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INVENTRA-INTELLIGENT INVENTORY MANAGEMENT SYSTEM

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PROBLEM STATEMENT (INDUSTRY PERSPECTIVE)

Traditional inventory systems face:

- Inaccurate stock tracking
- Overstocking & understocking
- Manual data entry errors
- No real-time visibility
- Poor demand forecasting
- Supply chain delays

Result: Revenue loss, waste, and operational inefficiency.





INDUSTRY NEED

Modern businesses require:

- **Real-time inventory monitoring**
- **Automated stock alerts**
- **Predictive demand insights**
- **Cloud-based accessibility**

Integration with sales & supply chain systems

Industry Need

What Modern Businesses Require

- Real-time Inventory Monitoring
- Automated Stock Alerts
- Predictive Demand Insights
- Cloud-Based Accessibility
- Integration with Sales & Supply Chain Systems

Used in sectors like:

- Retail
- Warehousing
- Manufacturing
- E-commerce





PROPOSED SOLUTION: INVENTRA

Inventra is a smart inventory platform that:

- **Tracks stock in real time**
- **Predicts shortages using data trends**
- **Reduces manual work**
- **Improves decision-making**
- **Enhances supply chain efficiency**

Goal: Move from reactive inventory → intelligent inventory



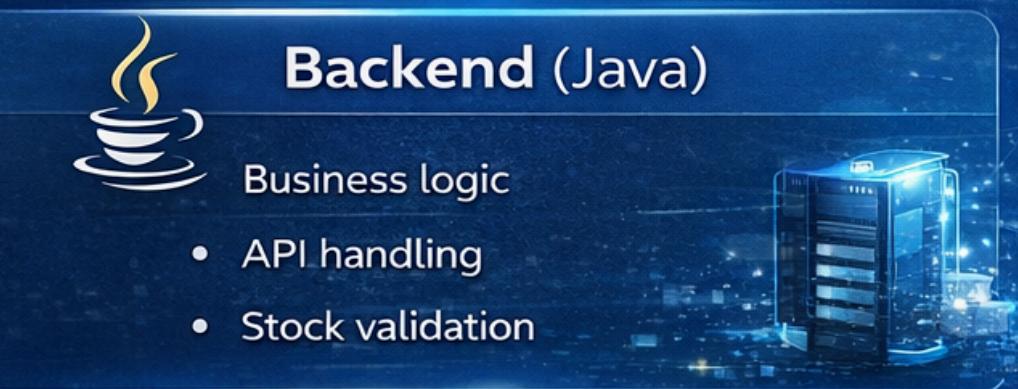
SYSTEM OBJECTIVES

- Automate inventory tracking
- Minimize stock discrepancies
- Provide real-time dashboards
- Enable low-stock and expiry alerts
- Maintain supplier and purchase records
- Improve demand planning



SYSTEM ARCHITECTURE

3-Tier Architecture





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CORE FEATURES





TECHNOLOGY STACK

Layer	Technology
Frontend	React.js
Backend	Java (Spring Boot if used)
Database	MySQL
API	REST APIs
Hosting (Optional)	Cloud / Local Server



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WORKFLOW OF INVENTRA





MODULE 1 – AUTHENTICATION MODULE

1.1 Module Overview

The Authentication Module ensures that only authorized users can access the system. It provides secure login, user role management, and data protection.

1.2 Objectives

- Prevent unauthorized system access
- Protect inventory data
- Provide role-based access control
- Maintain user activity accountability



1.3 Key Features

User Registration & Login

- Secure login using username and password
- Password encryption before storage

Role-Based Access Control (RBAC)

- Admin: Full system control
- Manager: View reports and make decisions
- Staff: Update stock entries

Session Management

- Automatic session timeout
- Secure logout

Data Security

- Encrypted credentials
- Protection against unauthorized access



1.4 Technologies Used

- Java backend authentication logic
- MySQL user database
- Token/session handling for secure access

1.5 Outcome

Ensures data privacy, system security, and controlled access to different inventory operations.



