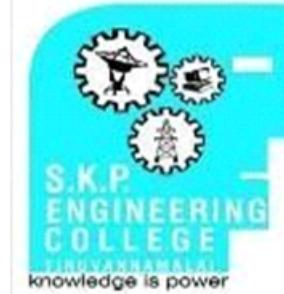




SKP ENGINEERING COLLEGE

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AUTOMATING INVENTORY MANAGEMENT

NMNT ID : NMNTSTD5122016

Team Name : SKP IT Riders

Submitted By

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GUIDE

MS. M.SAMHITHA, M.E.,

Problem Statement

How might we develop a solution for automating inventory management in small warehouses, including real-time stock tracking, automated order fulfilment and minimising human error.

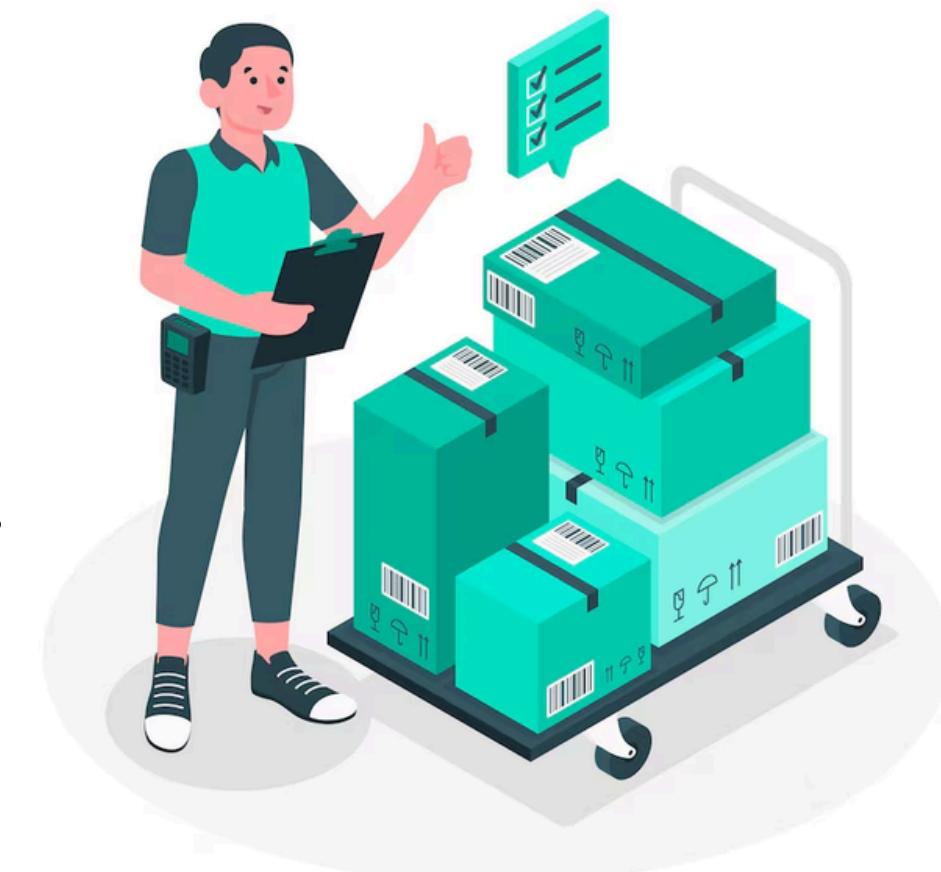


ABSTRACT

The Inventory Management Automation System is designed to simplify warehouse operations by allowing real-time stock tracking, automating order processing and forecasting demand. This system reduces human error, improves efficiency and ensures optimal inventory control through QR code scanning and automated alerts. Built with Django and deployed on Render, it features a user-friendly dashboard for warehouse users and administrators to monitor stock levels, manage orders and analyze reports.

Introduction

- In many small warehouses, inventory is still managed manually.
- This leads to errors, delays, and a lack of real-time data.
- Our project solves this by developing a web-based system.



- It automates tasks like stock tracking, order processing, and alert notifications.
- The website is built with Django and has an easy-to-use dashboard for staff and admin.

PROPOSED SOLUTION

- **Automated Inventory Tracking** – Implementing a QR code-based tracking system to monitor stock levels in real time, reducing the chances of errors and misplaced items.
- **Automated Order Fulfillment** – Streamlining the order process by automatically updating stock, generating invoices and ensuring timely order processing with minimal human intervention.
- **Real-Time Updates & Alerts** – Sending instant updates on low stock, overstocking and pending orders to help warehouse managers take quick action.
- **Demand Forecasting Dashboard** – For analytics to predict stock demand, optimize inventory levels and provide data-driven recommendations for better decision-making.

Literature Review



Research Focus

Many research works discuss inventory automation, but mostly for large-scale industries.



Cost Barriers

Existing solutions are costly and complex for small businesses.



