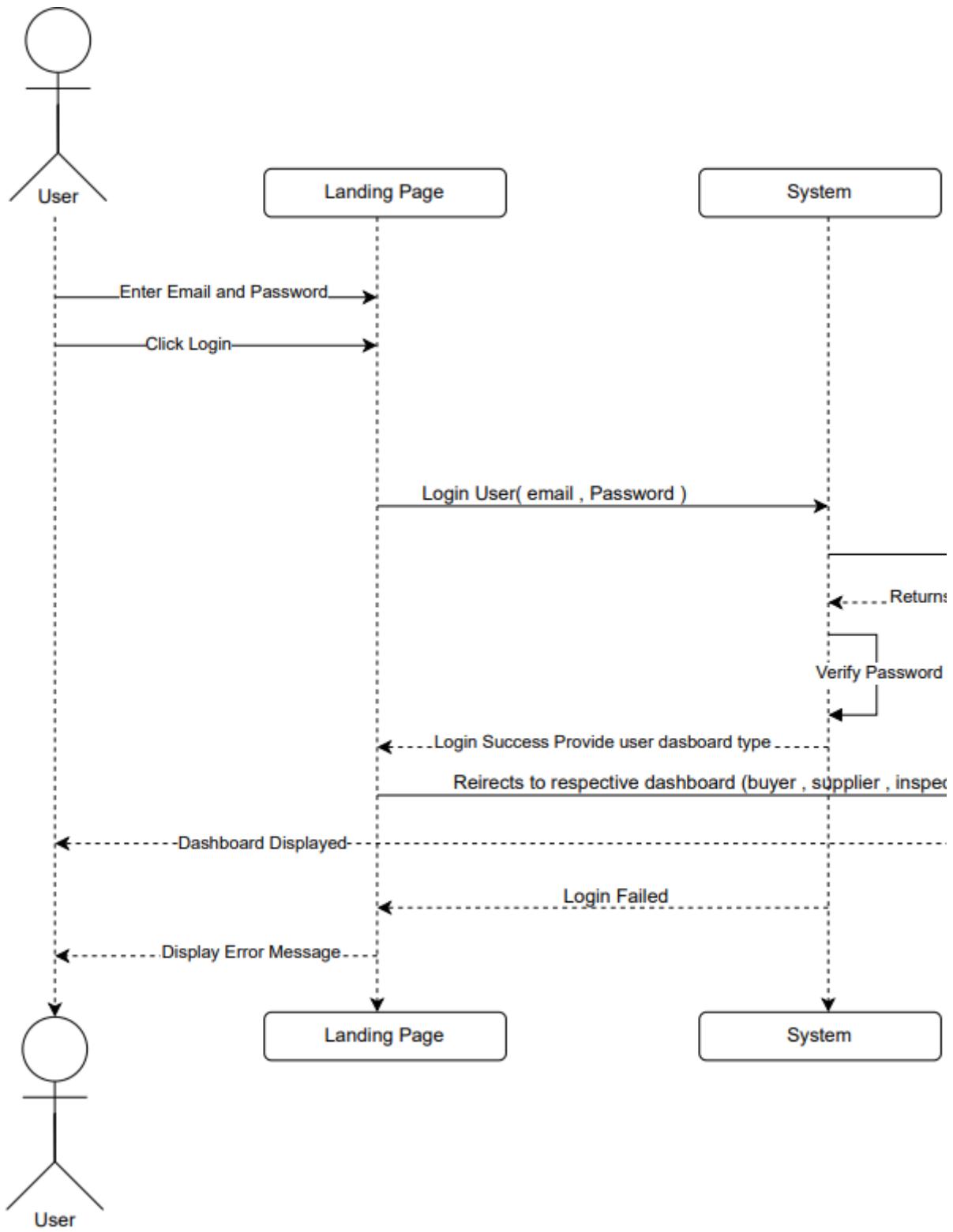
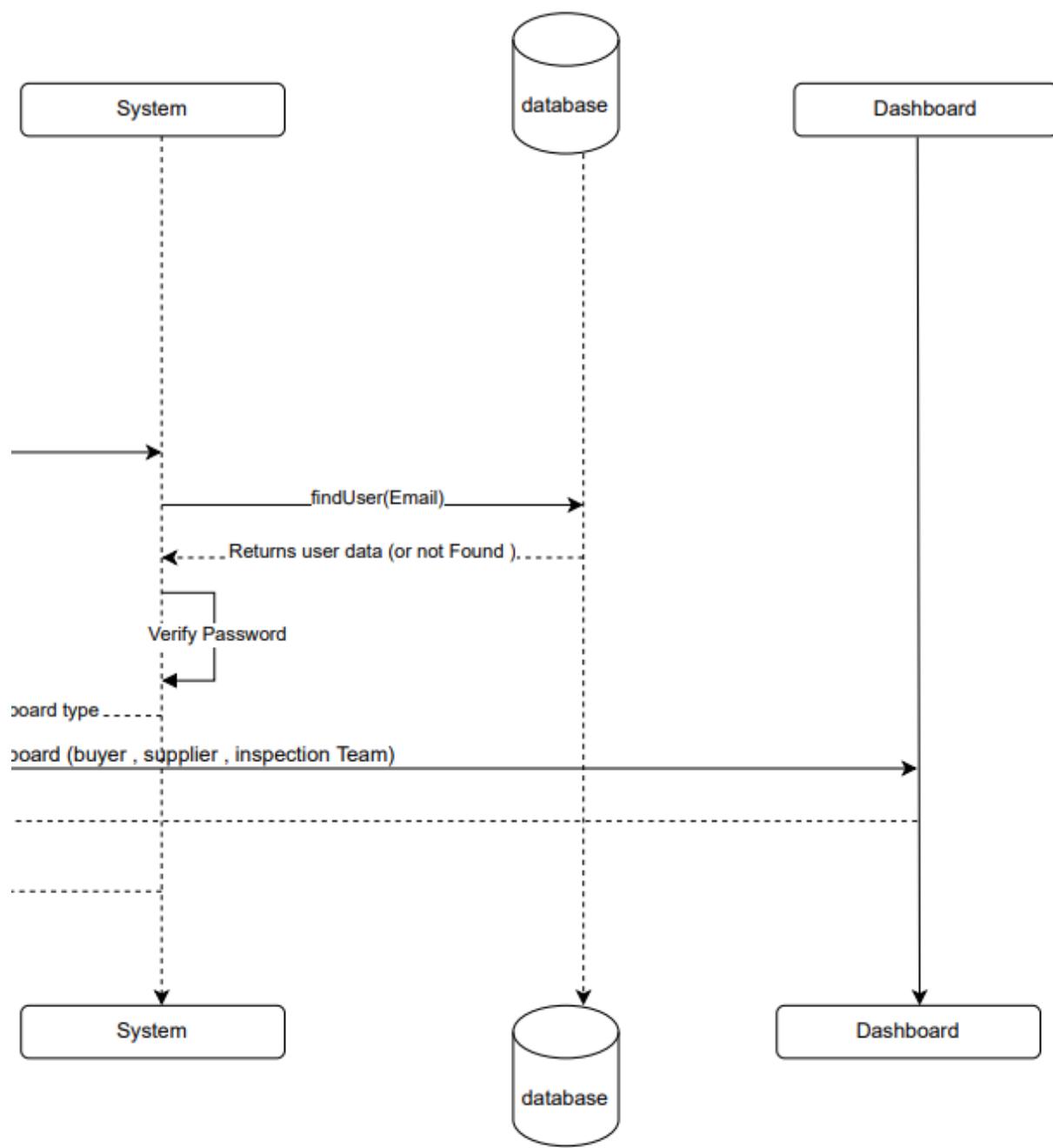


Figure 15 Login Sequence





## 5.21 Sequence Diagram (Buyer and Supplier)

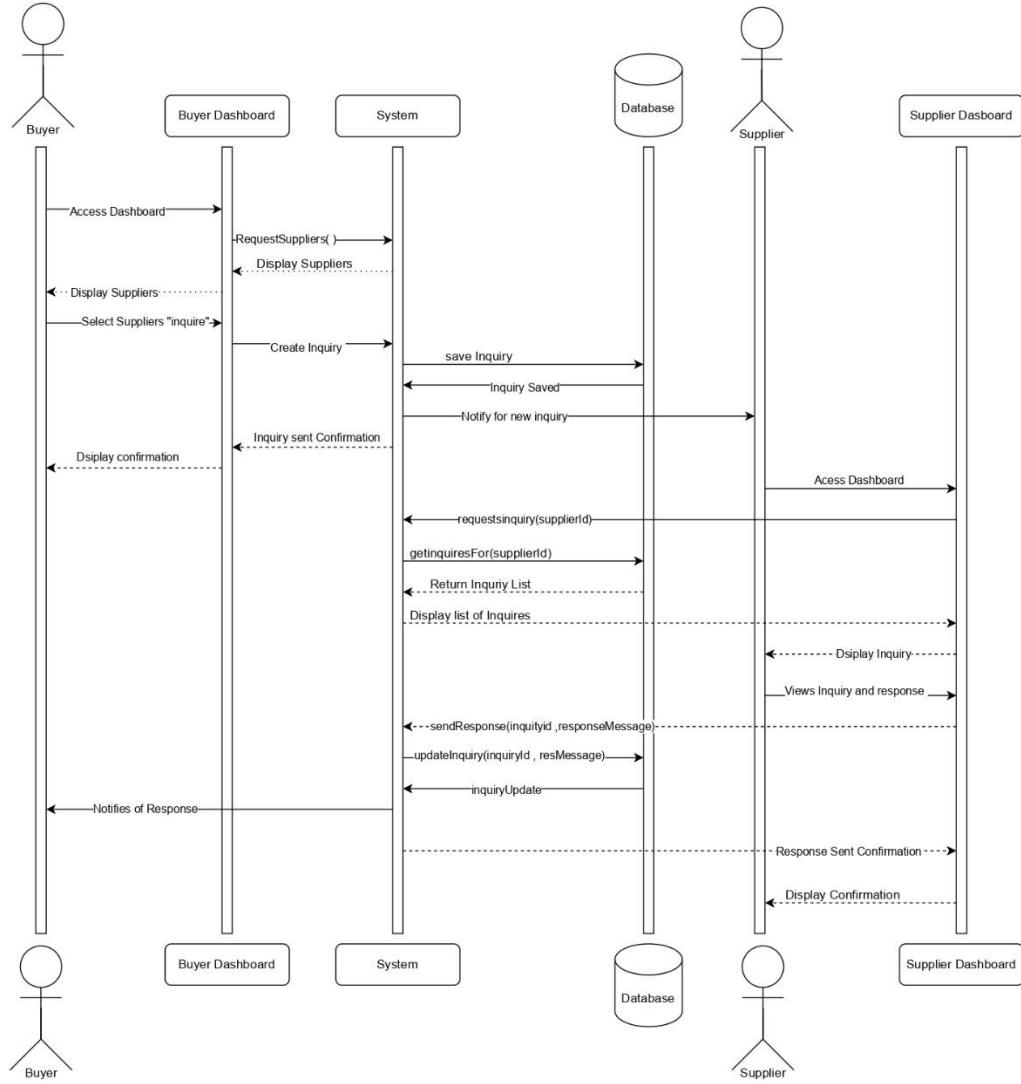
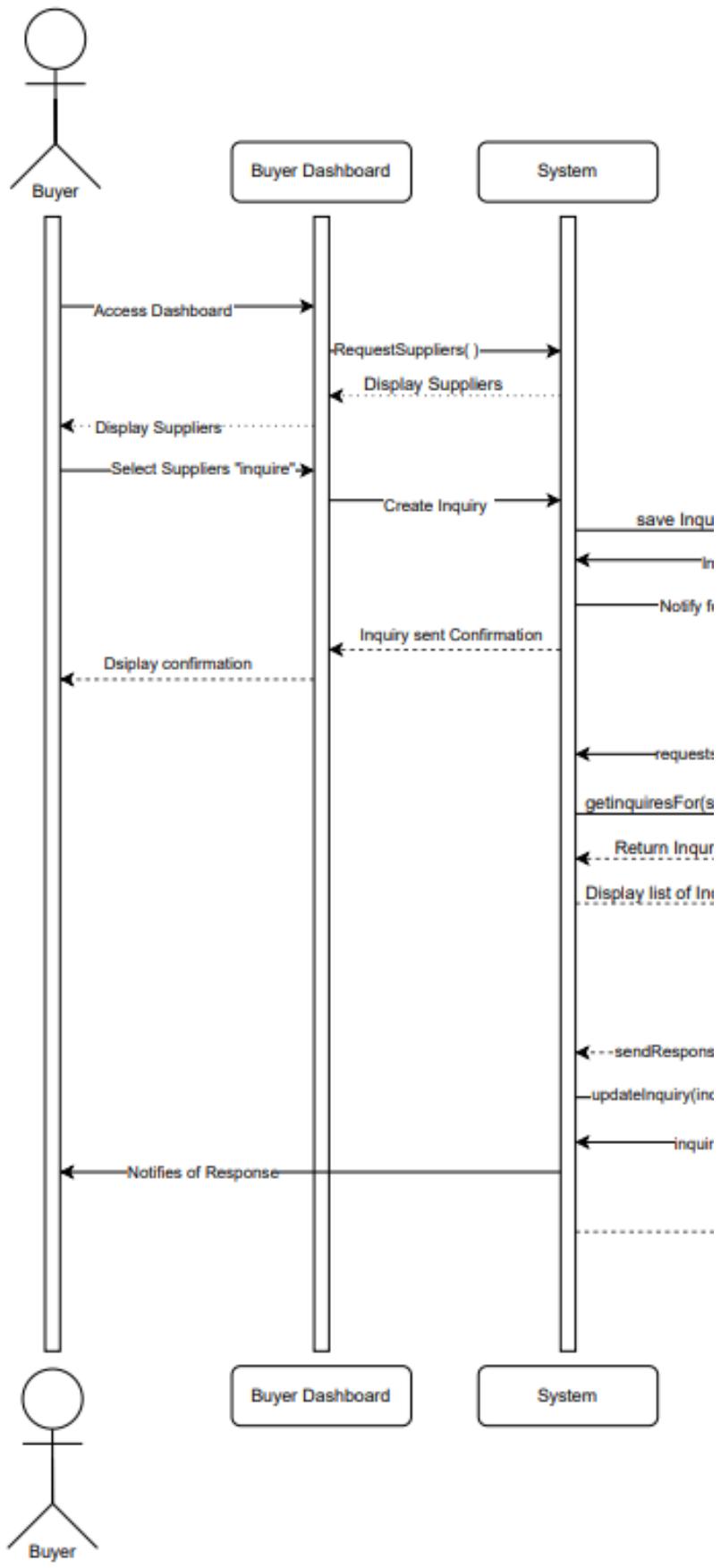
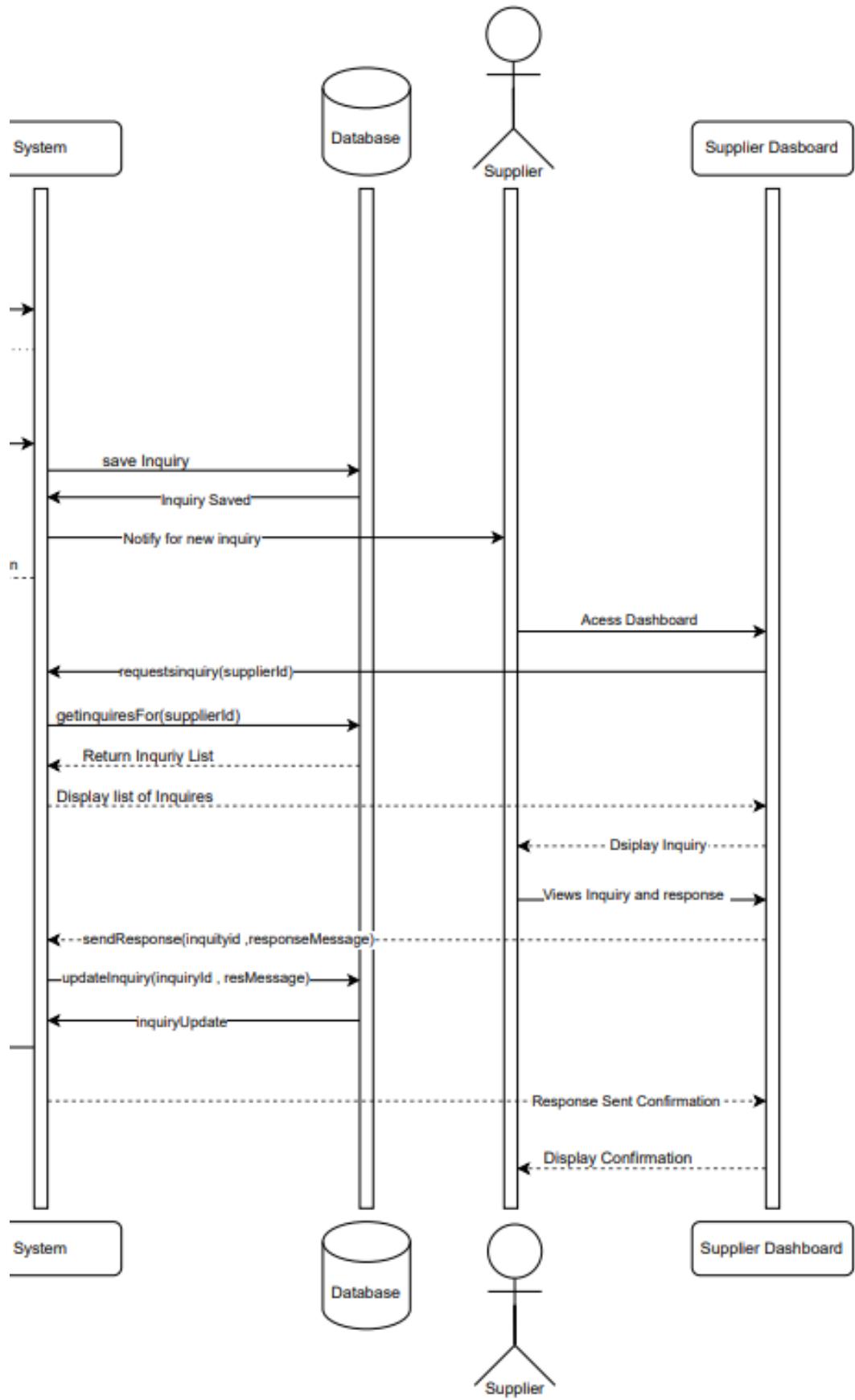