MODULE 1 – AUTHENTICATION MODULE (Pseudocode)

```
START

INPUT username, password

FETCH stored_password FROM Users WHERE username = input_username

IF username exists THEN
    IF hash(input_password) == stored_password THEN
        CREATE user_session
        ASSIGN role (Admin / Manager / Staff)
        DISPLAY dashboard
    ELSE
        DISPLAY "Invalid Password"
    ENDIF
ELSE
    DISPLAY "User Not Found"
ENDIF

END
```



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Inventra

Start Managing Your Inventory Smartly

- Quick & Easy Setup
- Secure Authentication
- Powerful Analytics
- Real-time Updates

Create Account

Join Inventra and streamline your inventory

FULL NAME
Enter your full name

EMAIL ADDRESS
Enter your email

ACCOUNT TYPE
User (View Inventory)
User (View Inventory) **Manager (Manage Stock)**
Manager (Manage Stock)

PASSWORD
Create a strong password

CONFIRM PASSWORD
Re-enter your password

CREATE ACCOUNT →

Already have an account? [Sign In →](#)



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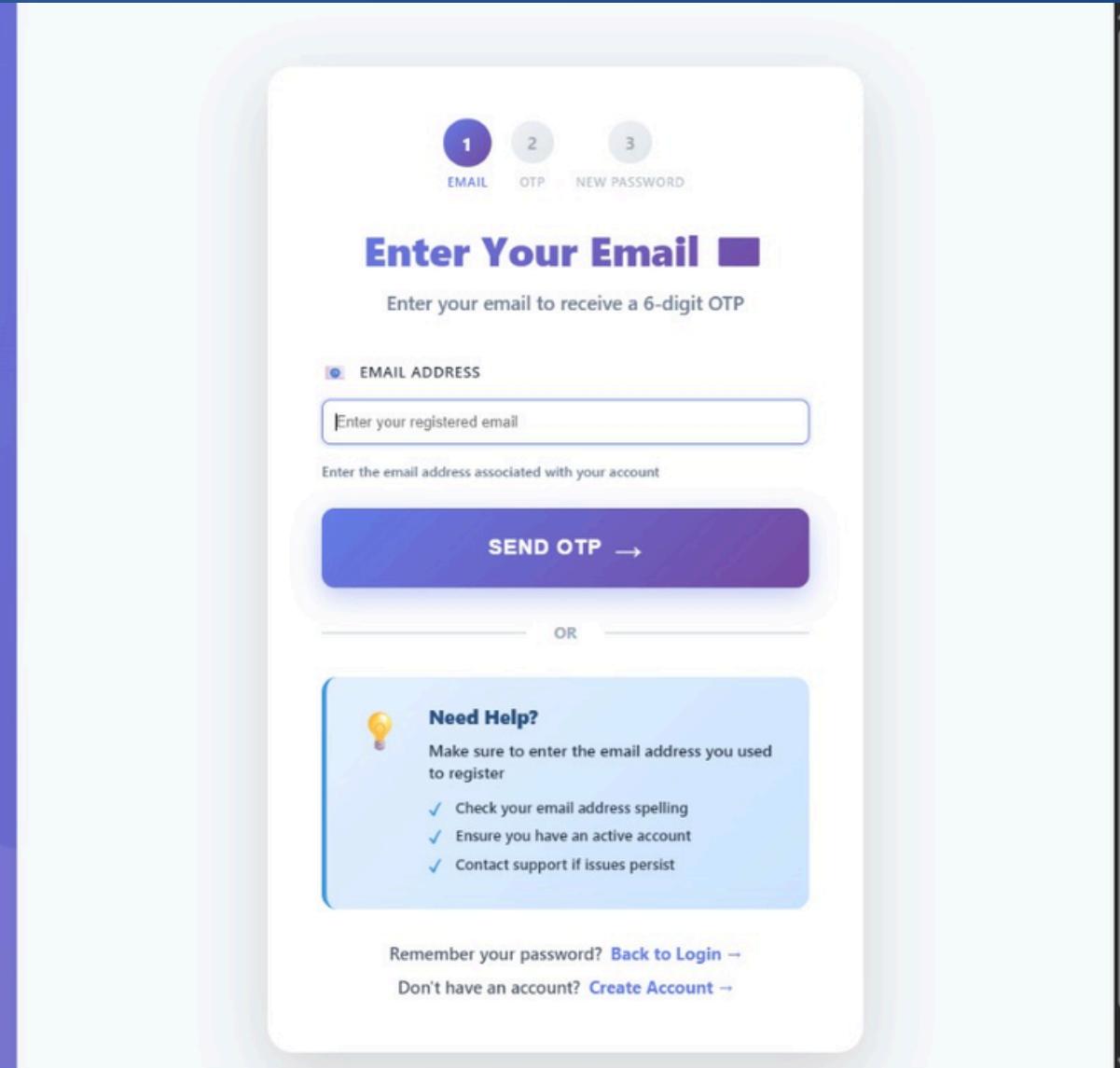
Already have an account? [Sign In →](#)



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The image shows a password recovery interface. At the top center is a yellow padlock icon with a key. Below it is a large white text area containing the title "Password Recovery" and a subtitle "Reset your account password securely with OTP". Below the subtitle are four rounded rectangular buttons with icons and text: "Email OTP Verification" (blue), "Secure 6-Digit Code" (orange), "10-Minute Validity" (red), and "Account Protection" (green).