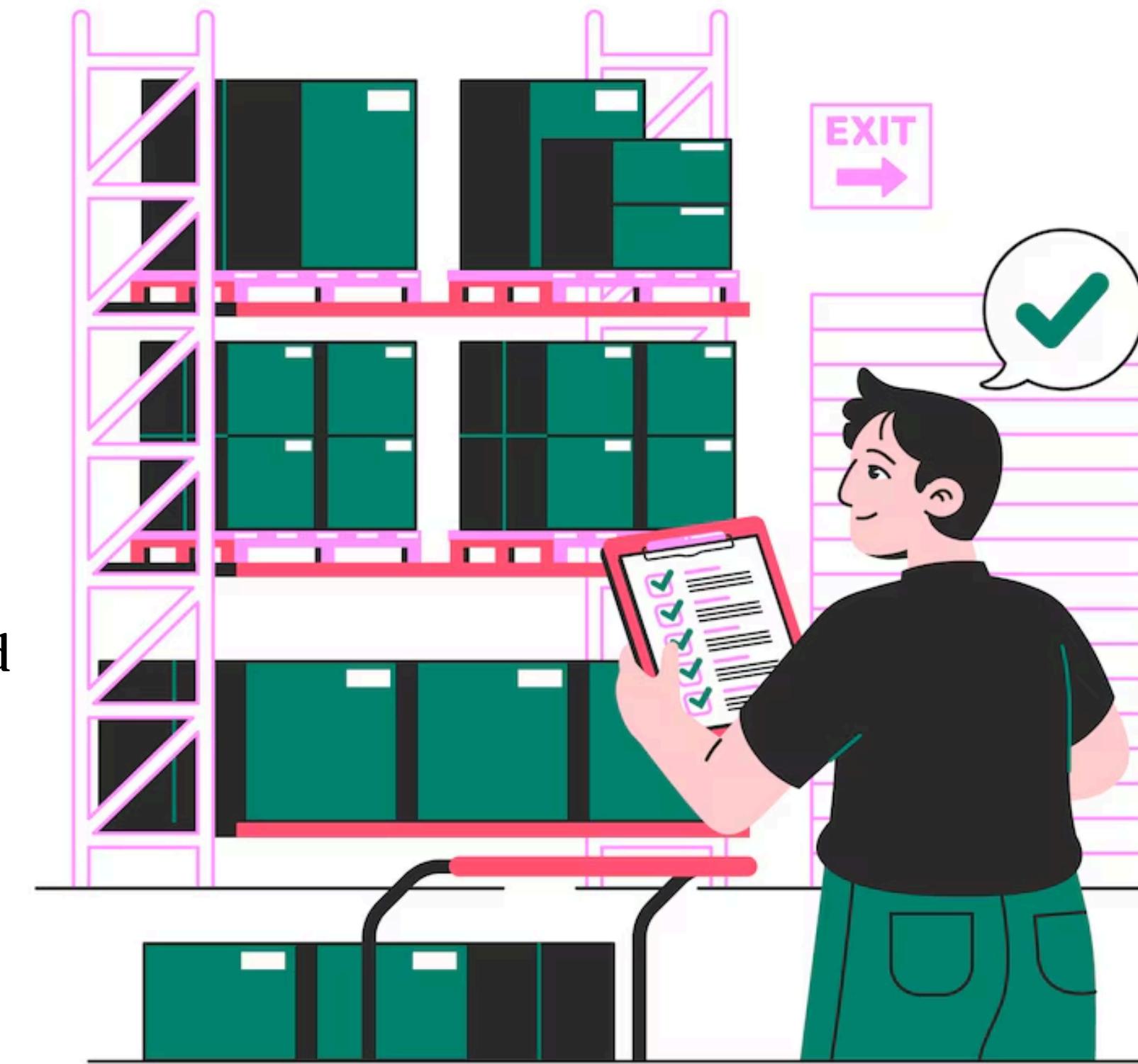
Technology Insights

Studies show that real-time tracking and QR-based systems reduce human errors.

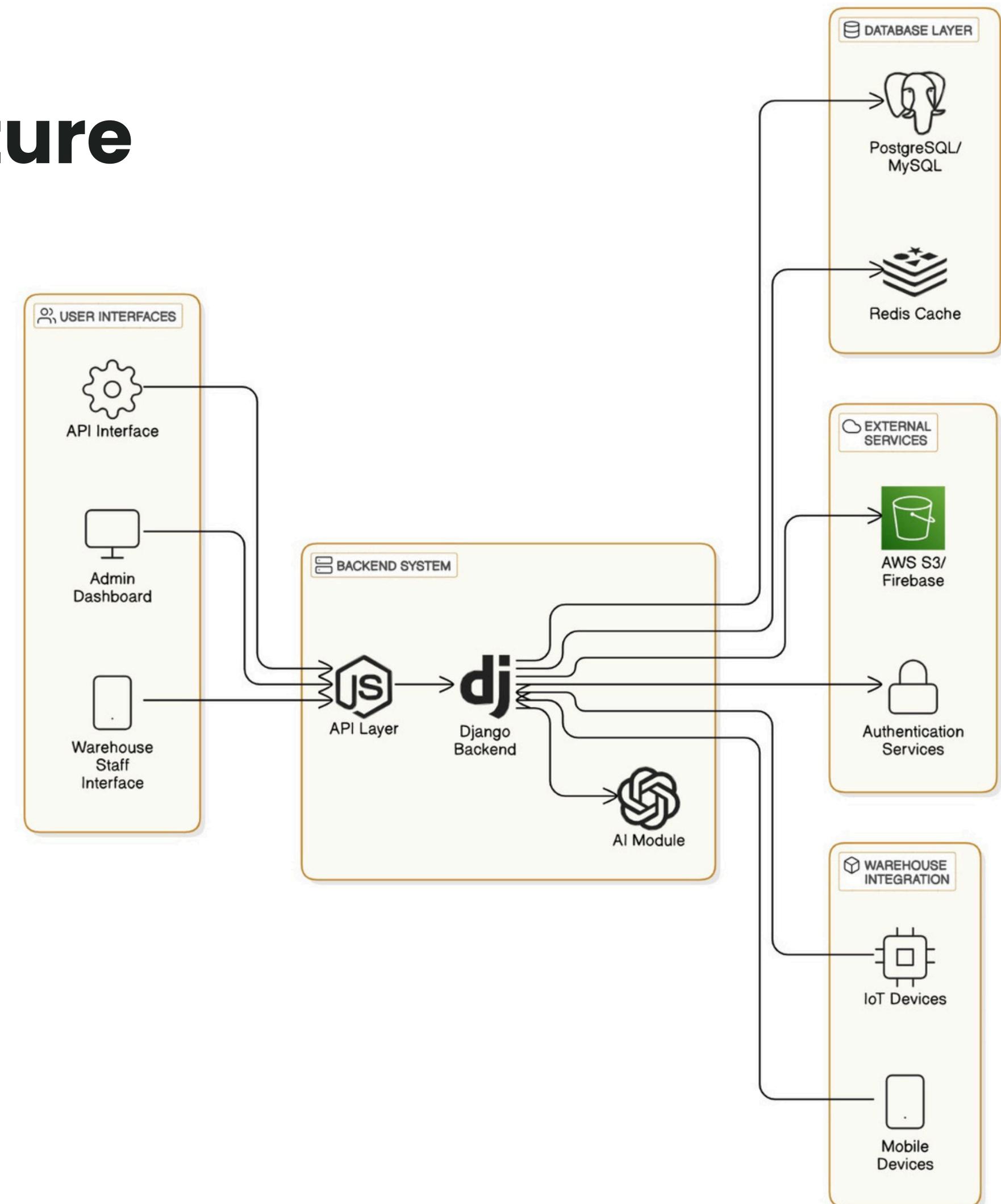


Our Approach

- Our project takes inspiration from existing works and customizes it for small warehouses.
- We focus on combining cost-effective tools (like QR codes and web dashboards) to simplify warehouse tasks.