Figure 16 Buyer & Supplier Sequence





## 5.22 Component Diagram

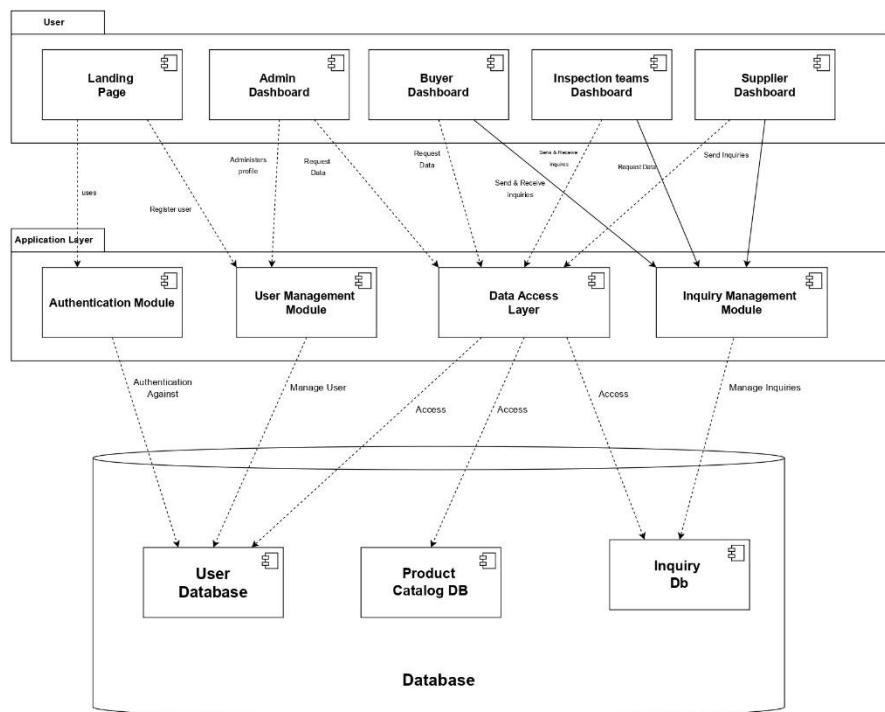
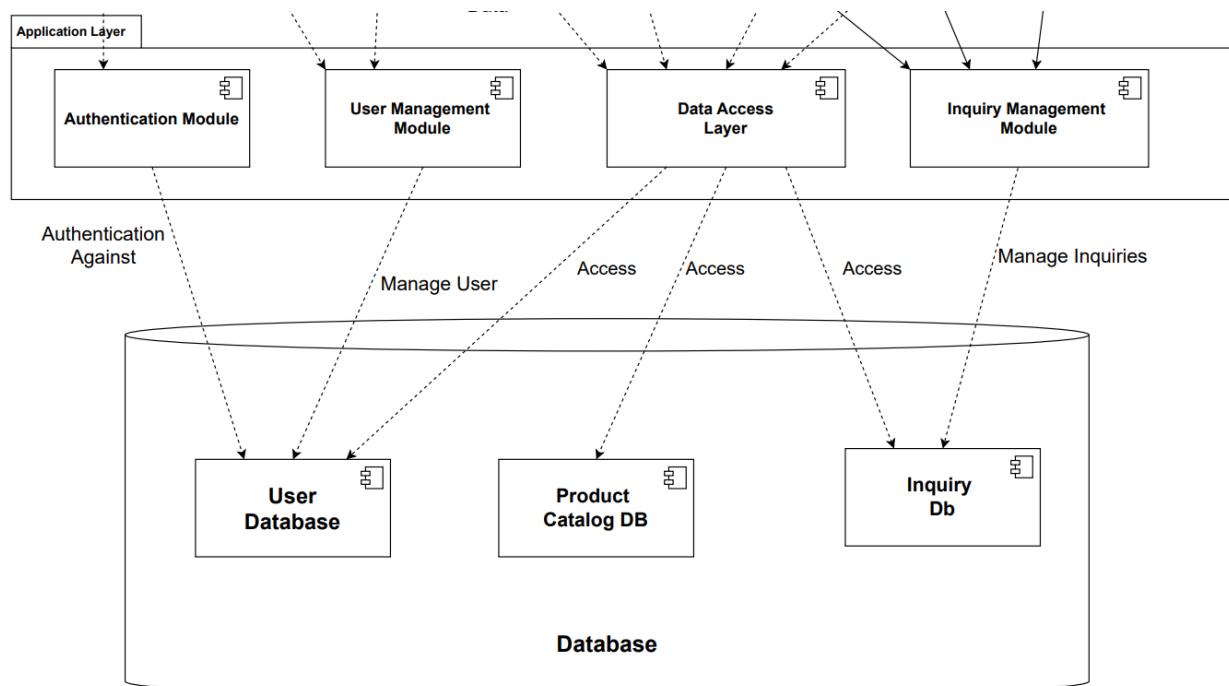
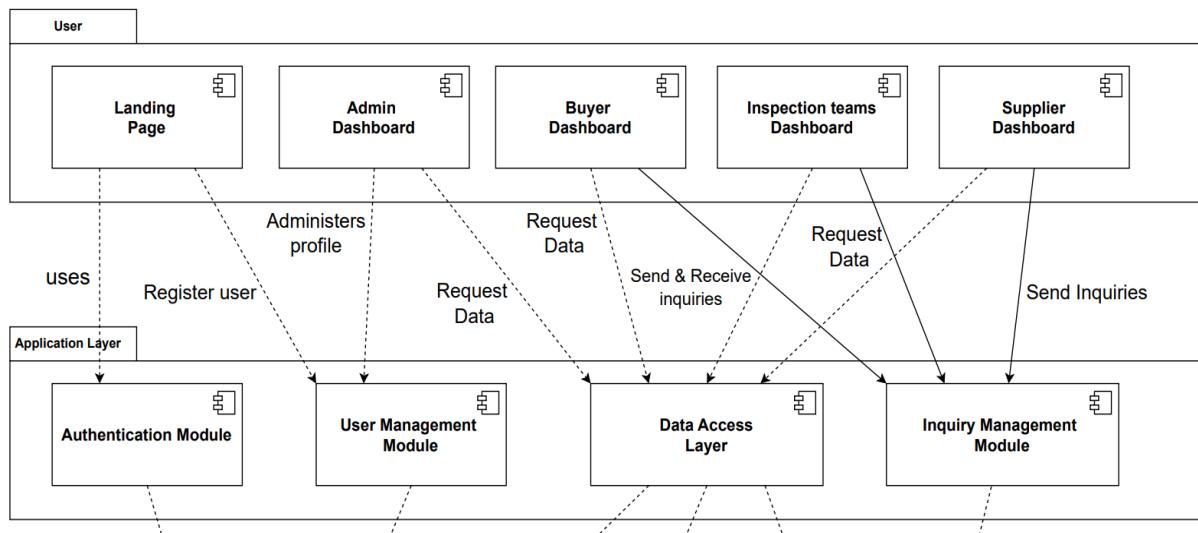


Figure 17 Component Diagram



## 5.23 Deployment Diagram

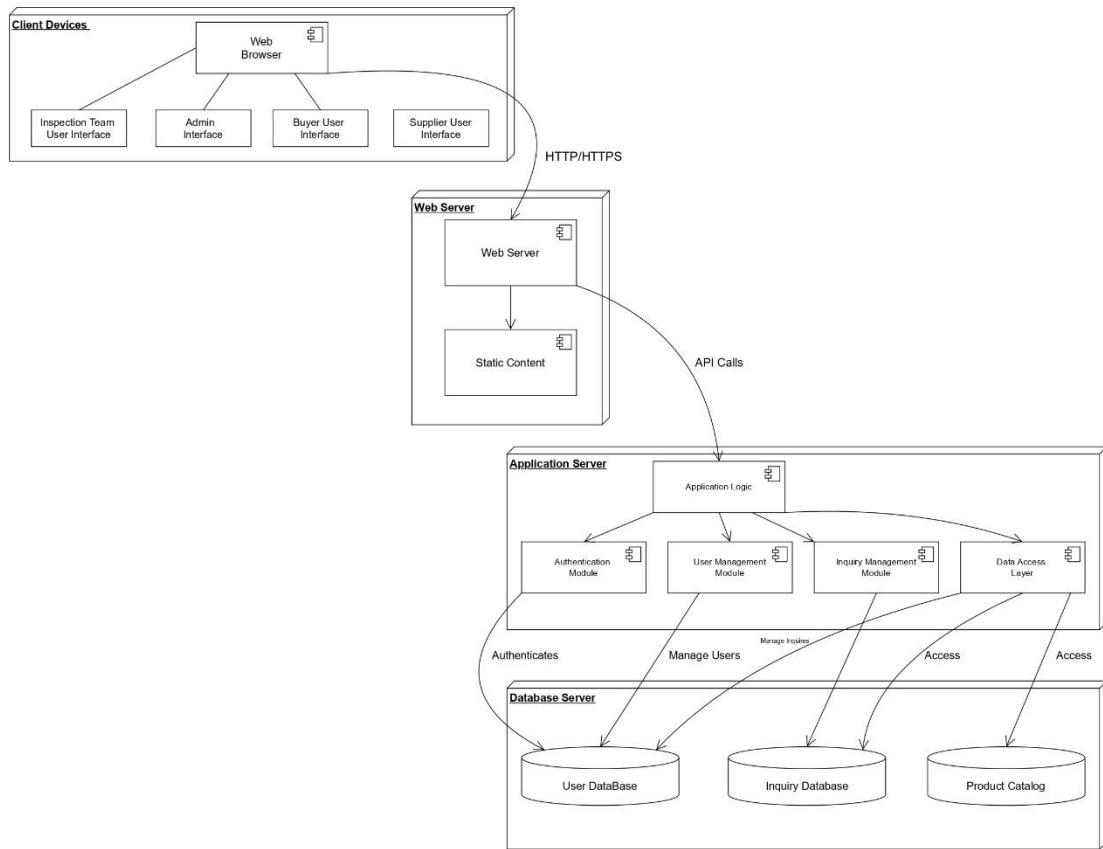
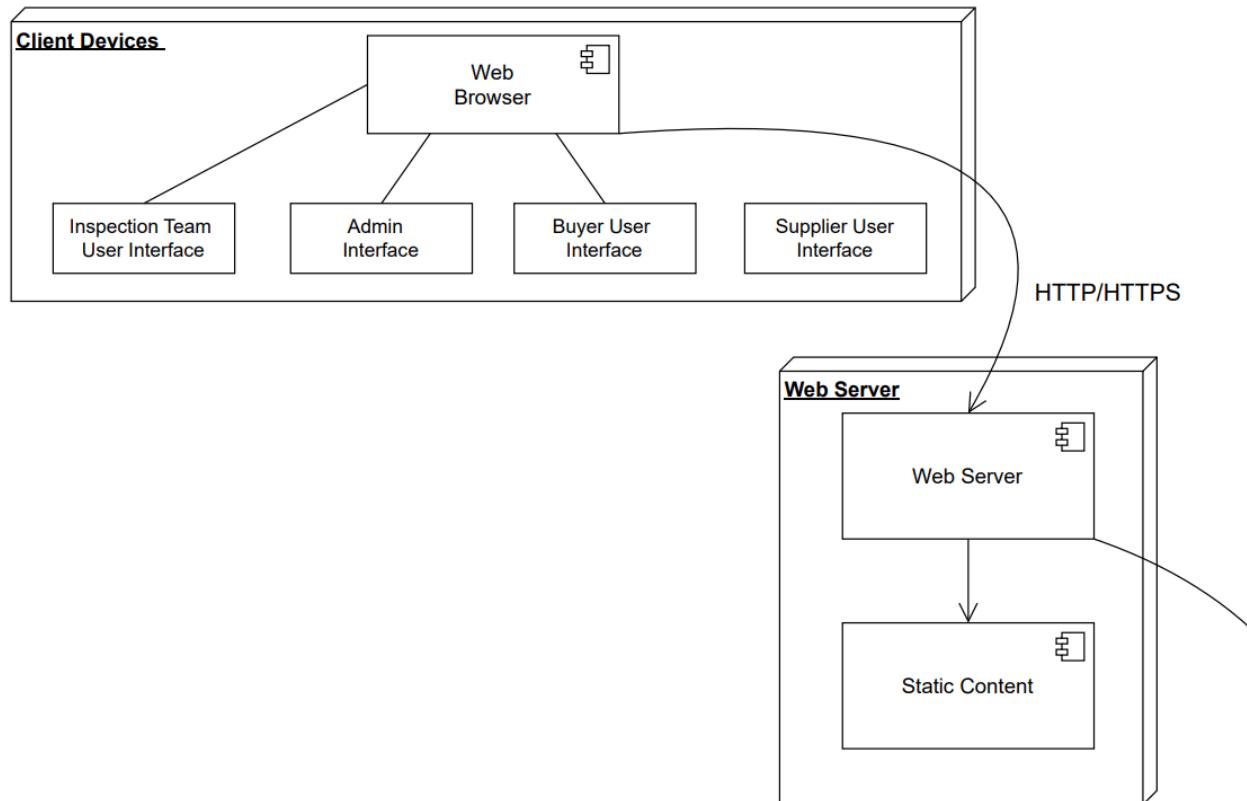
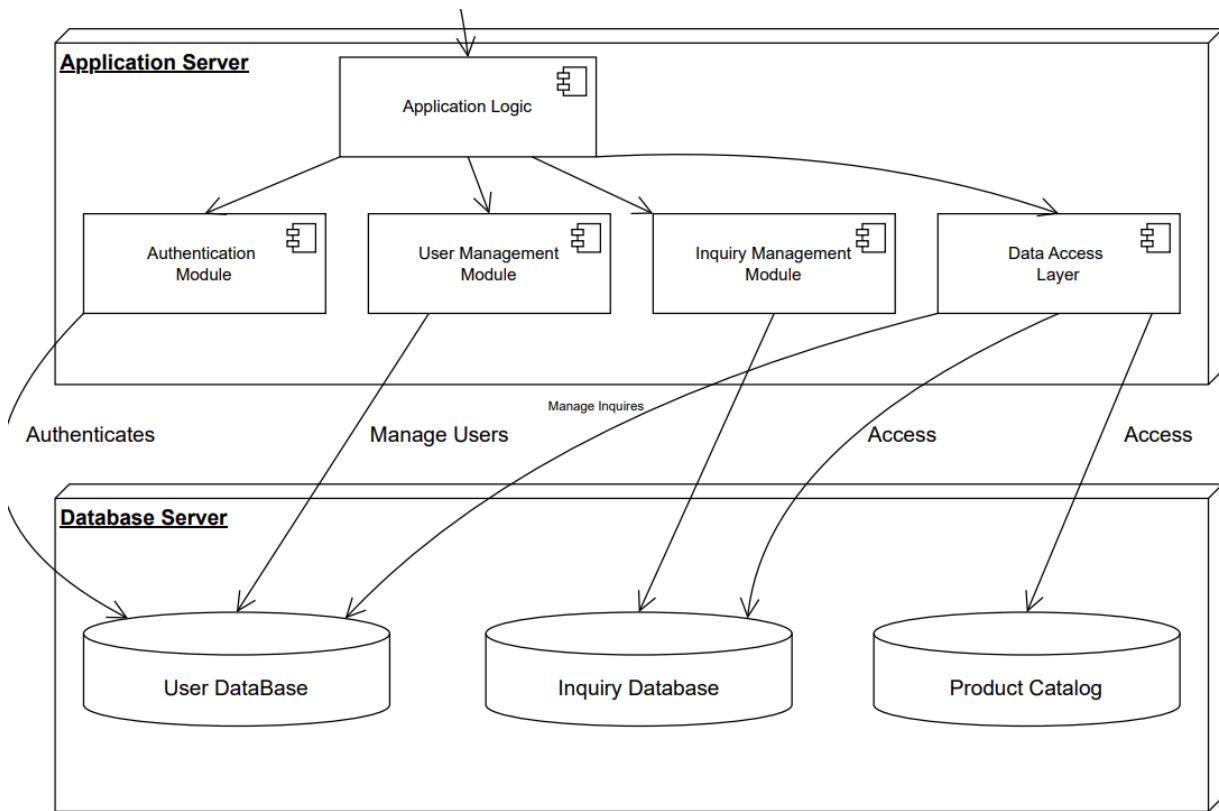