This image displays a mobile-style user flow for password recovery. It consists of three vertical steps: 1. EMAIL (with a blue circular icon), 2. OTP (with a grey circular icon), and 3. NEW PASSWORD (with a grey circular icon). Step 1 is active. Below the steps is a section titled "Enter Your Email" with a purple header. It contains a placeholder "Enter your email to receive a 6-digit OTP" and a form field labeled "EMAIL ADDRESS" with a placeholder "Enter your registered email". Below the form is a note: "Enter the email address associated with your account". A large purple button labeled "SEND OTP →" is centered below the input field. A horizontal line with the word "OR" separates this from a "Need Help?" section. This section includes a lightbulb icon and a note: "Make sure to enter the email address you used to register". It also lists three troubleshooting tips: "Check your email address spelling", "Ensure you have an active account", and "Contact support if issues persist". At the bottom of the flow are two links: "Remember your password? Back to Login →" and "Don't have an account? Create Account →".



MODULE 2 – PRODUCT DESIGN MODULE

2.1 Module Overview

This module manages all product-related information including creation, categorization, and stock structure.

2.2 Objectives

- Maintain accurate product records
- Organize inventory using categories and batches
- Support easy product updates and tracking



2.3 Key Features

Product Management

- Add new products
- Update product details
- Delete discontinued items

Categorization

- Products grouped by type (electronics, groceries, etc.)
- Easy filtering and searching

Batch Tracking

- Track items by batch number
- Helps monitor expiry or production lot

Stock Structure

- Each product linked with quantity, price, and supplier
- Unique product ID for tracking



2.4 Database Design

Stores:

- Product ID
- Product name
- Category
- Quantity
- Price
- Supplier details

2.5 Outcome

Provides a structured and organized inventory database, improving tracking accuracy.



MODULE 2 – PRODUCT DESIGN MODULE (Pseudocode)

Add Product

```
START  
  
INPUT product_name, category, quantity, price, supplier  
  
GENERATE unique_product_id  
  
INSERT INTO Products  
    (product_id, name, category, quantity, price, supplier)  
  
DISPLAY "Product Added Successfully"  
  
END
```

Update Product

```
START  
  
INPUT product_id  
FETCH product FROM database  
  
IF product exists THEN  
    UPDATE product details  
    SAVE changes  
    DISPLAY "Product Updated"  
ELSE  
    DISPLAY "Product Not Found"  
ENDIF  
  
END
```



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Fashion Admin Dashboard 🎉

Manage your fashion retail business and inventory

TOTAL USERS 0 ✓ 0 approved

FASHION PRODUCTS 11 ✓ 39 variants

STOCK ALERTS 3 ⚠ 0 out of stock

FASHION BRANDS 11 ✓ 9 seasonal items

Fashion Collection 11 Products

Export CSV View Collection Add New Product

PRODUCT NAME	CATEGORY	BRAND	SEASON	VARIANTS	TOTAL STOCK	STATUS	BASE PRICE	ACTIONS
Leather Fashion Belt	BELTS	BeltCraft	ALL SEASON	3 variants	17	IN STOCK	₹1,999	
Designer Sunglasses	SUNGGLASSES	SunStyle	SUMMER	3 variants	18	IN STOCK	₹3,299	
Diamond Necklace	JEWELRY	DiamondLux	ALL SEASON	2 variants	8	IN STOCK	₹15,999	