System Architecture



SOFTWARE REQUIREMENTS

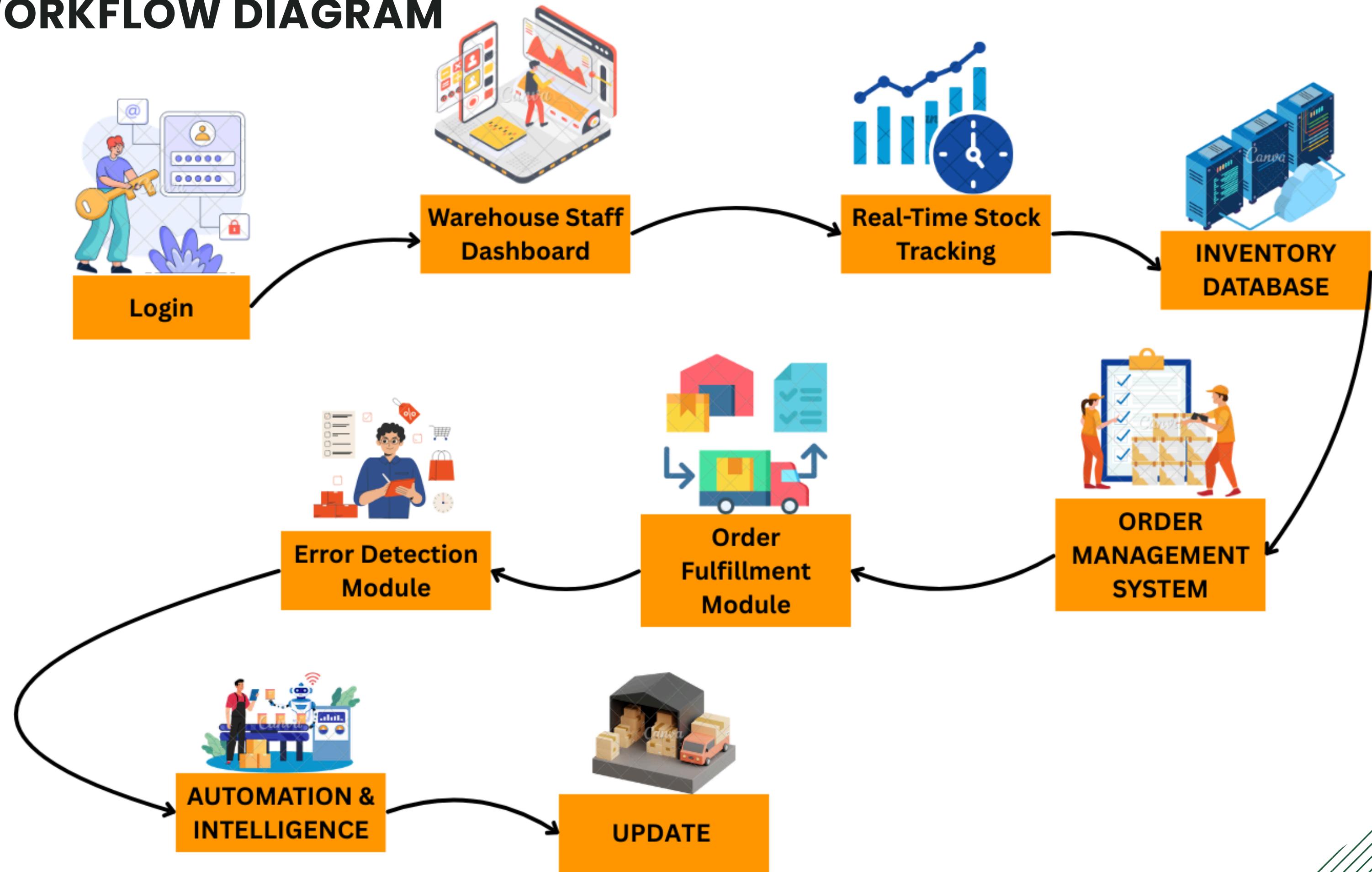
- **Frontend:** HTML, CSS, JavaScript – For creating the user interface.
- **Backend:** Django (Python) – For handling business logic and database operations.
- **Node.js:** API Layer - For send the Data frontend to backend & vice versa.
- **Database:** PostgreSQL – For storing inventory and order data.
- **Demand Analysis Dashboard** – For predictive analytics and inventory optimization.
- **Deployment:** Render – For hosting the application like AWS.
- **Authentication:** JWT\OAuth - For security data sending & role based accessing.

HARDWARE REQUIREMENTS

- **QR Code Scanners** – For scanning product QR codes to track inventory.
- **Server/Cloud Hosting** – To deploy and store the application data.
- **Computers/Tablets** – For warehouse staff to access the inventory management system.