Figure 18 Deployment Diagram





## 5.24 Database Diagram

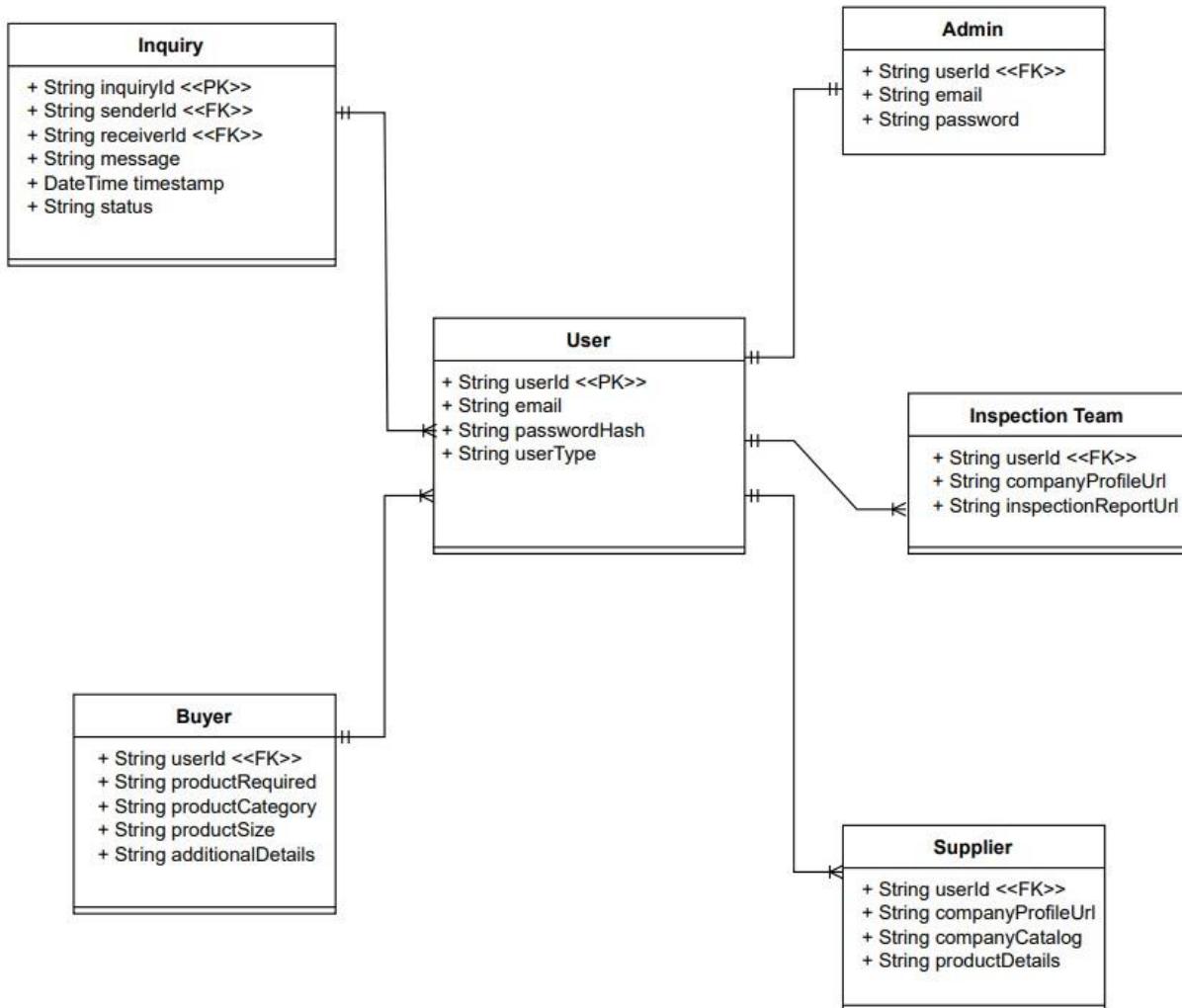


Figure 19 Database Diagram

## **5.25 Summary**

The architecture of the Nextile platform has been thoughtfully designed to handle multiple user roles, large data processing, AI integration, and secure operations. By using a modern stack and layered approach, Nextile ensures a seamless, scalable, and secure experience for all textile industry professionals.

# **Chapter 6**

## **6 System Implementation**

The system implementation phase for Nextile focused on transforming our ideas and planned architecture into a fully functional web platform tailored to the needs of textile buyers, suppliers, and inspection teams. This chapter outlines the step-by-step technical execution of various modules, from registration and authentication to AI-powered tools and admin management.

### **6.1 Technologies Used**

To develop a fast, secure, and responsive web platform, we used a modern technology stack combining UI frameworks, backend utilities, and AI support tools. Below is a summary of the core technologies and their roles:

#### **6.1.1 Next JS**

Next.js serves as the foundational framework of our web platform, enabling both frontend and backend development within a unified environment. It provides server-side rendering, static site generation, and built-in API routes that allow for efficient performance, SEO optimization, and easy deployment. Its seamless routing system and middleware support enhance the user and developer experience.

#### **6.1.2 React & React DOM**

React and React DOM power the user interface of our application through their component-based architecture. This allows for the development of dynamic, reusable UI components that update efficiently in response to data changes. React DOM ensures the virtual DOM renders these components into real DOM elements, optimizing browser performance.

#### **6.1.3 React Bootstrap**

React Bootstrap is used to implement sleek, responsive UI components that are pre-styled and customizable. It helps reduce the need for custom CSS while providing consistency across the design system. The integration with React components also ensures accessibility and mobile responsiveness.

#### **6.1.4 Bootstrap & Bootstrap Icons**

Bootstrap and Bootstrap Icons provide a wide range of pre-built CSS styles and icon libraries used throughout the application. These tools enhance the user interface with modern aesthetics while ensuring mobile-first design. Bootstrap's grid system and utilities simplify layout and spacing.

#### **6.1.5 AOS (Animate on Scroll)**

AOS library adds interactive animations that trigger as users scroll through the website. These animations improve user engagement by making transitions and content reveals visually appealing without compromising performance. The fade, slide, and zoom effects enhance the browsing experience.

#### **6.1.6 Swiper**

Swiper is utilized to create interactive and responsive sliders and carousels for showcasing images, testimonials, or featured products. It supports touch gestures, autoplay, and pagination, ensuring compatibility across all devices and improving UI interactivity.

#### **6.1.6 MongoDB Atlas & Mongoose**

MongoDB Atlas provides a secure, cloud-based NoSQL database solution, while Mongoose acts as an Object Data Modeling (ODM) library for Node.js. Together, they manage the storage and retrieval of structured application data using defined schemas, enabling scalable and maintainable database interactions.

#### **6.1.6 Cloudinary**

Cloudinary is used for managing and storing media files such as user profile pictures, catalog images, and inspection documents. It offers powerful image optimization, transformation, and delivery via a global CDN, ensuring fast load times and efficient cloud storage.

#### **6.1.6 Formidable**

Formidable is employed to parse incoming form data, particularly when handling multipart/form-data uploads such as files or images. It integrates smoothly with our backend routes to facilitate secure and structured file handling.

### **6.1.6 NextAuth.js**

NextAuth.js provides a secure and flexible authentication system integrated within our Next.js application. It supports multiple authentication providers, session handling, and token-based verification, allowing us to protect user data and ensure authorized access.

### **6.1.6 Bcrypt & Bcryptjs**

Bcrypt and its JavaScript implementation, Bcryptjs, are used to hash user passwords before storing them in the database. This adds a critical layer of security, making it difficult for attackers to retrieve original passwords even if the database is compromised.

### **6.1.6 Nodemailer**

Nodemailer is used to send automated emails such as inquiries, confirmations, or notifications between platform users. It integrates with email services to facilitate seamless communication and provides a reliable mechanism for delivering transactional emails.

### **6.1.6 Gemini API (via external route)**

The Gemini API powers our platform's AI capabilities, including natural language search, exploratory data analysis (EDA), and intelligent recommendations. Through a custom API route, the platform enables users to ask queries in plain English, analyze CSV files, and receive actionable business insights.

## **6.2 User Interface Development**

We began by designing and developing the core user-facing pages:

- Landing Page: A welcoming interface introducing Nextile's purpose and core features.
- Registration Flow: A user-friendly page offering three distinct paths for registration Buyer, Supplier, and Inspection Team each with its own dedicated form.

Each user role required different data fields for registration:

### **6.2.1 Buyer Registration**

- Company Name
- Company Registration Number
- Email and Password
- Product Required
- Product Category & Size
- Additional Details

### **6.2.2 Supplier Registration**

- Company Name & Registration Number
- Email and Password
- Company Profile (PDF Upload)
- Product Catalog (PDF Upload)
- Product Details

### **6.2.3 Inspection Team Registration**

- Company Name
- Country Name
- Email and Password
- Company Profile (PDF Upload)
- Inspection Reports
- Product Details

All registered data is securely stored in MongoDB Atlas, and passwords are hashed using bcrypt before storage.

## **6.3 Backend Models and Schemas**

To support the role-based system, we created Mongoose models for:

- Buyers

- Suppliers
- Inspection Teams
- Admins
- A general User model to manage shared login and role metadata

Each schema was carefully structured and connected to the MongoDB database using a central connection file in the libs folder. We also configured Cloudinary in this folder to handle image and file uploads.

## **6.4 API Route Setup**

We developed role-specific API routes in Next.js to manage registrations and data retrieval:

### **6.4.1 Buyer API Route**

- Registers buyers with hashed passwords
- Maps the user to a “buyer” role
- Fetches all buyers from the database

### **6.4.2 Supplier API Route**

- Handles file uploads (catalogs, profiles) to Cloudinary
- Registers suppliers with hashed passwords and links to the user role
- Retrieves all suppliers from the database

### **6.4.3 Inspection Team API Route**

- Manages Cloudinary uploads of inspection reports
- Registers inspection teams and links their roles
- Fetches all inspection team data from the database

## **6.5 Authentication System**

We implemented NextAuth.js to handle secure user authentication with role-based access control. When a user attempts to log in using their email and password, the system first checks the Admin collection to verify if the credentials match an admin account. If no match is found, it proceeds to check the User collection, validating the provided credentials and retrieving profile details based

on the user's role whether buyer, supplier, or inspection team. Upon successful login, a token is generated containing the user's ID, role, and associated profile ID. This token is then used to establish a session that remains active for 30 days. Additionally, we integrated custom middleware to enforce role-based access restrictions across different routes, ensuring that users only access functionalities relevant to their assigned roles.

## 6.6 User Dashboards and Profile Management

Each user has access to a personalized dashboard and profile:

- Buyer, Supplier, and Inspection Team Profiles were created with editable fields.
- Profile Editing Pages were developed so users can update their information at any time.
- Admin Dashboard was implemented with full control to view, edit, or delete any user.
- Admin can also manage buyers, suppliers, and inspection teams via dedicated management pages.