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Back to Dashboard

Fashion Collection

Discover the latest trends in apparel, footwear, and accessories

Show Filters

Add New Product

A admin Fashion Administrator

Leather Fashion Belt ALL SEASON UNISEX

by BeltCraft

Premium leather belt with designer buckle

Category: Belts

Material: Genuine leather with metal buckle

Available in 3 variants

Medium/Black Large/Black Medium/Brown

STARTING FROM ₹1999 IN STOCK 37 units total

Designer Sunglasses SUMMER UNISEX

by SunStyle

Premium designer sunglasses with UV protection

Category: Sunglasses

Material: Acetate frame with polarized lenses

Available in 3 variants

One Size/Black One Size/Brown One Size/Gold

STARTING FROM IN STOCK

Diamond Necklace ALL SEASON FEMALE

by DiamondLux

Elegant diamond necklace for special occasions

Category: Jewelry

Material: 18k gold with genuine diamonds

Available in 2 variants

One Size/Gold One Size/Silver

STARTING FROM ₹15999 IN STOCK 8 units total

premium t shirts ALL SEASON UNISEX

by zudio

best and casual

Category: Men's Clothing

Material: 100% cotton

Available in 1 variants

M/White

STARTING FROM ₹799 LOW STOCK 1 units total

Fashion Watch ALL SEASON UNISEX

by TimeStyle

Stylish fashion watch with leather strap

Category: Watches

Material: Stainless steel case with leather strap

Available in 3 variants

One Size/Black One Size/Brown One Size/Gold

STARTING FROM ₹2799 LOW STOCK 10 units total



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[← Back to Collection](#)

+ Add Fashion Product

Create new fashion items for your collection

Basic Information

PRODUCT NAME *	BRAND *	CATEGORY *	BASE PRICE (₹) *
e.g., Premium Cotton T-Shirt	e.g., Nike, Adidas, Zara	Men's Clothing	999.00

SEASON TARGET GENDER

All Season Unisex

DESCRIPTION

Describe the product features, style, and benefits...

MATERIAL CARE INSTRUCTIONS

e.g., 100% Cotton, Polyester Blend e.g., Machine wash cold, Tumble dry low

Product Variants (Size & Color)

[+ Add Variant](#)

Variant 1
SIZE COLOR INITIAL STOCK MIN STOCK LEVEL
M Black 0 5
PRICE ADJUSTMENT (₹)
0



MODULE 3 – ALERT MODULE

3.1 Module Overview

The Alert Module continuously monitors stock levels and notifies users when action is required.

3.2 Objectives

- Prevent stock shortages
- Reduce overstocking
- Enable proactive inventory decisions



3.3 Key Features

Low Stock Alerts

- Triggered when quantity falls below a threshold
- Notifies admin or manager

Reorder Reminders

- Suggests restocking before stockout occurs

Threshold Management

- Minimum stock level set for each product
- Customizable by admin

Dashboard Notifications

- Alerts displayed on user dashboard
- Highlight critical inventory items



3.4 Alert Workflow

Stock update → System checks threshold → Alert generated
→ Manager notified

3.5 Outcome

Ensures continuous stock availability and prevents revenue loss due to shortages.



MODULE 3 – ALERT MODULE (Pseudocode)

```
START

FOR each product IN inventory

    FETCH current_quantity
    FETCH minimum_threshold

    IF current_quantity <= minimum_threshold THEN
        CREATE alert_message = "Low stock for " + product_name
        SEND notification to Admin/Manager
    ENDIF

ENDFOR

END
```



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[← Back to Dashboard](#) **Alert Center**
Fashion retail stock alert management system

Stack-Based Alert System (LIFO)
Fashion Retail Implementation: Alerts use Stack data structure (Last-in-First-Out). Duplicate alerts for the same product are prevented using Stack.peek() - only new alerts for different products are pushed. This prevents alert flooding!

ACTIVE ALERTS **8**
Requires attention

LOW STOCK **5**
Below threshold

OUT OF STOCK **3**
Critical priority

RESOLVED **0**
Completed actions

Search by product name or message ALERT TYPE STATUS

STACK POSITION: 1 TOP (PEEK)

premium t shirts
⚠ premium t shirts (M/White) is running low on stock. Current: 100 units, Minimum required: 500 units. Please restock soon.

ALERT ID	PRODUCT ID	ALERT TYPE	STATUS	CREATED
#8	#9	LOW_STOCK	ACTIVE	21 hours ago

[View Details](#) [Resolve Alert](#) [View Fashion Collection](#) [Manage Stock](#)



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User Management

Manage user accounts, permissions, and access control

A admin Administrator

Total Users 5 All accounts

Pending Approval 0 Needs attention

Approved 5 Active accounts

Rejected 0 Denied access

All Users 5 Pending 0 Approved 5 Rejected 0

Search by username or email...

Users List

5 users found

<p>A admin admin@inventra.com</p> <p>Protected Admin Account</p> <p>Registered: Jan 30, 2026</p> <p>X Reject Delete</p>	<p>M manager manager@inventra.com</p> <p>X Reject Delete</p>	<p>S staff staff@inventra.com</p> <p>X Reject Delete</p>	<p>M manager2 manager2@gmail.com</p> <p>X Reject Delete</p>	<p>H hemanth_ravva ravvahemanth@gmail.com</p> <p>X Reject Delete</p>
--	---	---	--	---



MODULE 4 – TRANSACTIONS MODULE

4.1 Module Overview

This module handles all stock movement including purchases, sales, and inventory updates.