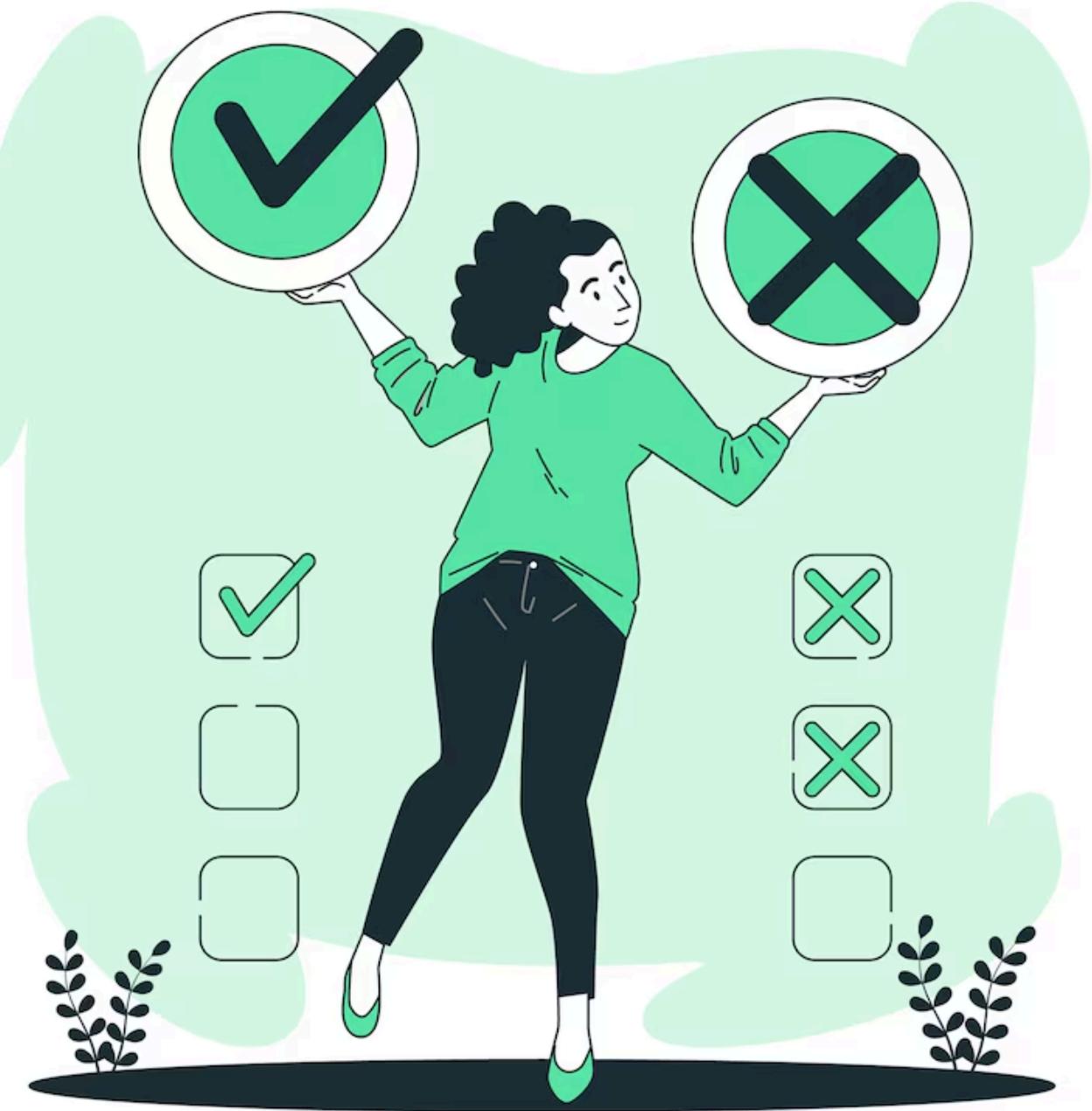


WORKFLOW DIAGRAM



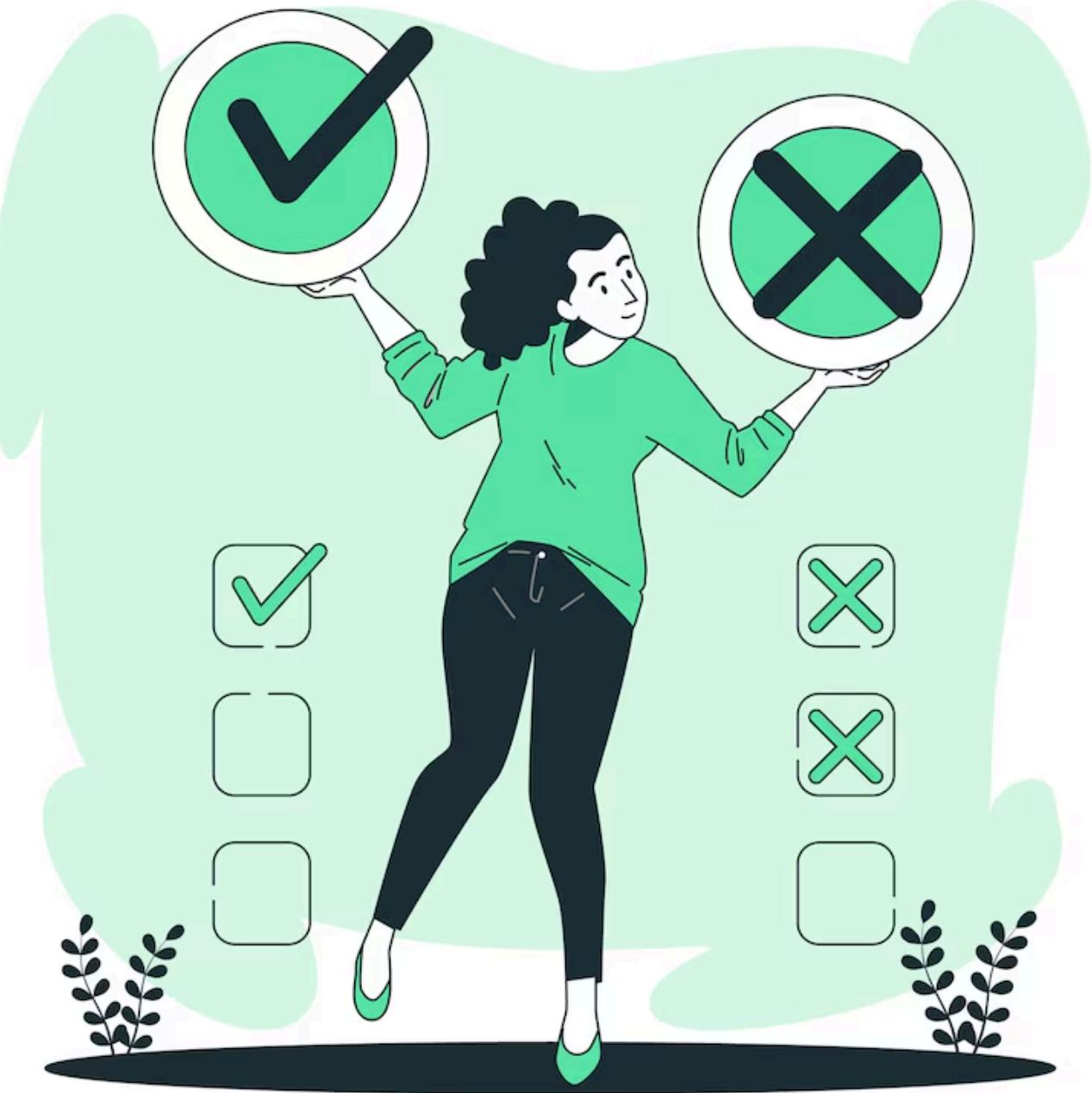
Advantages

- Real-time inventory updates using QR code scanning.
- Reduces human mistakes in stock and order management.
- Speeds up the order fulfillment process.
- Easy to use for both warehouse staff and admin.
- Sends alerts for low stock and pending orders.
- Saves time and improves daily warehouse operations.