## 6.7 Email-Based Inquiry System

We developed a flexible email-based inquiry system to facilitate seamless communication between users. When a user submits an inquiry form, they provide essential details such as their email, product description, quantity, lead time, and optional fields like payment terms and quality requirements, along with the recipient's email address. The API first validates the input and returns a 400 error if any required fields are missing. Upon successful validation, the system uses Gmail SMTP via Nodemailer, leveraging environment variables for secure configuration. It then composes and sends a well-formatted email containing the inquiry details. The response handling ensures that if the email is sent successfully, the system returns a JSON response indicating success. In case of failure, the system logs the error and responds with a 500 status code, maintaining clear feedback for users and developers alike.

## 6.8 Smart Search API

- A dynamic GET route that accepts queries like /api/search?query=textile
- Sends requests to an external API using a bearer token and custom headers
- Returns relevant search results (companies, news, partners)
- Displays results via a clean, searchable UI on the frontend

### **6.8.1 EDA & Business Insight Tools**

- Users can upload their CSV export data
- Gemini API generates:
  - Exploratory Data Analysis (EDA) charts
  - AI-written summaries and recommendations

### **6.8.2 Predictive Analysis Tool**

- Separate page allows CSV upload and custom prompt (e.g., “Predict next month’s top products”)
- Gemini API processes data and returns prediction results via prompt-based insights

## **Summary**

The implementation of Nextile successfully delivered a fully functional web platform with:

- Role-based registration and login
- Custom user dashboards and editable profiles
- Admin control over user management
- Email-based communication system
- AI-powered search, insights, and prediction tools
- Secure database interaction and file storage

This comprehensive implementation ensures that users across the textile industry can connect efficiently, share accurate information, and make smarter business decisions backed by artificial intelligence.

# **Chapter 7**

## **7 System Testing**

System testing is a crucial stage in the software development lifecycle. It ensures that the entire Nextile platform functions as intended, meets user requirements, and delivers a seamless experience. This chapter explains the testing strategies used in the Nextile project, with a focus on Black Box Testing and API Testing via Postman, along with sample test cases.

### **7.1 Introduction to System Testing**

System testing is the process of validating the complete and integrated system to verify that it meets the specified requirements. For Nextile, the goal was to verify all core functionalities such as user registration, login, inquiry handling, role-based access, profile management, email delivery, and AI-powered features. Since Nextile is a full-stack application, testing involved both frontend behavior and backend API responses.

### **7.2 Testing Strategy Used**

We adopted Black Box Testing as the primary testing strategy. In this method, the internal structure or code logic is not known to the tester. Instead, we focused on inputs, expected outputs, and user behavior.

### **7.3 Testing Strategy Used**

In Black Box Testing, we validated the application by testing different functionalities such as:

- Form validations
- API responses
- Role-based redirection
- AI search and CSV analysis results
- Email inquiry delivery

Each module was tested independently to ensure that the system behaves as expected without accessing the internal source code.

## **7.4 Postman API Testing**

To verify our backend APIs, we used Postman, a popular API testing tool. The following were tested:

### **7.4.1 Registration Endpoints**

- Buyers: Tested buyer registration with correct and incorrect inputs.
- Suppliers: Uploaded files (product catalogs, company profiles) and validated Cloudinary uploads.
- Inspection Teams: Verified secure registration with file uploads and role mapping.

### **7.4.2 Authentication API**

- Login functionality was tested using correct and incorrect credentials for Admin, Buyer, Supplier, and Inspection Team roles.

### **7.4.3 Inquiry API**

- Verified inquiry email sending.
- Tested for missing required fields.
- Checked error handling for invalid or missing recipient email.

### **7.4.4 AI Search API**

- Sent GET requests with and without `query` parameter.
- Validated response from the external AI-powered endpoint.

### **7.4.5 CSV Upload & EDA APIs**

- Uploaded CSV files and verified JSON responses including AI-generated insights and summaries.

## 7.5 Sample Test Cases

### 7.5.1 Test Case for Buyer Registration (Valid Input)

This test case verifies the successful registration of a buyer when all required fields are filled in correctly. With the buyer registration form accessible, the tester opens the registration page, inputs valid data in all fields, and submits the form. The system displays a success message and saves the buyer's information in the MongoDB database as expected. The actual result matched the expected outcome, and the test was marked as Passed.

Field	Detail
Test Case ID	TC01
Test Case Name	Buyer Registration – Valid Input
Description	Tests buyer registration with all required fields filled correctly.
Preconditions	Buyer registration form is accessible.
Test Steps	<ol style="list-style-type: none"><li>1. Open buyer register page</li><li>2. Fill in all fields</li><li>3. Click submit</li></ol>
Expected Result	Success message is displayed, data is saved in MongoDB.
Actual Result	Success message received, data stored.
Status	Passed

*Table 1 Buyer Registration Test Case*

### 7.5.2 Test Case for Buyer Registration (Missing Email)

This test case checks the system's validation when the required email field is left blank during buyer registration. With the buyer form open, the tester fills in all other fields except the email and submits the form. The expected outcome is that the system displays an error message like "Email is required" or returns a 400 error from the API. The actual result confirmed that the error message was correctly shown, validating the form's input handling. The test was successfully executed and marked as Passed.

Field	Detail
Test Case ID	TC02
Test Case Name	Buyer Registration – Missing Email
Description	Validates error when required email field is missing.
Preconditions	Buyer form should be open.
Test Steps	<ol style="list-style-type: none"> <li>1. Leave email blank</li> <li>2. Fill others</li> <li>3. Submit</li> </ol>
Expected Result	Error displayed: “Email is required” or 400 from API.
Actual Result	Error message received.
Status	Passed

*Table 2 Buyer Missing email Test Case*

### **7.5.3 Test Case for Supplier Registration with Uploads**

This test case verifies that the file upload functionality works correctly during supplier registration. With the supplier form open, the tester fills in the required details, uploads catalog or profile files, and submits the form. Upon submission, the system returned a success response containing the Cloudinary file URLs, confirming that the upload and data storage processes functioned as intended. The test was executed successfully and marked as Passed.

Field	Detail
Test Case ID	TC03
Test Case Name	Supplier Registration with Uploads
Description	Checks that catalog/profile uploads to Cloudinary work.
Preconditions	Supplier form should be open.
Test Steps	<ol style="list-style-type: none"> <li>1. Fill supplier form</li> <li>2. Upload files</li> <li>3. Submit</li> </ol>
Expected Result	Files stored in Cloudinary, data stored in DB.
Actual Result	Success response with Cloudinary URLs.
Status	Passed

*Table 3 Supplier Test case with Uploads*

#### **7.5.4 Test Case for Inspection Team Registration (Valid Input)**

This test case ensures that the inspection team can successfully complete the registration process, including file uploads. With the inspection team registration form open, the tester fills in all required fields, uploads the necessary reports, and submits the form. The expected outcome is a successful registration with the uploaded files being stored in Cloudinary. The system returned a success response, confirming that both data submission and file handling worked as intended. The test passed successfully and was marked as Passed.

Field	Detail
Test Case ID	TC04
Test Case Name	Inspection Team Registration – Valid Input
Description	Verifies full registration and uploads for inspection team.
Preconditions	Inspection form open.
Test Steps	<ol style="list-style-type: none"> <li>1. Fill all fields</li> <li>2. Upload reports</li> <li>3. Submit</li> </ol>
Expected Result	Registration successful, files saved to Cloudinary.
Actual Result	Success response received.
Status	Passed

*Table 4 Inspection Team Valid Input Test Case*

#### **7.5.5 Test Case for Admin Login (Valid Credentials)**

This test case verifies that an admin user can log in successfully using valid credentials. With an existing admin record in the MongoDB collection, the tester navigates to the login page, enters the correct admin email and password, and submits the form. The expected behavior is that the admin is authenticated and redirected to the dashboard. The actual result confirmed a successful login, and the admin dashboard was loaded as intended. The test ran as expected and was marked as Passed.

Field	Detail
Test Case ID	TC05
Test Case Name	Admin Login – Valid Credentials
Description	Tests admin login with correct email/password.
Preconditions	Admin user exists in MongoDB collection.
Test Steps	<ol style="list-style-type: none"> <li>1. Go to login</li> <li>2. Enter admin credentials</li> <li>3. Submit</li> </ol>
Expected Result	Admin logged in, redirected to dashboard.
Actual Result	Login successful, admin dashboard loaded.
Status	Passed

*Table 5 Admin Valid Input Test Case*

#### **7.5.6 Test Case for Inspection Team Registration (Valid Input)**

This test case ensures that the inspection team can successfully complete the registration process, including file uploads. With the inspection team registration form open, the tester fills in all required fields, uploads the necessary reports, and submits the form. The expected outcome is a successful registration with the uploaded files being stored in Cloudinary. The system returned a success response, confirming that both data submission and file handling worked as intended. The test passed successfully and was marked as Passed.

Field	Detail
Test Case ID	TC06
Test Case Name	User Login – Incorrect Password
Description	Verifies system response on incorrect login password.
Preconditions	User must be registered.
Test Steps	<ol style="list-style-type: none"> <li>1. Go to login</li> <li>2. Enter wrong password</li> <li>3. Submit</li> </ol>
Expected Result	Error: “Invalid credentials” shown.
Actual Result	Error displayed.
Status	Passed

*Table 6 Inspection Team Valid Input Test Case*

### **7.5.7 Test Case for Inquiry Email (All Valid Inputs)**

This test case verifies that the inquiry email functionality works correctly when all required fields are properly filled. With the inquiry form functional, the tester enters valid data in all fields and submits the form. The expected outcome is that the email is successfully sent to the intended recipient. The actual result confirmed that the email was sent using Nodemailer, indicating that the system handled the process as intended. The test was executed successfully and marked as Passed.

Field	Detail
Test Case ID	TC07
Test Case Name	Inquiry Email – All Valid Inputs
Description	Checks email is sent when all fields are filled.
Preconditions	Inquiry form should be working.
Test Steps	<ol style="list-style-type: none"> <li>1. Fill all fields</li> <li>2. Submit</li> </ol>
Expected Result	Email sent successfully to recipient.
Actual Result	Email sent via Nodemailer.
Status	Passed

*Table 7 Inquiry Test Case*

### **7.5.8 Test Case for Inquiry Email (Missing Required Field)**

This test case checks the system's validation when a required field, such as quantity or lead time, is missing in the inquiry form. With the form open, the tester leaves the quantity field blank and submits the form. The expected result is a 400 error from the API along with an appropriate error message displayed to the user. The actual result confirmed that a validation error was triggered, ensuring the system correctly enforces input requirements. The test was successfully executed and marked as Passed.

Field	Detail
Test Case ID	TC08
Test Case Name	Inquiry Email – Missing Required Field
Description	Tests response when quantity or leadTime is missing.
Preconditions	Inquiry form should be open.
Test Steps	1. Leave quantity blank 2. Submit
Expected Result	400 error returned, error message shown.
Actual Result	Validation error received.
Status	Passed

*Table 8 Inquiry Missing field Test Case*

### **7.5.9 Test Case for AI Search API (Valid Query)**

This test case verifies the functionality of the AI-powered search feature when a valid query is submitted. With the search page operational, the tester enters the term “cotton” and submits the search request. The expected outcome is that a list of AI-matched search results is displayed based on the query. The actual result confirmed that relevant data was successfully retrieved from the Gemini API, demonstrating proper handling of valid inputs. The test was completed successfully and marked as Passed.

Field	Detail
Test Case ID	TC09
Test Case Name	AI Search API – Valid Query
Description	Checks valid query handling by AI search API.
Preconditions	Search page working.
Test Steps	<ol style="list-style-type: none"> <li>1. Type “cotton” in search</li> <li>2. Submit</li> </ol>
Expected Result	List of AI-matched search results shown.
Actual Result	Relevant data received from Gemini API.
Status	Passed

*Table 9 API search Test Case*

#### **7.5.10 Test Case for AI Search API (Missing Query Param)**

This test case validates the system's response when the AI search form is submitted without a query parameter. With the search form open, the tester attempts to submit it without entering any search term. The expected result is a 400 error along with the message “Query parameter is required.” The actual result confirmed that the appropriate error was returned, ensuring the API enforces input validation. The test was executed successfully and marked as Passed.

Field	Detail
Test Case ID	TC10
Test Case Name	AI Search API – Missing Query Param
Description	Validates 400 error on missing query parameter.
Preconditions	Search form is open.
Test Steps	1. Submit form without query
Expected Result	400 error with “Query parameter is required” message.
Actual Result	Proper error received.
Status	Passed

*Table 10 API missing query test case*

### **7.5.11 Test Case of CSV Upload for EDA**

This test case evaluates the functionality of the EDA (Exploratory Data Analysis) feature powered by the Gemini API. With the EDA page operational, the tester uploads a CSV file and submits it for analysis. The expected outcome is that the system processes the file and generates a summary of the data along with AI-driven insights. The actual result confirmed that the EDA results were successfully displayed on screen, validating the correct integration of CSV handling and Gemini's analytical capabilities. The test was completed successfully and marked as Passed.

Field	Detail
Test Case ID	TC11
Test Case Name	CSV Upload for EDA
Description	Tests uploading CSV and receiving Gemini EDA output.
Preconditions	EDA page working.
Test Steps	<ol style="list-style-type: none"><li>1. Upload CSV</li><li>2. Submit for EDA</li></ol>
Expected Result	Data summary and AI insights generated.
Actual Result	EDA results shown on screen.
Status	Passed

*Table 11 CSV file upload Test Case*

### **7.5.12 Test Case for Unauthorized Profile Access**

This test case verifies that access to restricted pages, such as the buyer profile, is properly blocked when a user is not logged in. Without an active session, the tester attempts to visit the /buyer/profile route directly. The expected result is a redirection to the login page or a 401 Unauthorized response. The actual result confirmed that the redirection to the login page occurred as intended, demonstrating that the authentication middleware effectively protects private routes. The test was successfully executed and marked as Passed.

Field	Detail
Test Case ID	TC12
Test Case Name	Unauthorized Profile Access
Description	Ensures restricted pages are blocked without login.
Preconditions	User is not logged in.
Test Steps	1. Visit /buyer/profile directly without login
Expected Result	Redirects to login or shows 401 Unauthorized.
Actual Result	Redirect worked correctly.
Status	Passed

*Table 12 Unauthorized Access Test Case*

### 7.5.13 Test Case for Role-based Redirection After Login

This test case ensures that users are redirected to the appropriate dashboard or profile page based on their role after logging in. With the login page functioning correctly, the tester logs in as a buyer, supplier, and admin, one after the other. The expected behavior is that each user is redirected to their respective route buyers to /buyer/profile, suppliers to /supplier/profile, and admins to their dashboard. The actual result confirmed that all role-based redirections were handled correctly, validating the post-login logic. The test was successfully executed and marked as Passed.

Field	Detail
Test Case ID	TC13
Test Case Name	Role-based Redirection After Login
Description	Verifies correct redirection based on role after login.
Preconditions	Login page working.
Test Steps	1. Login with buyer 2. Login with supplier 3. Login as admin
Expected Result	Buyer → /buyer/profile, Supplier → /supplier/profile, etc.
Actual Result	All roles redirected properly.
Status	Passed

*Table 13 Role Base Login Test Case*

### **7.5.14 Test Case TC14: Password Hashing Verification**

This test case verifies that user passwords are securely stored in the database using hashing techniques. After registering a new user, the tester inspects the password field in the database to ensure it is not stored in plain text. The expected result is that the password is hashed, typically using a library like bcrypt. The actual result confirmed that the stored value was a hashed string, ensuring compliance with secure password handling practices. The test was successfully completed and marked as Passed.