4.2 Objectives

- Maintain accurate stock levels
- Record every inventory movement
- Provide complete transaction history



4.3 Key Features

Purchase Entry

- Add stock when new items are received
- Supplier details recorded

Sales Entry

- Reduce stock when items are sold
- Automatically updates quantity

Automatic Stock Update

- Stock adjusted in real time after each transaction

Transaction History

- Records date, product, quantity, and type (in/out)
- Useful for auditing and reporting



4.4 Database Records

Stores:

- Transaction ID
- Product ID
- Quantity
- Type (Purchase/Sale)
- Date and time

4.5 Outcome

Provides complete visibility of stock movement
and ensures inventory accuracy.

Final Flow Between Modules

Authentication → Product Management → Transactions → Alerts → Manager Decision



MODULE 4 – TRANSACTIONS MODULE (Pseudocode)

Purchase Transaction

```
START  
  
INPUT product_id, purchase_quantity  
  
FETCH current_stock FROM Products  
  
new_stock = current_stock + purchase_quantity  
  
UPDATE Products SET quantity = new_stock  
  
INSERT INTO Transactions (product_id, quantity, type="PURCHASE", date)  
  
DISPLAY "Stock Updated"  
  
END
```

Sales Transaction

```
START  
  
INPUT product_id, sales_quantity  
  
FETCH current_stock FROM Products  
  
IF current_stock >= sales_quantity THEN  
    new_stock = current_stock - sales_quantity  
    UPDATE Products SET quantity = new_stock  
  
    INSERT INTO Transactions (product_id, quantity, type="SALE", date)  
  
    DISPLAY "Sale Recorded"  
  
ELSE  
    DISPLAY "Insufficient Stock"  
ENDIF  
  
END
```



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Transaction History

Complete audit trail of all fashion retail operations

TOTAL TRANSACTIONS **49** All time records

TODAY **0** Recent activity

THIS WEEK **49** Last 7 days

FILTERED RESULTS **49** Current view

FROM DATE TO DATE

ACTION TYPE USER FILTER

STOCK IN 22 hours ago

Kids Cartoon T-Shirt
New shipment - Kids Cartoon T-Shirt

USER: admin | QUANTITY: 15 units | TRANSACTION ID: #1



USE CASE SCENARIOS

- Retail store stock monitoring
- Warehouse material tracking
- Hospital inventory (medicines/equipment)
- E-commerce backend systems



BENEFITS TO INDUSTRY

Reduced stock wastage

- Lower operational cost
- Faster restocking
- Better demand forecasting
- Improved customer satisfaction



CHALLENGES ADDRESSED

Industry Challenge	How Inventra Solves It
Overstocking	Demand tracking
Stockouts	Low-stock alerts
Manual errors	Automated logging
Delayed decisions	Real-time dashboard



COMPARISON WITH TRADITIONAL SYSTEMS

Feature	Traditional	Inventra
Stock Updates	Manual	Automated
Visibility	Limited	Real-time
Alerts	None	Smart Alerts
Decision Making	Experience-based	Data-driven
Scalability	Low	High



LITERATURE REVIEW

Traditional Inventory Models

Early systems used EOQ (Economic Order Quantity) and manual logs.

Limitations:

- No real-time tracking
- No automation
- Human error prone

ERP-Based Inventory Systems

Enterprise platforms like SAP ERP and Oracle NetSuite introduced:

Centralized inventory
Database-driven tracking
Supply chain integration

However:

- Expensive
- Complex for small businesses
- Requires heavy infrastructure

Research Gap Identified

Most existing solutions are:

- Too costly for small/medium businesses
- Hardware-dependent (IoT/RFID heavy)
- Not user-friendly

Inventra fills the gap by providing:

- Software-based smart tracking
- Affordable implementation
- Real-time monitoring without expensive hardware



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INNOVATION OF INVENTRA

Combines:

- Real-time database tracking
- Intelligent stock alerts
- Trend-based insights

Bridges gap between basic inventory software

and complex ERP systems



CONCLUSION

Inventra transforms inventory management from manual tracking to intelligent monitoring, helping businesses:

- **Increase efficiency**
- **Reduce losses**
- **Make faster decisions**



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THANK YOU