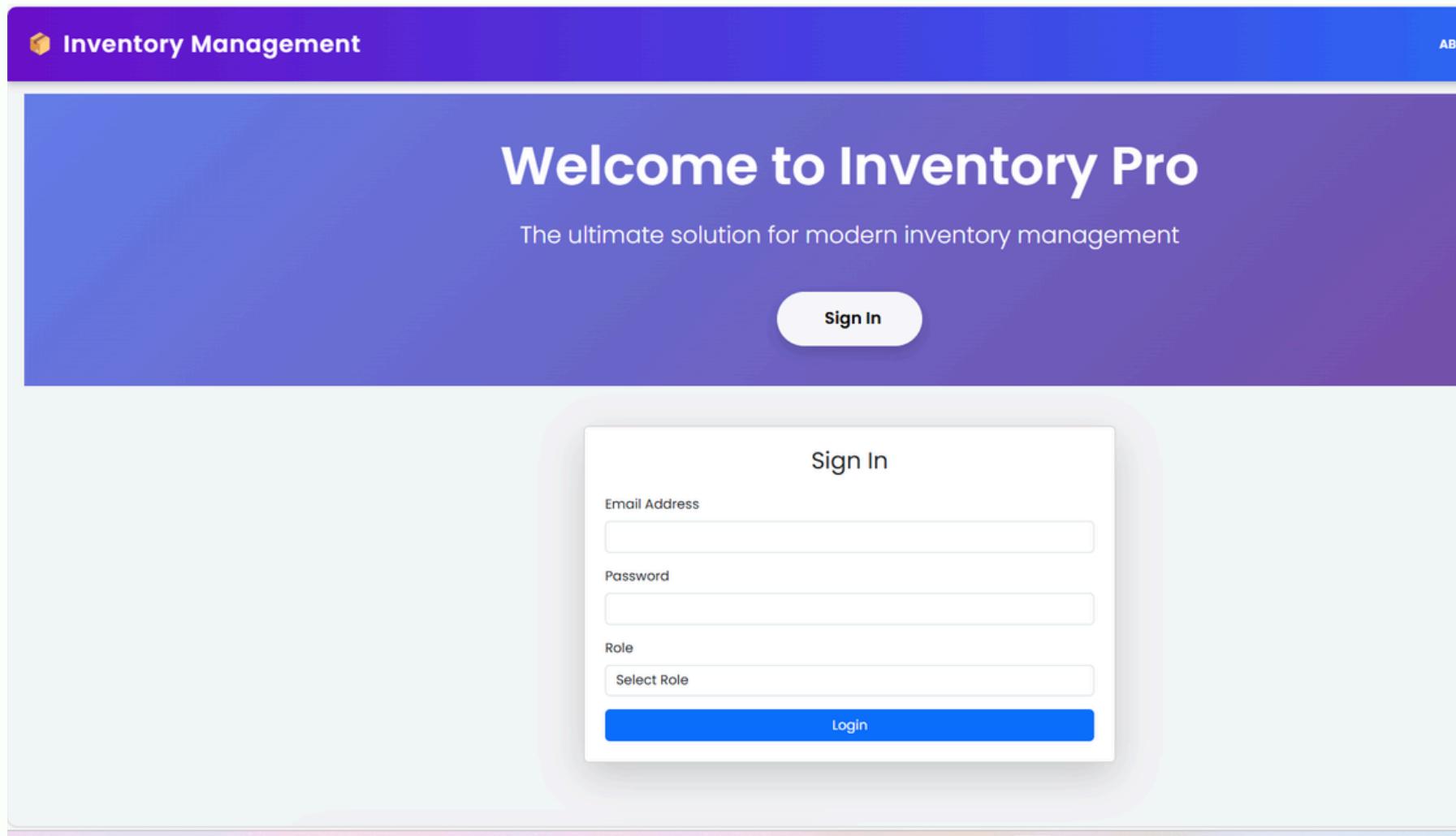


Disadvantages

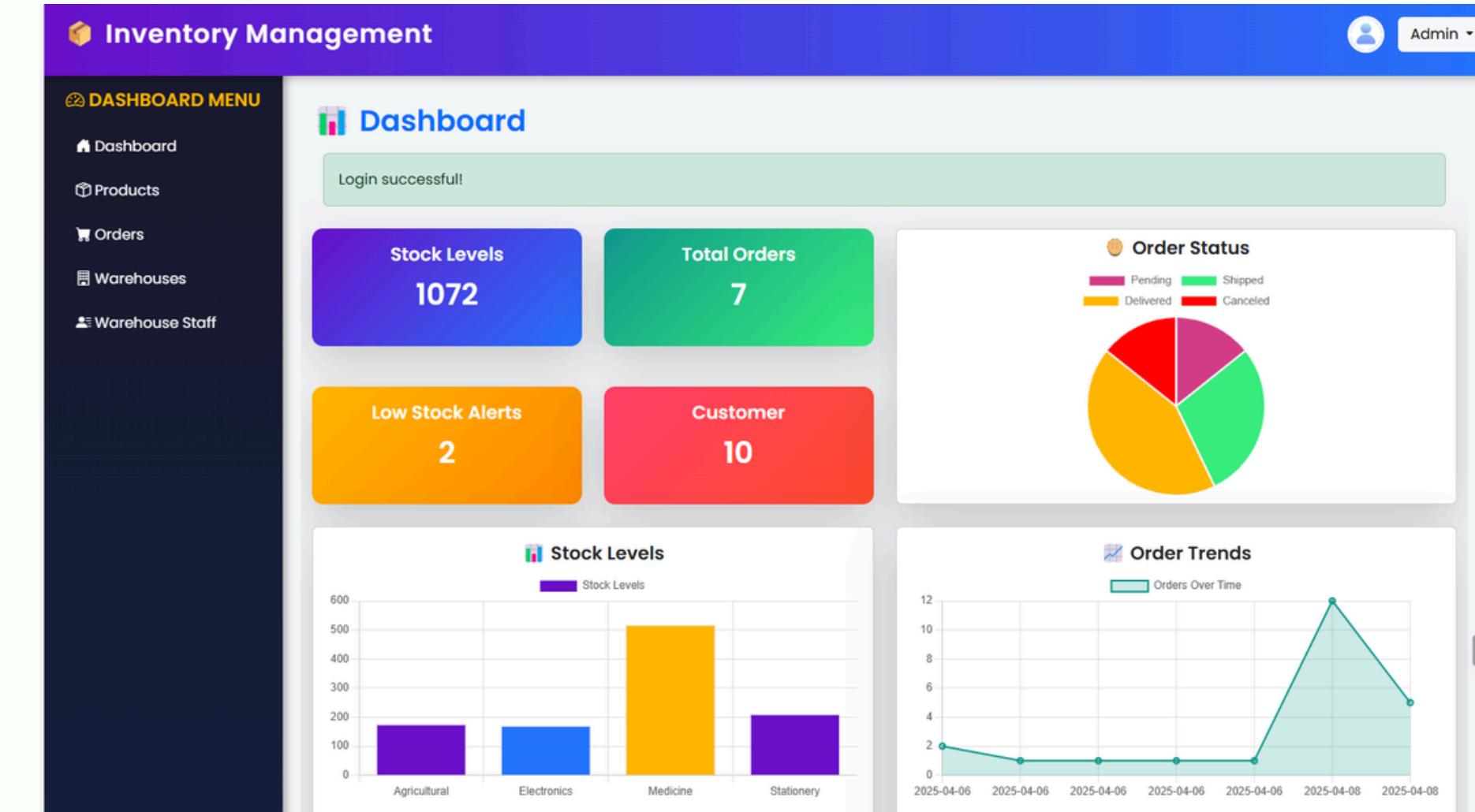
- Needs a device with a camera to scan QR codes.
- Requires internet connection to work properly.
- Users may need basic training to use the system.
- Scanning fails if the QR code is damaged or unclear.



PROTOTYPE OUTPUT SCREENS



The Welcome to Inventory Pro screen features a purple header with the title "Welcome to Inventory Pro" and a subtitle "The ultimate solution for modern inventory management". A "Sign In" button is located in the center. Below the header is a "Sign In" form with fields for Email Address, Password, and Role, followed by a "Login" button.



WAREHOUSE STAFF LOGIN

WAREHOUSE DASHBOARD

PROTOTYPE OUTPUT SCREENS

Inventory Management

DASHBOARD MENU

- Dashboard
- Products
- Orders
- Warehouses
- Warehouse Staff

Product List

Categories: 4 Available Categories: 10

Suppliers: 4 Available Supplier: 5

Low Stock: 2 Total Stock: 1072

Add Product

Product	Category	Stock	Price	Actions
Wireless Mouse	Electronics	Low (5)	₹399.00	<button>Edit</button> <button>Delete</button>
LED Monitor 22 inch	Electronics	30	₹5799.00	<button>Edit</button> <button>Delete</button>
USB Type-C Cable	Electronics	120	₹129.00	<button>Edit</button> <button>Delete</button>
Tractor Tyre	Agricultural	120	₹2899.00	<button>Edit</button> <button>Delete</button>
Sprinkler Set	Agricultural	45	₹499.00	<button>Edit</button> <button>Delete</button>
Electric Water Pump	Agricultural	10	₹4699.00	<button>Edit</button> <button>Delete</button>