Field	Detail
Test Case ID	TC14
Test Case Name	Password Hashing Verification
Description	Validates that passwords are stored securely (hashed).
Preconditions	User is registered.
Test Steps	1. Register new user 2. Check password field in DB
Expected Result	Password is not plain text, is hashed (e.g., bcrypt).
Actual Result	Hash observed.
Status	Passed

*Table 14 Password Hashing Test Case*

### **7.5.15 Test Case for Admin Edit/Delete Functionality**

This test case verifies that an admin has the ability to edit and delete user records from the system. With the admin already logged in, the tester accesses the admin dashboard, selects a user, and performs both edit and delete operations. The expected outcome is that the user's data is either updated or removed from the MongoDB database accordingly. The actual result confirmed that the database was successfully updated and the changes were reflected on the frontend, validating full functionality. The test was successfully executed and marked as Passed.

Field	Detail
Test Case ID	TC15
Test Case Name	Admin Edit/Delete Functionality
Description	Confirms that admin can edit and delete user records.
Preconditions	Admin is logged in.
Test Steps	<ol style="list-style-type: none"> <li>1. Go to admin dashboard</li> <li>2. Edit and delete user</li> </ol>
Expected Result	User data updated or removed from DB.
Actual Result	MongoDB updated and frontend reflected change.
Status	Passed

*Table 15 Admin Edit Delete Test Case*

## 7.6 Bug Tracking and Fixes

During testing, bugs such as missing field validations, incorrect redirections after login, and file upload errors were identified and resolved. Postman was particularly helpful in catching malformed payloads, unhandled error responses, and status code mismatches.

## 7.7 Login Form Unfilled Password

The screenshot shows a login interface with a dark background. At the top, there is a label "Email address" followed by an input field containing the text "socksstream@gmail.com". Below this is a label "Password" followed by an input field with the placeholder "Enter password". A red validation message box is positioned above the password field, containing a yellow exclamation mark icon and the text "Please fill out this field." At the bottom left, there is a link "Don't have an account?". At the bottom right, there are three buttons: "Buyer Registration", "Supplier Registration", and "Inspection Team".

Figure 20 Login Form password missing

## 7.8 Login Form Unfilled Email

The screenshot shows a login interface with a black header and a red gradient background. At the top left is a logo consisting of three overlapping circles in light blue, light green, and light orange. Below the logo is the text "Food Safety Inspection System". The main form area has a white background.

**Email address**  
Enter email

**Password**  
Please fill out this field.

.....

**Login**

Don't have an account?

Buyer Registration   Supplier Registration   Inspection Team

Figure 21 Login form Unfill Email

## 7.9 Login Form Wrong Email Format

The screenshot shows a login interface with a dark background. At the top is a text input field labeled "Email address" containing "socksstream.gmail.com". Below the input field is an orange button labeled "Login". To the left of the "Login" button, there is a link "Don't have an account?". At the bottom of the screen, there are three buttons: "Buyer Registration", "Supplier Registration", and "Inspection Team". A prominent error message is displayed in a white box with a black border and a yellow exclamation mark icon. The message reads: "Please include an '@' in the email address. 'socksstream.gmail.com' is missing an '@'." The text "socksstream.gmail.com" is also partially visible in the input field below the error message.

Figure 22 Login form wrong Email format

## 7.10 Login Form Wrong Email & Password

A screenshot of a mobile-style login interface. At the top, a pink rectangular box contains the text "Invalid email or password". Below this, there are two input fields: one for "Email address" containing "socksstream@gmail.com" and another for "Password" containing several dots. A large orange button labeled "Login" is centered below the inputs. At the bottom of the screen, there is a link "Don't have an account?" and three dark blue buttons labeled "Buyer Registration", "Supplier Registration", and "Inspection Team".

Figure 23 Login Form Wrong email & password

## 7.11 Supplier Form without File Attachment

The image shows a digital supplier registration form. At the top, there are four input fields: 'Company Name' (Socks Stream), 'Company Reg No' (SUP-TEX-2024-12345), 'Email' (socksstream@gmail.com), and 'Password' (.....). Below these are two file upload sections: 'Upload Company Profile (PDF)' with a 'Choose File' button and a 'No file chosen' message, and 'Upload Product Catalog' with a 'Choose File' button and a 'No file chosen' message, accompanied by a warning message 'Please select a file.' A red exclamation mark icon is visible above the catalog upload field. Underneath these sections is a 'Product Details' area containing the text 'We want high quality denim jeans'. At the bottom is a large orange 'Register' button.

**Company Name**  
Socks Stream

**Company Reg No**  
SUP-TEX-2024-12345

**Email**  
socksstream@gmail.com

**Password**  
.....

**Upload Company Profile (PDF)**

Choose File No file chosen

**Upload Product Catalog** ! Please select a file.

Choose File No file chosen

**Product Details**

We want high quality denim jeans

**Register**

Figure 24 Supplier Form without file Attachment

## **7.12 Conclusion**

System testing for Nextile was carried out using a mix of Black Box Testing and API Testing with Postman. The tests ensured that user registrations, secure logins, email inquiries, role-based access, and AI functionalities all work as expected. The combination of well-defined test cases and modern testing tools helped deliver a stable and reliable application ready for deployment in the textile industry.

# **Chapter 8**

## **8 Application Prototype**

The application prototype of Nextile represents a functional and visual demonstration of the web-based platform's core features, designed to validate the system's objectives, user interface, and interaction flow before final deployment. This prototype was developed to test usability, gather feedback, and ensure the system architecture aligns with user requirements from textile buyers, suppliers, and inspection teams.

The prototype includes all essential modules such as registration, authentication, role-based dashboards, inquiry forms, AI-powered search, and data visualization. It serves as a working version of the final product, helping stakeholders understand the interface and flow of the system before full-scale implementation.

### **8.1 Prototype Objectives**

- Validate the overall design and layout of the platform
- Demonstrate major features like registration, login, dashboard access, inquiry management, and AI integrations
- Identify usability issues through early testing
- Gather feedback from intended users
- Serve as a reference for full development

### **8.2 Key Screens in Prototype**

Below is a description of the main UI screens in the Nextile prototype:

#### **8.2.1 Landing Page**

- Introduction to the platform with sections like Home, Insights and Explore Links.
- Designed using Bootstrap and AOS animations for smooth UX

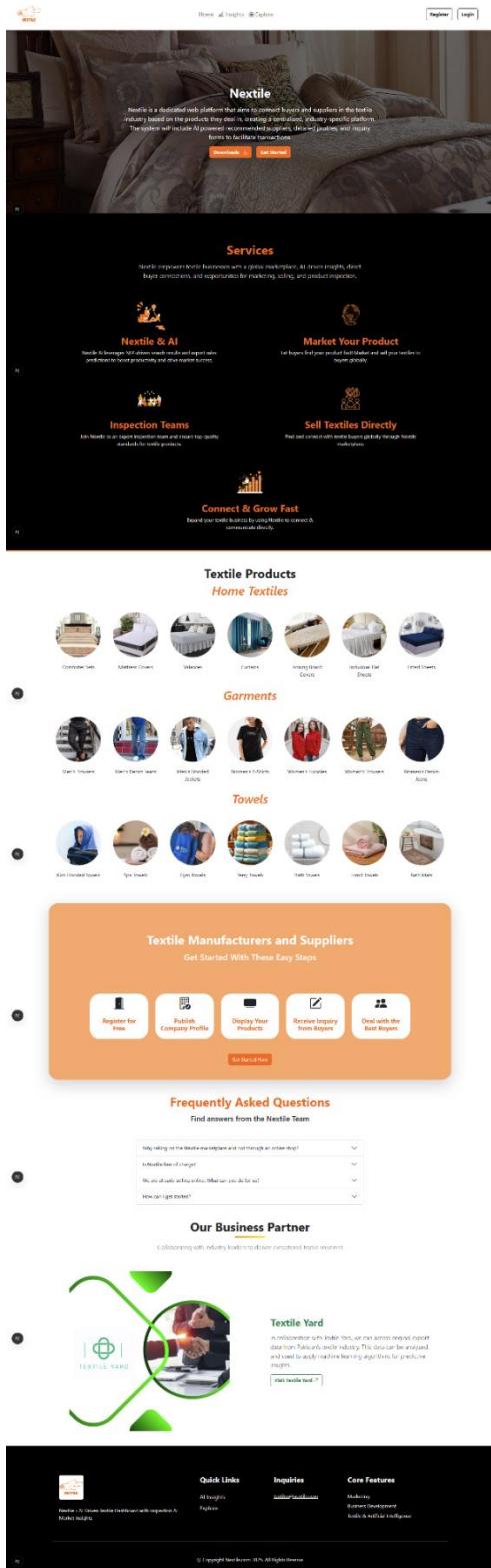


Figure 25 Landing Page

## 8.2.2 Role-Based Registration

- Users can select from Buyer, Supplier, or Inspection Team roles.
- Each role has a dedicated registration form with custom fields and file upload capability.

The screenshot shows the Nextile registration page with a dark background. At the top, there is a logo of a hand holding a stylized orange shape, with the word "NEXTILE" below it. To the right of the logo are links for "Home", "AI Insights", "Explore", "Register", and "Login".

The main content area features three sections:

- For Buyers**:
  - Hassle-Free Sourcing - Submit your request, and suppliers will reach out to you.
  - Streamlined Communication - Manage all supplier interactions through inquiry forms.[Register as Buyer](#)
- For Suppliers**:
  - Showcase Your Products - List your offerings and attract interested buyers.
  - Grow Your Sales - Receive inquiries and convert them into business opportunities.[Register as Supplier](#)
- For Inspection Teams**:
  - Ensure Quality - Verify product quality and compliance with industry standards.
  - Seamless Coordination - Collaborate with buyers and suppliers for smooth transactions.[Register as Inspection Team](#)

At the bottom left, there is a footer section with the Nextile logo and the text: "Nextile - AI Driven Textile Dashboard with Inspection & Market Insights". On the right, there are sections for "Quick Links" (AI Insights, Explore), "Inquiries" (textiles@nextile.com), and "Core Features" (Marketing, Business Development, Textile & Artificial Intelligence). A copyright notice at the bottom center states: "© Copyright Nextile.com 2025. All Rights Reserved".

Figure 26 Role Based Registration

### 8.2.3 Role-Based Registration (Buyer)

The screenshot shows the 'Buyer Registration' page of the Nextile website. At the top, there is a navigation bar with links for 'Home', 'AI Insights', 'Explore', 'Register', and 'Login'. Below the navigation bar, there is a large, blurred background image featuring a hand holding a tablet with a textile pattern, and the word 'NEXTILE' is visible at the bottom left of the tablet screen.

The registration form consists of several input fields:

- Company Name**: A text input field.
- Company Reg No**: A text input field.
- Email**: A text input field.
- Set your Password**: A text input field.
- Product Required**: A dropdown menu.
- Product Category**: A dropdown menu.
- Product Size**: A dropdown menu.
- Additional Details**: A text input field.

At the bottom right of the form is a large orange 'Register' button.

Below the registration form, there is a footer section with the Nextile logo and some text:

Nextile - AI Driven Textile Dashboard with Inspection & Market Insights

**Quick Links**

- AI Insights
- Explore

**Inquiries**

[textiles@nextile.com](mailto:textiles@nextile.com)

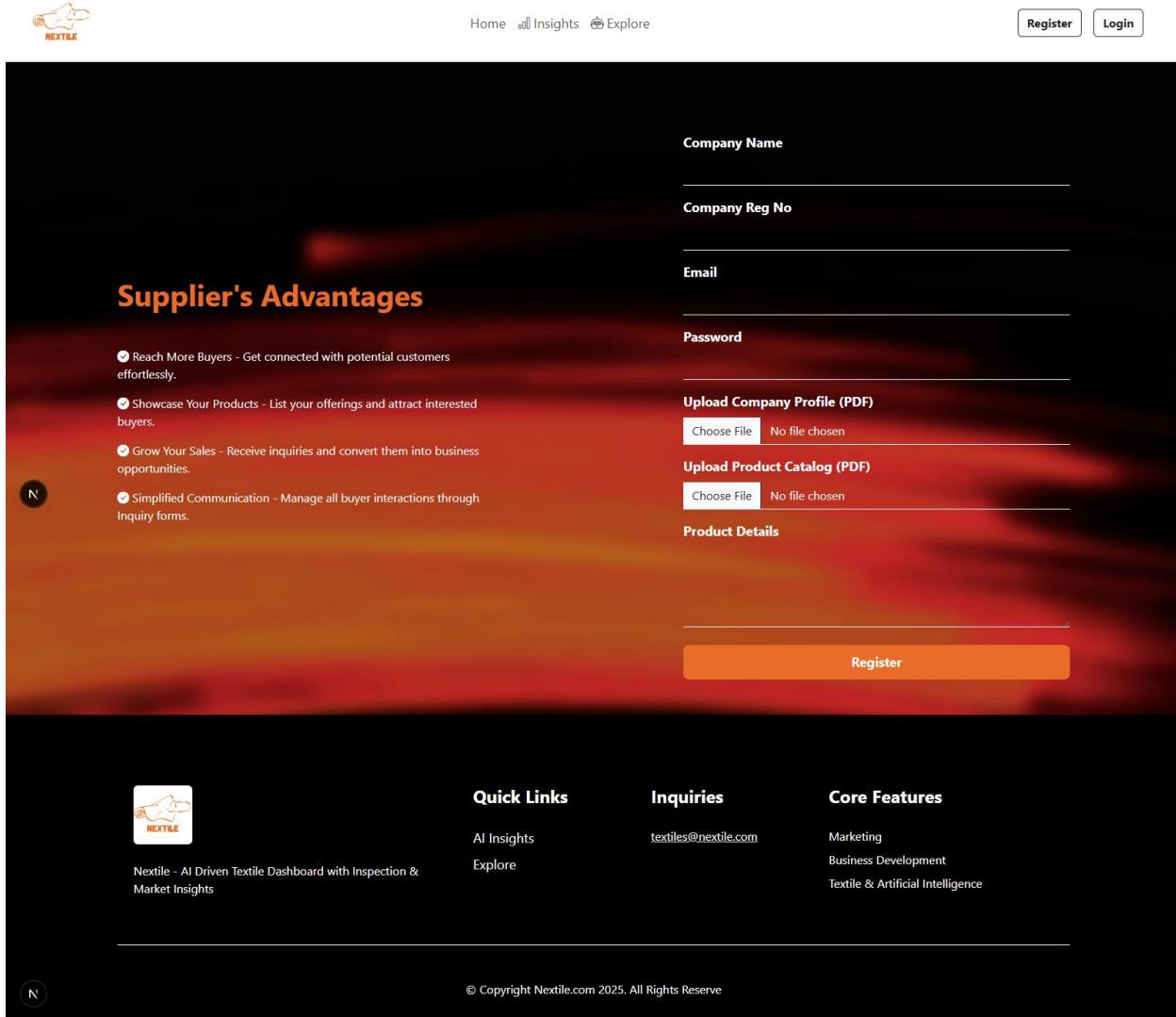
**Core Features**

- Marketing
- Business Development
- Textile & Artificial Intelligence

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Figure 27 Buyer Registration

## 8.2.4 Role-Based Registration (Supplier)



The image shows a screenshot of a web-based supplier registration form. At the top right, there are navigation links for "Home", "AI Insights", "Explore", "Register" (in a blue box), and "Login". The main content area has a dark background with orange highlights. On the left, there's a section titled "Supplier's Advantages" listing five benefits with checkmarks. To the right, there are input fields for "Company Name", "Company Reg No", "Email", and "Password". Below these are two file upload fields: "Upload Company Profile (PDF)" and "Upload Product Catalog (PDF)", both showing "No file chosen". A "Product Details" section is partially visible. At the bottom right is a large orange "Register" button. The footer contains the Nextile logo, a copyright notice ("© Copyright Nextile.com 2025. All Rights Reserved"), and a "Market Insights" link.

**Supplier's Advantages**

- Reach More Buyers - Get connected with potential customers effortlessly.
- Showcase Your Products - List your offerings and attract interested buyers.
- Grow Your Sales - Receive inquiries and convert them into business opportunities.
- Simplified Communication - Manage all buyer interactions through Inquiry forms.

**Company Name**

**Company Reg No**

**Email**

**Password**

**Upload Company Profile (PDF)**  
Choose File No file chosen

**Upload Product Catalog (PDF)**  
Choose File No file chosen

**Product Details**

**Register**

**Quick Links**

AI Insights  
Explore

**Inquiries**

textiles@nextile.com

**Core Features**

Marketing  
Business Development  
Textile & Artificial Intelligence

Nextile - AI Driven Textile Dashboard with Inspection & Market Insights

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Figure 28 Supplier Registration

### 8.2.5 Role-Based Registration (Inspection team)

The screenshot shows the inspection team registration page on the Nextile AI Driven Textile Dashboard. At the top, there is a navigation bar with links for Home, AI Insights, Explore, Register, and Login. The main content area features a dark background with orange highlights. On the left, there is a section titled "Inspection Team's Advantages" listing five benefits with checkmarks:

- Ensure Quality - Verify product quality and compliance with industry standards.
- Streamlined Inspections - Conduct inspections efficiently with structured processes.
- Comprehensive Reports - Provide detailed assessments to buyers and suppliers.
- Seamless Coordination - Collaborate with buyers and suppliers for smooth transactions.

On the right, there are several input fields and file upload sections:

- Company Name
- Email
- Password
- Country Name
- Upload Company Profile (PDF) (Choose File: No file chosen)
- Inspection Reports (PDF) (Choose File: No file chosen)
- Product to be Inspected

A large orange "Register" button is located at the bottom right of the form area. At the bottom of the page, there is a footer with the Nextile logo, quick links for AI Insights and Explore, an inquiries email address (textiles@nextile.com), and core features: Marketing, Business Development, and Textile & Artificial Intelligence. There is also a copyright notice: © Copyright Nextile.com 2025. All Rights Reserved.

Figure 29 Inspection Team Registration

## 8.2.6 Login Page

- Secure login form with email and password.
- Integrates NextAuth.js for session management and role detection.

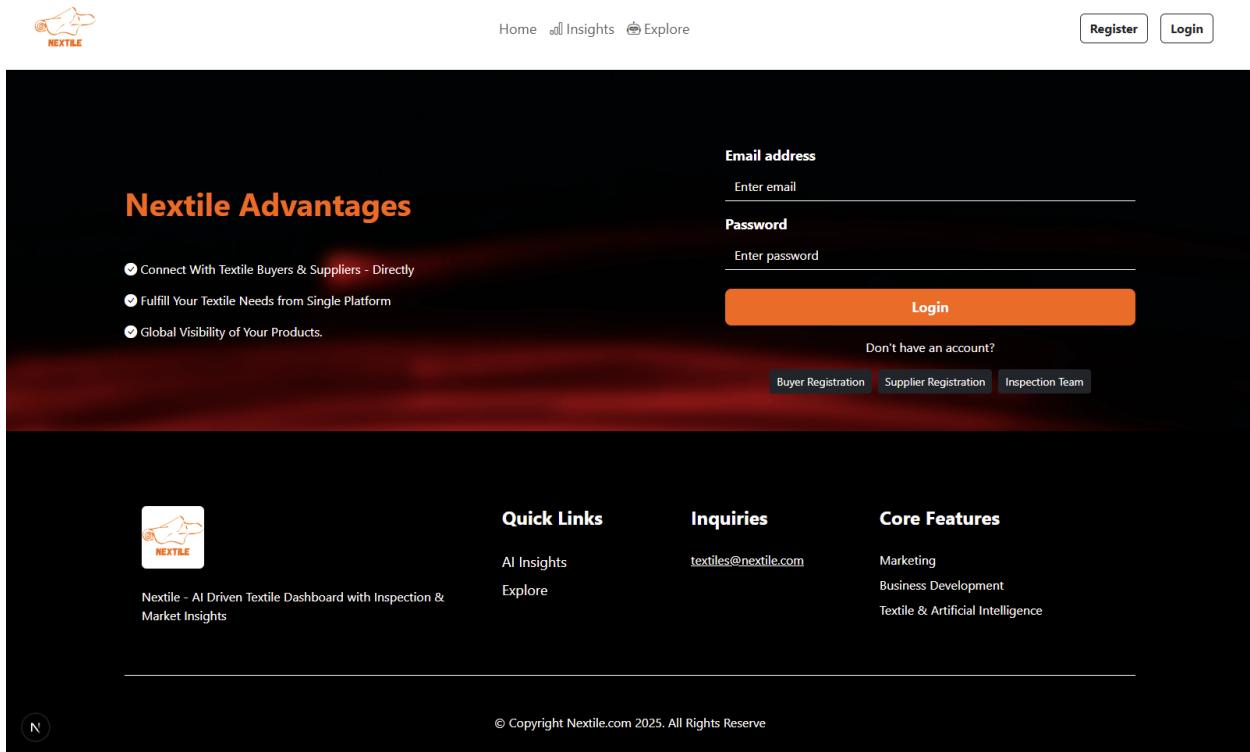


Figure 30 Login Page

## 8.2.7 Buyer Profile

- Displays supplier and inspection team profiles.

The screenshot displays the origo business Services platform interface. At the top, there is a navigation bar with icons for Home, Insights, Explore, and origo business Services. Below the navigation bar, a welcome message reads "Welcome, origo business Services".

**Suppliers**

**Socks Stream**

Registration No: SUP-TEX-2024-12345

Email: socksstream@gmail.com Products Offering: Details inside profile

Account Type: Supplier Documents: Company Profile (PDF), Product Catalog (PDF)

Product Details: We supply high quality of Garments and Home Textiles

Inquiry

**Inspection Teams**

**Neurazek, Faisalabad**

Email: neurazek@gmail.com Country: Pakistan

Account Type: Inspection Team Documents: Company Profile (PDF), Inspection Reports (PDF)

Product to be Inspected: We inspect Garments and Home Textiles!

Contact Team

**Footer**

Nextile - AI Driven Textile Dashboard with Inspection & Market Insights

Quick Links: AI Insights, Explore

Inquiries: [textiles@nextile.com](mailto:textiles@nextile.com)

Core Features: Marketing, Business Development, Textile & Artificial Intelligence

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Figure 31 Buyer Profile

## 8.2.8 Buyer Dashboard

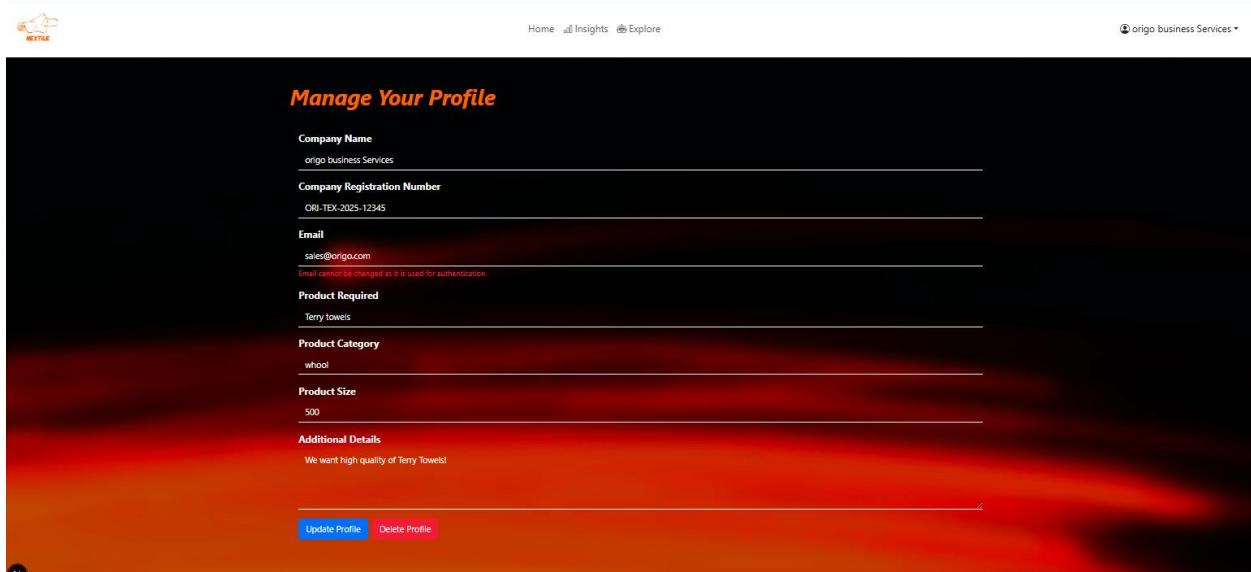


Figure 32 Buyer Dashboard

## 8.2.9 Supplier Profile

The screenshot shows the Nextile AI Driven Textile Dashboard interface. At the top, there is a navigation bar with icons for Home, Insights, Explore, and Socks Stream. Below the navigation bar, a welcome message reads "Welcome, Socks Stream". A section titled "Buyers" displays two supplier profiles:

- origo business Services**  
Registration No: ORI-TEX-2025-12345  
Email: sales@origo.com Product Required: Terry towels  
Account Type: **Buyer** Product Size: 500 Product Category: whool  
Additional Details: We want high quality of Terry Towels! [✉ Inquiry](#)
- Catto**  
Registration No: Cat-TEX-2025  
Email: faizan.jr12@gmail.com Product Required: Terry towels  
Account Type: **Buyer** Product Size: 500 Product Category: whool  
Additional Details: I want high quality towels. [✉ Inquiry](#)

At the bottom of the dashboard, there is a footer with the Nextile logo, a copyright notice, and links to Quick Links, Inquiries, and Core Features.

**Quick Links**

- AI Insights
- Explore

**Inquiries**

[textiles@nextile.com](mailto:textiles@nextile.com)

**Core Features**

- Marketing
- Business Development
- Textile & Artificial Intelligence

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Figure 33 Supplier Profile

## 8.2.10 Supplier Dashboard

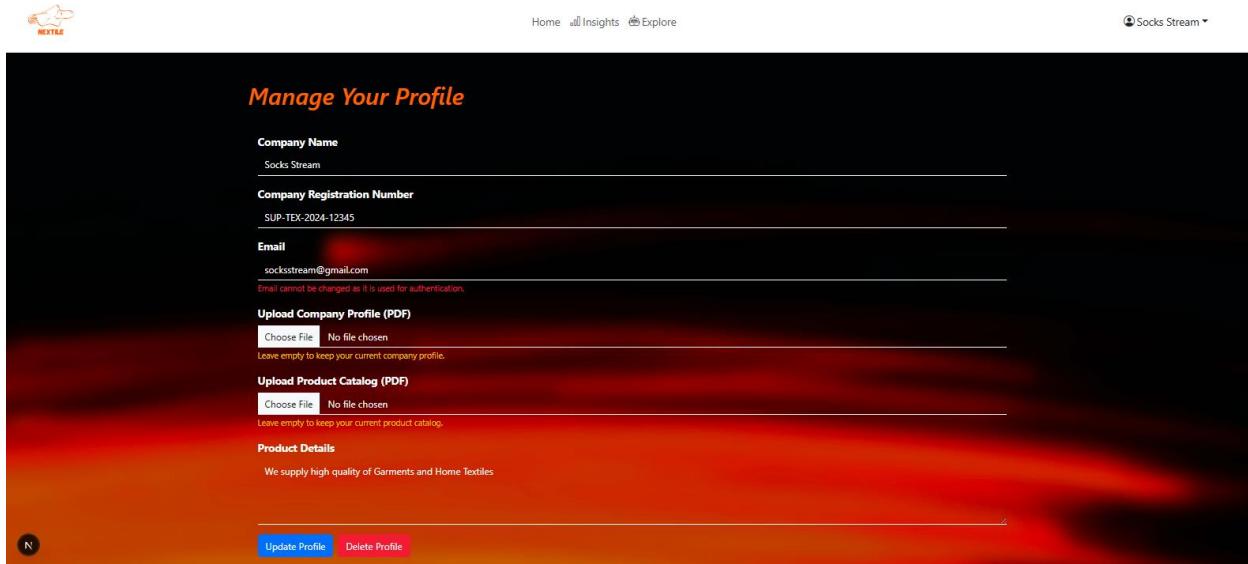


Figure 34 Supplier Dashboard

## 8.2.11 Inspection Team Profile

The screenshot shows the Nextile AI Driven Textile Dashboard. At the top, there is a navigation bar with icons for Home, AI Insights, Explore, and a dropdown for 'Neurazek, Faisalabad'. Below the navigation bar, the text 'Welcome, Neurazek, Faisalabad' is displayed in orange. A section titled 'Buyers' lists two profiles: 'origo business Services' and 'Catto'. Each profile card includes the company name, registration number, email, product required, account type, product size, product category, additional details, and an 'Inquiry' button. At the bottom of the page, there is a footer with the Nextile logo, quick links for AI Insights and Explore, an inquiry email address (textiles@nextile.com), core features (Marketing, Business Development, Textile & Artificial Intelligence), and a copyright notice: '© Copyright Nextile.com 2025. All Rights Reserved'.

Home Insights Explore Neurazek, Faisalabad ▾

Welcome, Neurazek, Faisalabad

**Buyers**

**origo business Services**

Registration No: ORI-TEX-2025-12345

Email: sales@origo.com Product Required: Terry towels

Account Type: **Buyer** Product Size: 500 Product Category: whool

Additional Details: We want high quality of Terry Towels!

Inquiry

**Catto**

Registration No: Cat-TEX-2025

Email: faizan.jr12@gmail.com Product Required: Terry towels

Account Type: **Buyer** Product Size: 500 Product Category: whool

Additional Details: I want high quality towels.