PRODUCTS LIST PAGE

Inventory Management

DASHBOARD MENU

- Dashboard
- Products
- Orders
- Warehouses
- Warehouse Staff

Orders

Create Order

Pending Orders: 1

Delivered Orders: 3

Canceled Orders: 1

Shipped Orders: 2

Search orders... Filter by Status Filter by Payment dd-mm-yyyy dd-mm-yyyy Apply Clear

Order ID	Customer	Product	Date	Status	Payment Status	Actions
#7	Ravi Chandran	Wireless Mouse	2025-04-08	Delivered	Paid	<button>View</button>
#6	Divya Shree	A4 Size Notebooks (Pack of 5)	2025-04-08	Delivered	Paid	<button>View</button>
#5	Karthik Raj	Laser Printer	2025-04-06	Shipped	Paid	<button>View</button>
#4	Arun Kumar	Balpoint Pens (Box of 20)	2025-04-06	Shipped	Unpaid	<button>View</button>
#3	Meena R	Wireless Mouse	2025-04-06	Delivered	Paid	<button>View</button>
#2	Meena R	Wireless Mouse	2025-04-06	Canceled	Refund	<button>View</button>

ORDER PAGE

PROTOTYPE OUTPUT SCREENS

Inventory Management

Warehouses

[+ Add Warehouse](#)

Warehouse Name	Location	Category	Description	Action
Thanjavur Warehouse	Thanjavur	Agricultural	Agricultural tools and machinery storage.	Edit Delete
Madurai Agro Depot	Madurai	Agricultural	Backup depot for agro products.	Edit Delete
Chennai Electronics Hub	Chennai	Electronics	Main hub for all electronic items.	Edit Delete
Chennai Health Depot	Chennai	Medicine	Central warehouse for distributing medical kits and hospital essentials across Tamil Nadu.	Edit Delete
Chennai Wholesale Market Depot	Chennai, Tamil Nadu	Grocery		Edit Delete