Inquiry

Nextile - AI Driven Textile Dashboard with Inspection & Market Insights

**Quick Links**

[AI Insights](#) [Explore](#)

**Inquiries**

[textiles@nextile.com](mailto:textiles@nextile.com)

**Core Features**

Marketing  
Business Development  
Textile & Artificial Intelligence

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Figure 35 Inspection Team Profile

### 8.2.12 Inspection Team Dashboard

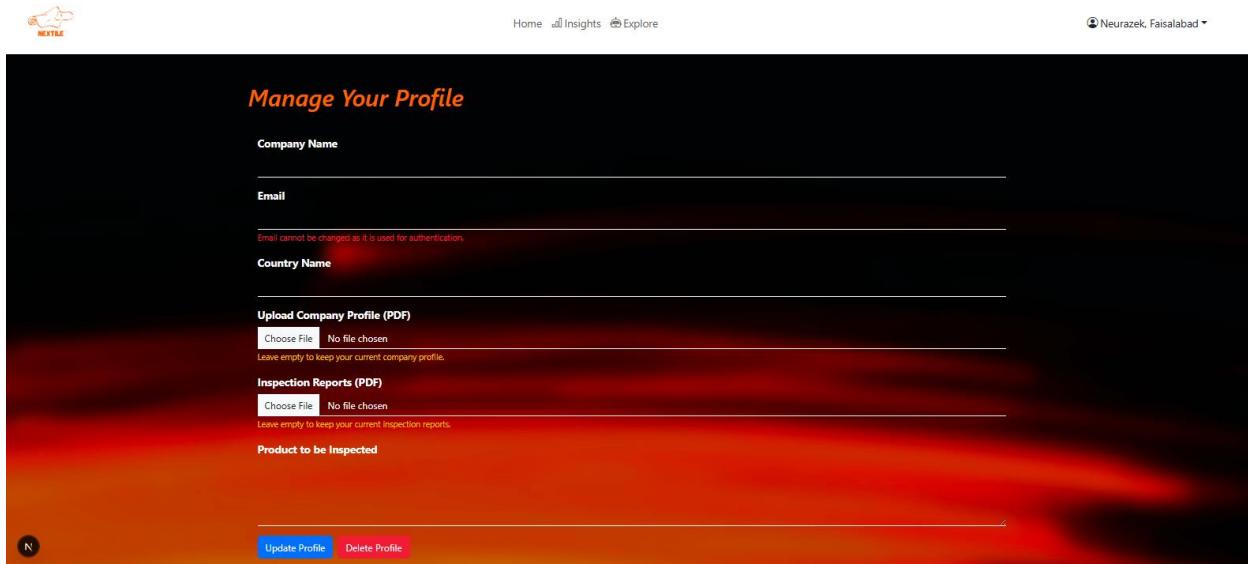


Figure 36 Inspection Team Dashboard

### 8.2.13 Admin Panel

The screenshot shows the Admin Dashboard interface. At the top, there is a navigation bar with links for Home, Insights, Explore, Admin Dashboard, and a dropdown for the Administrator. Below the navigation is a header titled "Admin Dashboard". Underneath the header, there are three tabs: "Buyers (2)", "Suppliers (1)", and "Inspection Teams (1)". The "Buyers (2)" tab is selected. Two user profiles are listed:

- origo business Services**  
Buyer  
**Registration:** ORI-TEX-2025-12345  
**Email:** sales@origo.com  
**Product Required:** Terry towels  
**Category:** whool
- Catto**  
Buyer  
**Registration:** Cat-TEX-2025  
**Email:** faizanjr12@gmail.com  
**Product Required:** Terry towels  
**Category:** whool

Each profile has an orange "Manage" button at the bottom. The footer of the dashboard includes the Nextile logo, a copyright notice ("Nextile - AI Driven Textile Dashboard with Inspection & Market Insights"), and a footer menu with sections for Quick Links, Inquiries, and Core Features. The Quick Links section includes links for AI Insights and Explore. The Inquiries section includes an email address (textiles@nextile.com). The Core Features section lists Marketing, Business Development, and Textile & Artificial Intelligence.

Figure 37 Admin Panel

## 8.2.14 Insights Page

The screenshot displays the Insights Page interface. At the top left is a section titled "Predictive Analytics" featuring a magnifying glass icon and the text: "Do you want predictions on your textile export data? Just upload your CSV, enter your prompt, and get valuable predictions using our AI-powered feature." Below this is a button labeled "Start Predicting". To the right is a large orange call-to-action box with the text "Upload CSV → Enter Prompt → Get Predictions" and three buttons: "CSV", "AI", and "Insights". At the bottom left is a section titled "Exploratory Data Analysis" with a bar chart icon, the text "Instant EDA + AI Insights", and three buttons: "Charts", "AI Analysis", and "Insights". A small circular icon with the letter "N" is positioned to the left of the EDA section.

**Predictive Analytics**

Do you want predictions on your textile export data? Just upload your CSV, enter your prompt, and get valuable predictions using our AI-powered feature.

Start Predicting

Upload CSV → Enter Prompt → Get Predictions

CSV AI Insights

**Exploratory Data Analysis**

Instant EDA + AI Insights

Charts AI Analysis Insights

N

Figure 38 Insights Page

### 8.2.15 AI Search Interface

The screenshot displays the Nextile AI Search Interface. At the top, there is a navigation bar with links for Home, Insights, Explore, Register, and Login. The main header features the text "Discover Leading Textile Buyers, Suppliers & Inspection Experts" and a sub-instruction "Utilize advanced NLP-based search to connect with the best in the textile industry". Below this, a search bar shows the query "2 Textile Suppliers of Garments from Lahore, Pakistan". The search results section is titled "Search Results" and contains two entries:

- Style Textile (Pvt.) Limited**
  - Products & Services: Premium quality knitwear and activewear.
  - Location: 3-KM Off Manga Raiwind Road, Lahore - 54000, Pakistan.
  - Contact: +92-42-35395001
- PK Apparel Pvt. Ltd.**
  - Products & Services: Jeans (Men, Women, Girls), T-shirts (Men), Chino Pants (Men), and other knitted and woven garments.
  - Location: 21-KM Ferozepur road, Lahore, Pakistan (Factory).
  - Contact: (+92) 423 5216095

The footer of the page includes the Nextile logo, a copyright notice ("Nextile - AI Driven Textile Dashboard with Inspection & Market Insights"), quick links for AI Insights and Explore, an inquiries email address ("textiles@nextile.com"), and core features including Marketing, Business Development, and Textile & Artificial Intelligence. A copyright notice at the bottom also states "© Copyright Nextile.com 2025. All Rights Reserved".

Figure 39 AI Search Interface

## 8.2.16 CSV Upload & Analysis

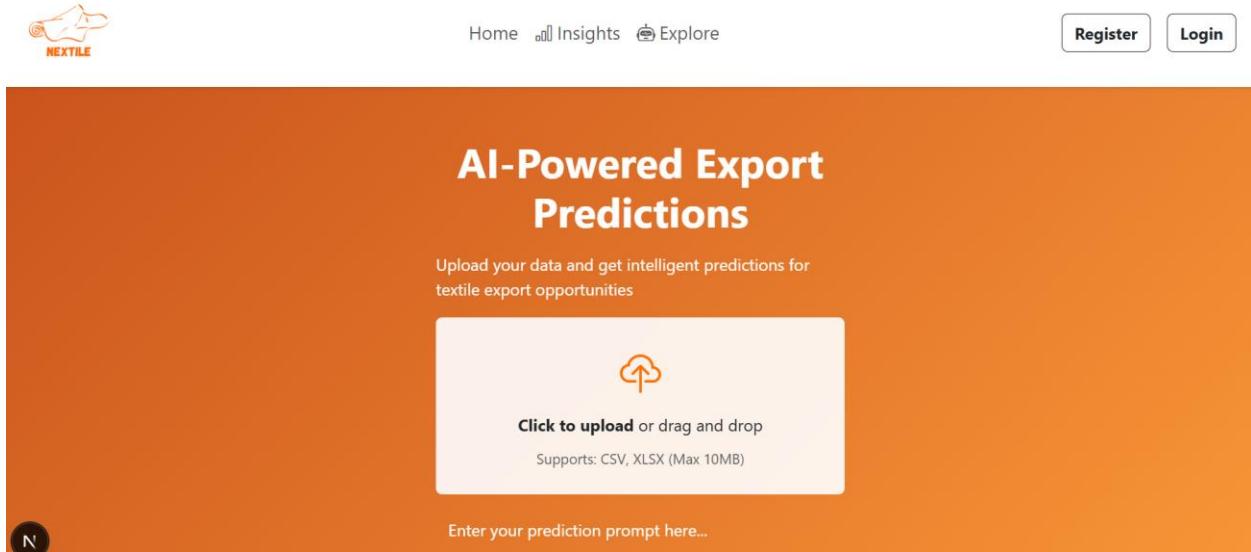


Figure 40 Upload & Analysis

## 8.2.17 CSV Upload & Predictions

The screenshot shows a user interface for AI-powered export predictions. At the top, a large orange header reads "AI-Powered Export Predictions" with the sub-instruction "Upload your data and get intelligent predictions for textile export opportunities". Below this is a file upload area with a cloud icon and the text "SOCKS JUNE-2022.csv". It specifies "Supports: CSV, XLSX (Max 10MB)". A question below asks, "Which importers are predicted to be your top 3 customers in terms of overall quantity purchased next month?". A "Generate Prediction" button is present. The main content area is titled "Prediction Results" and includes sections for "File Processed" (SOCKS JUNE-2022.csv), "Analysis Prompt" ("Which importers are predicted to be your top 3 customers in terms of overall quantity purchased next month?"), and "Prediction Insights". Three insights are listed: "Key Insight 1" (TARGET GLOBAL SOURCING LTD: Based on historical data, TARGET GLOBAL SOURCING LTD is a frequent and high-volume importer.), "Key Insight 2" (H&M HENNES & MAURITZ GBC AB: H&M HENNES & MAURITZ GBC AB consistently imports significant quantities.), and "Key Insight 3" (PRIMARK US CORP: PRIMARK US CORP shows a strong purchase volume.). At the bottom, there are links for "New Prediction", "Export Results", and "Share Analysis".

Figure 41 AI Prediction

## 8.2.18 Inquiry Form

The screenshot shows a modal window titled "Inquiry Form" overlaid on a web page. The modal has a dark background and contains several input fields and sections:

- Email:** A text input field labeled "Enter your email".
- Product / Service Description:** A large text area for describing the product or service required.
- Quantity / Volume Required:** A text input field.
- Lead Time / Delivery Time:** A text input field.
- Payment Terms / Conditions:** A text input field.
- Quality Requirements / Standards:** A text input field.
- Additional Notes / Comments:** A text input field.
- Submit Inquiry:** A button at the bottom right of the form.

At the top left of the modal, there is a user profile section for "Neurazeck, Fail" with fields for Email (neurazeck@gmail.com), Country (Pakistan), Account Type (Inspection Team), and Documents (Company Profile, Inspection Report). Below this is a note about inspecting garments and home textiles, and a "Contact Team" button. At the bottom left of the modal, there is a logo for "Nextile - AI Driven Textile Dashboard" and "Market Insights". The footer of the modal includes a copyright notice: "© Copyright Neurazeck 2023. All Rights Reserved".

Figure 42 Inquiry Form

### 8.2.19 Exploratory Data Analysis (EDA)

EDA (Exploratory Data Analysis) is the process of using statistics and visualizations to understand the characteristics of a dataset before applying any formal modeling or prediction.

The screenshot shows the Nextile EDA Platform dashboard. At the top, there is a navigation bar with the Nextile logo, Home, all Insights, Explore, Register, and Login buttons. The main header is "Nextile EDA Platform" with the subtitle "Professional Data Analysis with AI Insights". Below this is a large orange button with a chart icon and the text "Ready for Professional Analysis?". A sub-section titled "Advanced Analysis Features" lists three categories: "Univariate Analysis" (Histograms, Box Plots, Bar Charts, Pie Charts, Count Plots), "Bivariate Analysis" (Scatter Plots, Heatmaps, Grouped Bar Charts, Bubble Charts), and "Multivariate Analysis" (Treemaps, Network Graphs, 3D Plots, Sankey Diagrams). At the bottom of the dashboard, there are links for AI-Powered Insights, 25+ Chart Types, Business Recommendations, and Quality Assessment.

**Quick Links**

- AI Insights
- Explore

**Inquiries**

[nextiles@nextile.com](mailto:nextiles@nextile.com)

**Core Features**

- Marketing
- Business Development
- Textile & Artificial Intelligence

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Figure 43 EDA Dashboard

## 8.2.20 Executive overview (EDA)

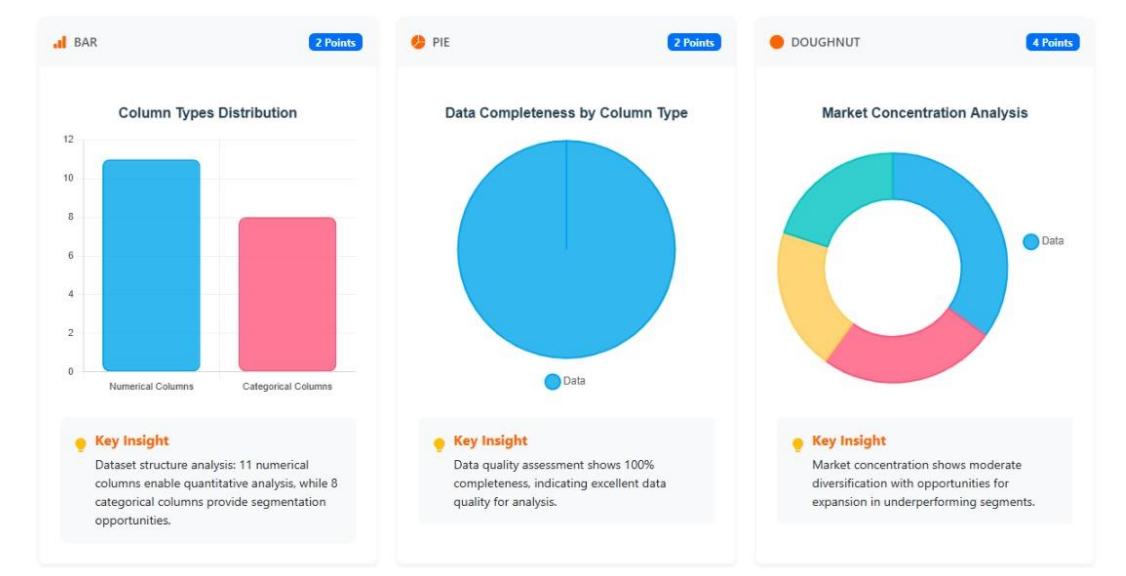


Figure 44 EDA Executive Overview

## 8.2.21 Univariate Analysis (EDA)

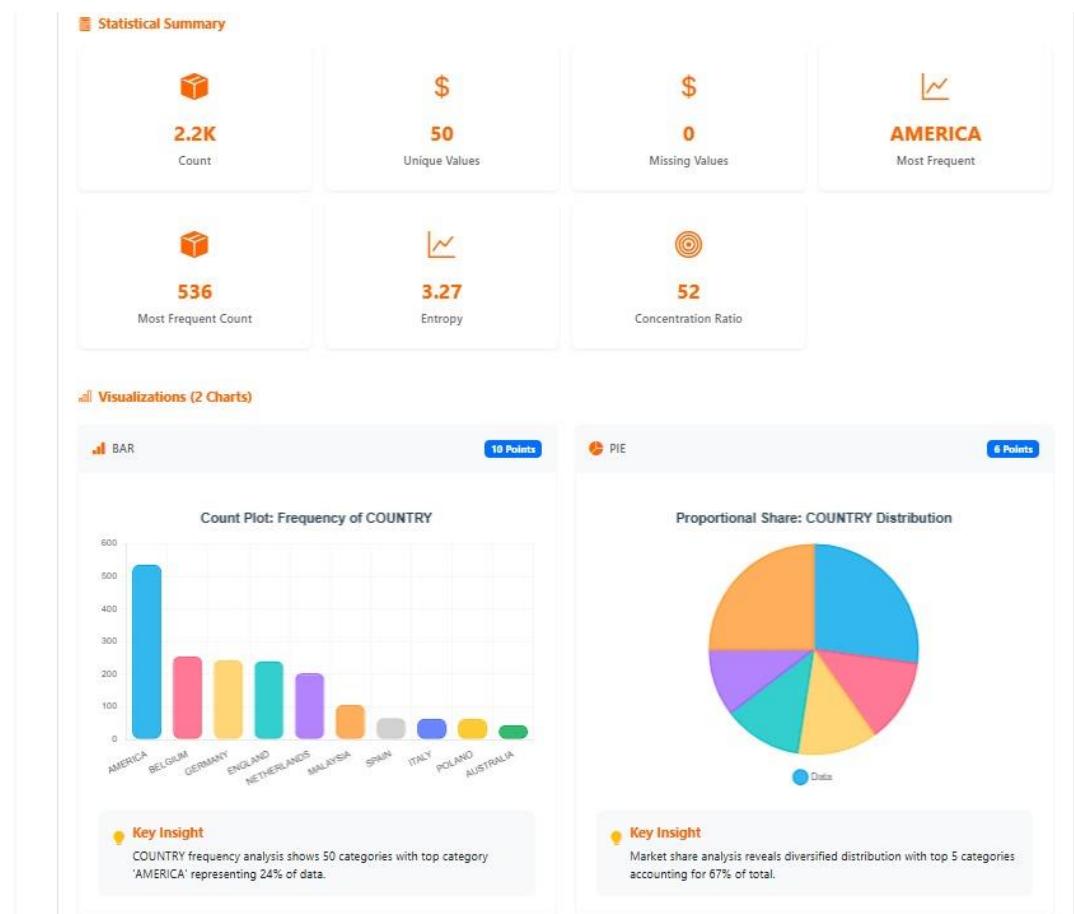


Figure 45 Univariate Analysis EDA

## 8.2.22 Multivariate Analysis (EDA)

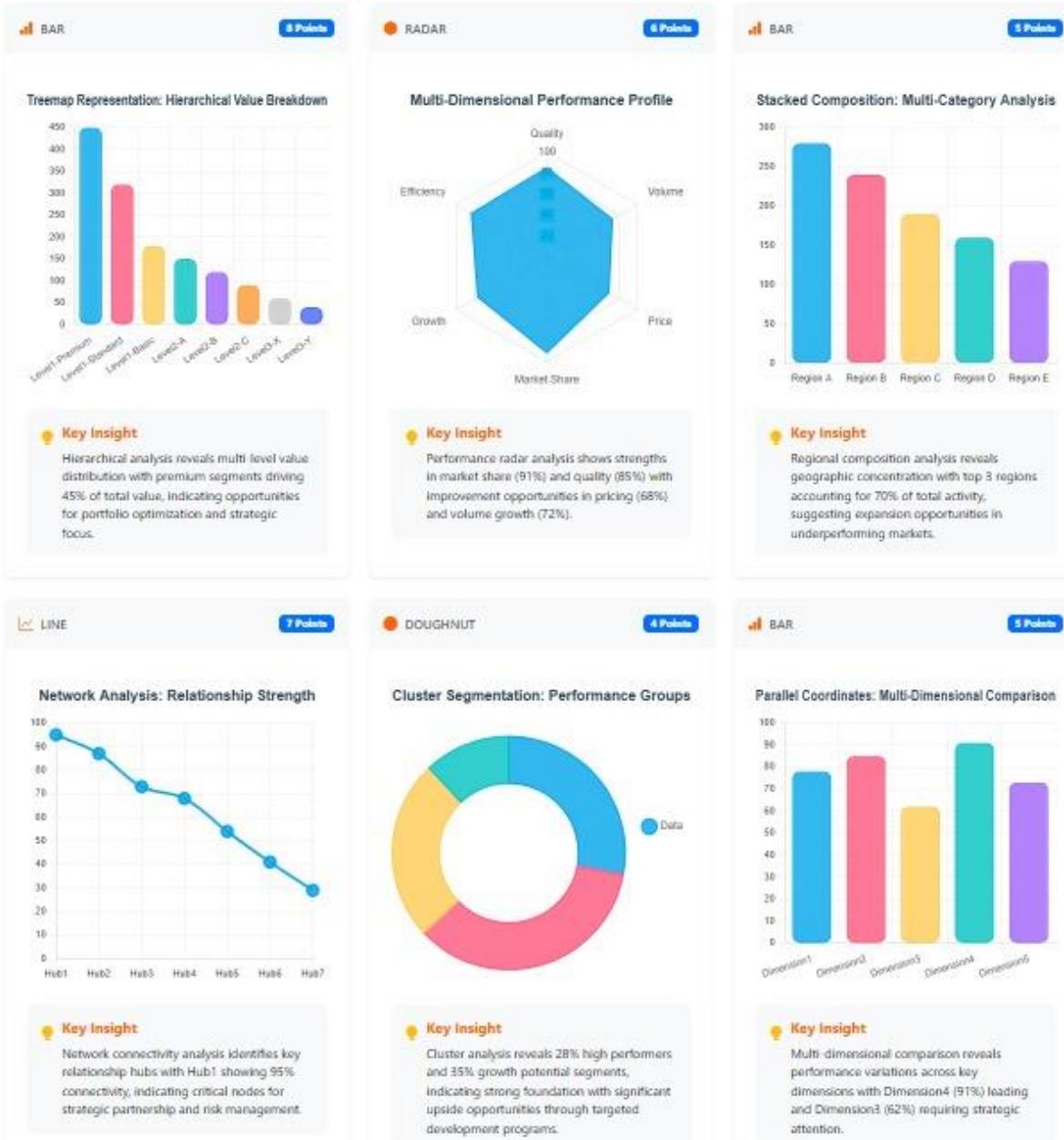


Figure 46 Multivariate Analysis EDA

### 8.2.23 EDA Insights

The screenshot displays a user interface for 'AI Insights' with the following sections:

- Strategic Business Insights & Recommendations**: This section is currently empty.
- High-Impact Opportunities**:
  - Advanced analytics capabilities with 11 quantitative metrics enable predictive modeling
  - Market segmentation potential through 8 categorical dimensions
  - Data-driven decision making supported by comprehensive statistical analysis
  - Performance optimization opportunities identified through multivariate analysis
- Risk Areas & Mitigation Strategies**:
  - Data quality monitoring required for missing value management

Figure 47 EDA Insights

# **Chapter 9**

## **9 User manual**

This User Manual serves as a step-by-step guide to help users navigate and use the Nextile platform efficiently. Whether you are a Buyer, Supplier, Inspection Team, or Admin, this manual explains how to register, log in, update profiles, send inquiries, and use AI-powered features such as search, insights, and export data predictions.

### **9.1 System Access**

#### **9.1.1 Accessing the Platform**

- Open your preferred browser.
- Enter the platform URL in the address bar:  
<https://nextile.vercel.app/> (or your local deployment URL).

### **9.2 User Registration**

#### **9.2.1 Choose Role**

- On the registration page, choose your role by clicking one of the three options:
  - Register as Buyer
  - Register as Supplier
  - Register as Inspection Team

#### **9.2.2 Fill Registration Form**

Each role has a different set of required fields:

#### **9.2.3 For Buyers**

- Company Name
- Company Registration Number
- Email
- Password
- Product Required

- Product Category
- Product Size
- Additional Details

#### **9.2.4 For Suppliers**

- Company Name
- Company Registration Number
- Email
- Password
- Company Profile (PDF)
- Product Catalog (PDF)
- Product Details

#### **9.2.5 For Inspection Teams**

- Company Name
- Email
- Password
- Country Name
- Company Profile (PDF)
- Inspection Reports (PDF)
- Product Details

#### **9.2.6 Submit**

- Click the "Register" button.
- Upon successful registration, your data is saved securely in the database (MongoDB Atlas), and you will be redirected to the login page.

### **9.3 User Login**

- Go to /login
- Enter your Email and Password
- The system will:

1. First check if you're an Admin
  2. Then check regular users (Buyer, Supplier, or Inspection Team)
- After verification, you will be redirected to your dashboard based on your role.

## **9.4 Dashboard Overview**

### **9.4.1 Buyer Dashboard**

- View profiles of Suppliers and Inspection Teams
- Send inquiries through structured forms
- Access AI tools for:
  - Smart Search
  - Export Data Analysis
  - CSV Upload for EDA & Prediction

### **9.4.2 Supplier Dashboard**

- View Buyer profiles
- Manage uploaded product catalogs and company profiles
- Edit profile anytime
- Respond to Buyer inquiries

### **9.4.3 Inspection Team Dashboard**

- Upload inspection reports
- Showcase credibility through company profile
- Connect with buyers for product verification

### **9.4.4 Admin Dashboard**

- Manage all users (Buyers, Suppliers, Inspection Teams)
- Edit or delete user records
- Monitor platform activity

## **9.5 Sending Inquiries**

### **9.5.1 How it Works**

- Go to any user profile you want to inquire about
- Click the "Send Inquiry" button
- Fill the structured inquiry form:
  - Email (your own)
  - Product Description
  - Quantity
  - Lead Time
  - Payment Terms (optional)
  - Quality Requirements (optional)
  - Additional Notes (optional)
- Click Send
- The inquiry is sent to the recipient via Nodemailer through Gmail SMTP.

## **9.6 Using AI Features**

### **9.6.1 Smart Search**

- Go to the AI Search page
- Enter any keyword (e.g., “cotton supplier in Pakistan”)
- Click Search
- AI fetches relevant results from external APIs

### **9.6.2 Export Data Analysis (EDA)**

- Navigate to the EDA page
- Upload your CSV export file
- Click Analyze
- You will receive:
  - Charts and graphs of your export performance

- AI-generated insights and summaries

### **9.6.3 Prediction Tool**

- Go to the Prediction page
- Upload your export data in CSV
- Enter a prompt (e.g., “What is the total quantity of socks predicted to sell next month?”)
- AI will analyze the data and respond with prediction

## **9.7 Profile Management**

- Users can edit their profile from the dashboard
- Update company details, upload new documents, or change product info
- Admin can also edit or delete any user’s profile

## **9.8 Security Measures**

- Passwords are encrypted using bcrypt
- Role-based access control ensures proper authorization
- Sessions are protected via NextAuth and expire after 30 days
- Email communication uses secure SMTP protocols

## **9.9 Logging Out**

- Click on your profile/avatar in the navbar
- Select Logout
- Your session will be securely ended

## **9.10 Troubleshooting**

Issue	Solution
Forgot Password	Currently not available. Please contact admin support.
Unable to send inquiry	Ensure all required fields are filled and internet is stable.
CSV not uploading	Make sure the file is in .csv format and within size limits.
AI features not responding	Check API connection or try again later.
Unauthorized access	You might not be logged in or have the correct role for that page.

*Table 16 Troubleshooting Table*

## **9.11 Contact & Support**

For support or inquiries, email us at:

[textile@nextile.com](mailto:textile@nextile.com)

Or reach out through the contact form on the website.

# **Chapter 10**

## **10 Introduction**

Nextile was designed with a clear goal: to modernize and unify the textile industry's fragmented processes through a smart, AI-powered platform. From the start, the focus has been on addressing the real struggles of textile buyers, suppliers, and inspection teams by providing a centralized digital solution. As the project reaches completion, it reflects innovation, usability, and industry-specific problem-solving in every layer of its design.

### **10.1.1 Modernizing the Textile Business Process**

The traditional textile trading workflow often involves time-consuming partner searches, poor-quality verification methods, and limited communication. Nextile brings a digital transformation to this outdated model by offering a streamlined platform where all stakeholders can interact efficiently. The inclusion of features like role-based access, smart profiles, and automated inquiries simplifies what once was a complex and manual process.

### **10.1.2 AI-Powered Insights for Smarter Decisions**

One of Nextile's standout innovations is its integration of AI-driven tools. Users can now search more intelligently, explore data trends with the help of exploratory data analysis (EDA), and even receive export predictions based on uploaded CSV files. These capabilities enable businesses to make data-informed decisions rather than relying on guesswork, positioning them for strategic growth.

### **10.1.3 Secure and Scalable Architecture**

Built using Next.js, MongoDB, bcrypt, and NextAuth, the platform ensures both security and scalability. Role-specific schema models, password encryption, and session-based authentication offer a secure experience, while cloud-based file management (via Cloudinary) and modular API routes ensure that the system can scale with increasing users and data volumes.

#### **10.1.4 Empowering All User Types**

Nextile is not just a tool for buyers or suppliers; it's an ecosystem designed for the entire supply chain. Buyers can find verified suppliers and inspection teams, suppliers can present their full product catalogs and certifications, and inspection teams can showcase their work and be easily hired—all from a single dashboard. Admins have full control with capabilities to edit or delete users and manage platform data.

#### **10.1.5 Enhancing Global Trade Opportunities**

By offering export analysis, product filtering, and predictive AI tools, Nextile goes beyond just listing companies. It provides businesses with market insights, demand forecasts, and performance evaluations. This increases competitiveness for textile professionals and opens doors to more informed international trade.

### **10.2 Nextile: A Comprehensive Platform for the Textile Industry**

#### **10.2.1 Features That Drive Impact**

From user registration and profile editing to inquiry forms and AI search, Nextile delivers a complete experience. Each feature was tested thoroughly, including black-box testing and Postman-based API testing, to ensure usability and reliability. The platform handles all data flow seamlessly from user login to data storage and communication offering a polished, professional user experience.

#### **10.2.2 Admin Control for Oversight and Security**

An intuitive Admin Panel allows system administrators to manage buyers, suppliers, and inspection teams, ensuring the platform remains clean, compliant, and relevant. Admins can view, update, or remove users and monitor platform activity as needed.

#### **10.2.3 Real-Time Communication via Email Inquiries**

Nextile integrates a Gmail SMTP-based inquiry system, allowing users to send detailed product inquiries to others via email. It supports structured communication with pre-set fields like product

description, quantity, lead time, payment terms, and more—ensuring clarity and speed in decision-making.

### **10.3 Final Reflection**

Nextile represents a bold step forward for the textile industry platform that not only solves immediate challenges but also anticipates future needs with intelligent solutions. From secure role-based access to AI-driven insights, and from responsive design to scalable infrastructure, the system offers everything needed for modern textile trade.

As the textile industry continues to evolve, Nextile stands ready to adapt, improve, and expand. Future enhancements like a mobile application, live chat messaging, multilingual support, and integrated payment systems could further increase its value.

Ultimately, Nextile redefines how textile professionals discover, connect, and grow, offering a smarter, safer, and more productive digital experience.

## **References**

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6. <https://next-auth.js.org/>
7. <https://textilepages.com/>