DASHBOARD MENU

- Dashboard
- Products
- Orders
- Warehouses
- Warehouse Staff

Inventory Management

Warehouse Staff

[+ Add Warehouse Staff](#)

User ID	Name	Email	Mobile Number	Role	Action
#16	Admin	admin@g.co	7639805115	Admin	Edit Delete
#17	Meena R	meenars@gmail.com	9123456780	Manager	Edit Delete
#18	Suresh Babu	sureshbabu@gmail.com	9988776655	Manager	Edit Delete
#19	Priya Lakshmi	priyalakshmi@gmail.com	8899001122	Warehouse Staff	Edit Delete
#20	Karthik Raj	karthikraj@gmail.com	9123987654	Warehouse Staff	Edit Delete
#21	Vijay Kumar	vijaykumar@gmail.com	9845123789	Manager	Edit Delete
#22	Revathi R	revathir@gmail.com	9345671230	Manager	Edit Delete
#23	Saravanan S	saravanans@gmail.com	9087654312	Admin	Edit Delete
#24	Lakshmi Narayanan	lakshminarayanan@gmail.com	9443322110	Warehouse Staff	Edit Delete
#25	Deepa Mahalakshmi	deepamahalakshmi@gmail.com	9500123456	Warehouse Staff	Edit Delete
#26	Rajesh Kannan	rajeshkannan@gmail.com	9367012345	Manager	Edit Delete

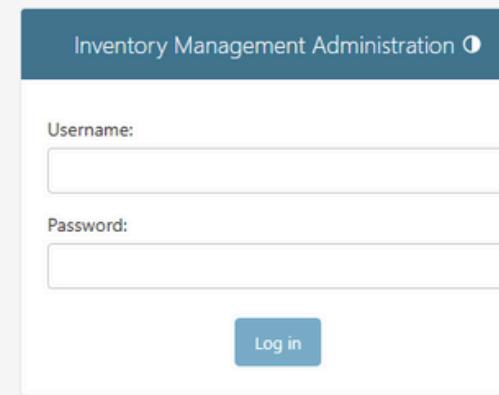
DASHBOARD MENU

- Dashboard
- Products
- Orders
- Warehouses
- Warehouse Staff

WAREHOUSE BRANCHES

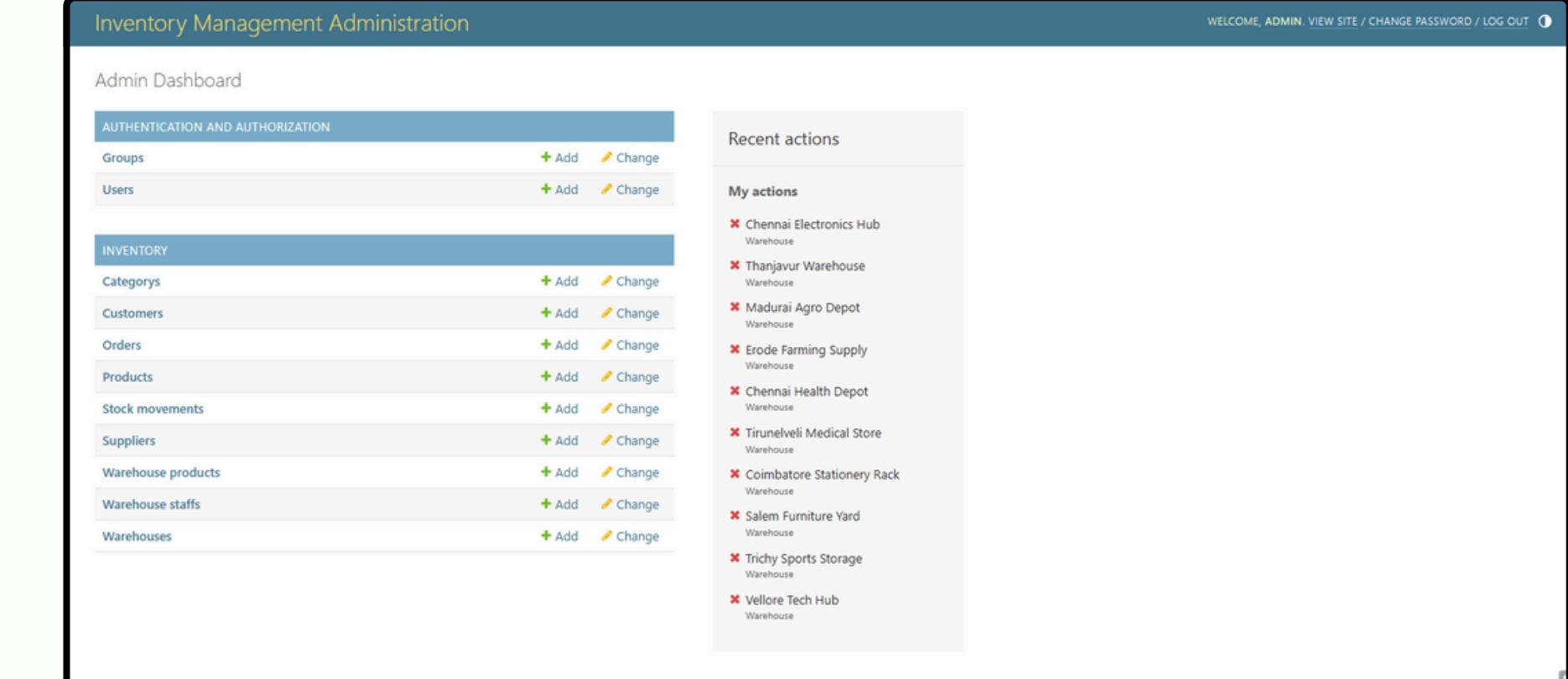
WAREHOUSE STAFF MANAGEMENT

PROTOTYPE OUTPUT SCREENS



The Admin Login screen features a dark blue header bar with the text "Inventory Management Administration" and a help icon. Below the header is a light gray form area containing two input fields: "Username:" and "Password:", each with a placeholder text "Enter your details". At the bottom right of the form is a blue rectangular button labeled "Log in".

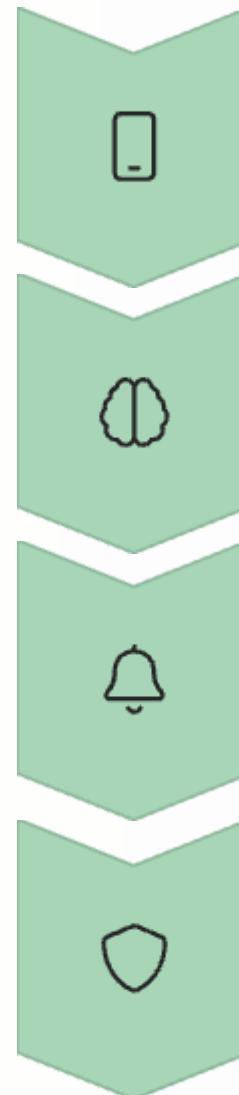
ADMIN LOGIN



The Admin Dashboard screen has a dark blue header bar with the text "WELCOME, ADMIN. VIEW SITE / CHANGE PASSWORD / LOG OUT" and a help icon. Below the header is a light gray main area. On the left, there's a sidebar titled "Admin Dashboard" with sections for "AUTHENTICATION AND AUTHORIZATION" (Groups, Users) and "INVENTORY" (Categories, Customers, Orders, Products, Stock movements, Suppliers, Warehouse products, Warehouse staffs, Warehouses). Each section includes "Add" and "Change" buttons. To the right of the sidebar is a "Recent actions" panel listing recent warehouse creations, such as "Chennai Electronics Hub Warehouse" and "Vellore Tech Hub Warehouse", each preceded by a red "X" icon.

ADMIN DASHBOARD

Future Work



Mobile-Friendly Version

Create a responsive design for smartphones and tablets

AI/ML Integration

Improve demand prediction using artificial intelligence

Advanced Notifications

Send order and stock alerts via SMS or WhatsApp

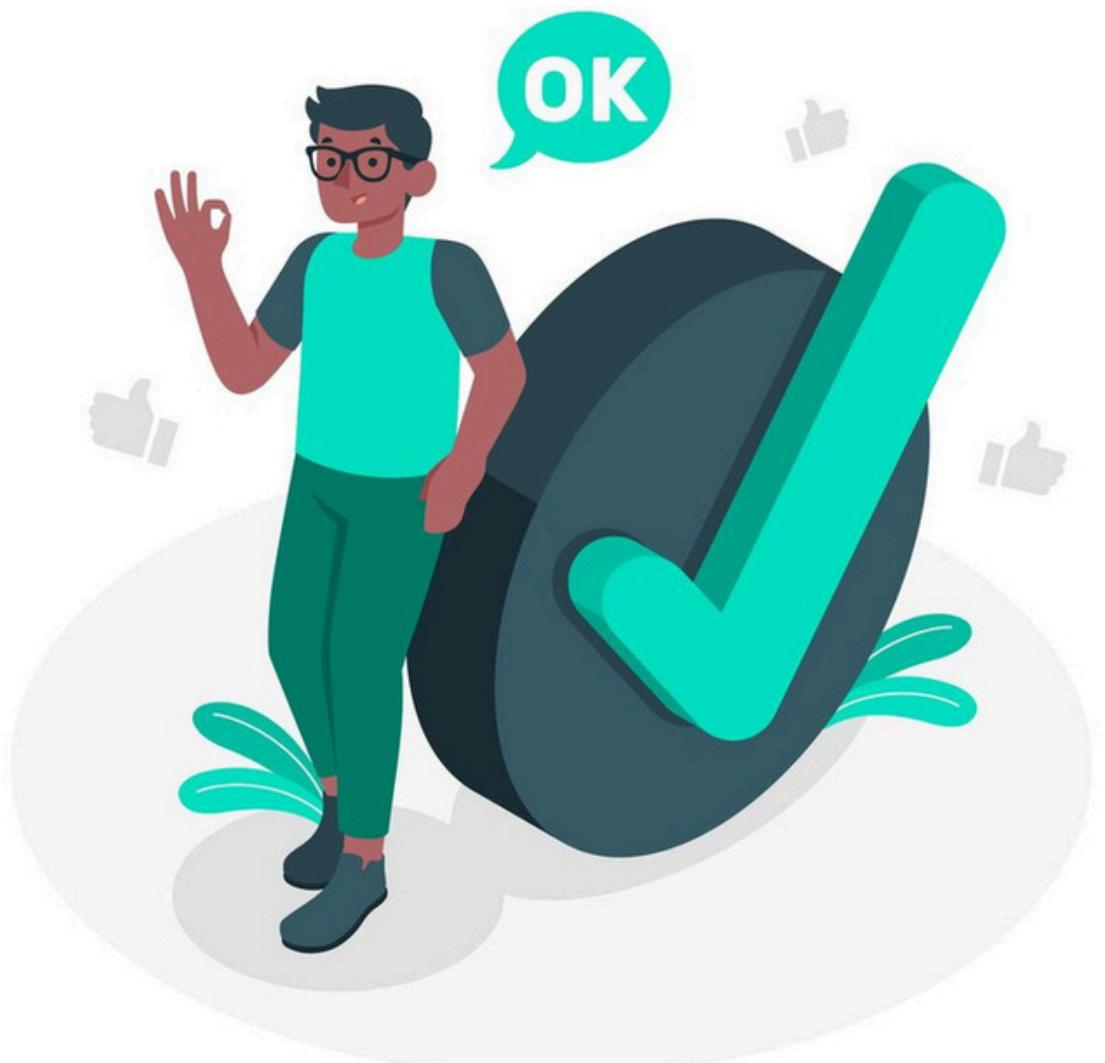
Security Improvements

Add login activity tracking for admin and staff



CONCLUSION

The developed system offers a smart, efficient solution for managing small warehouse operations. It automates inventory tracking using QR codes, streamlines order fulfillment, and delivers real-time stock updates with instant alerts. With integrated demand forecasting, it enhances accuracy, decision-making and operational efficiency while reducing manual workload.



Project Demonstration Automating Inventory Management

