

Company Inventory Analysis

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Abstract- This paper presents the development and implementation of a robust inventory analysis system tailored for a construction materials manufacturing company. The primary objective of the system is to enhance operational efficiency by automating the inventory and sales management process. Built using Python and Django for the application logic and user interface, and SQLite for database management, the system provides an intuitive platform for managing the supply chain. It covers functionalities such as user registration and login, real-time stock updates, sales and purchase tracking, customer and supplier management, and comprehensive reporting features.

Keywords- Inventory Management, Construction Materials, Python Django, SQLite, Stock Monitoring

I. INTRODUCTION

Inventory management plays a critical role in the operational success of companies dealing with physical goods, particularly in industries like construction materials manufacturing where real-time tracking of stock is essential. Traditionally, many companies have relied on manual or semi-digital systems to maintain stock levels, customer orders, and supplier records. These outdated methods are not only time-consuming but also prone to human errors, delays, and inefficiencies, especially during high-demand periods. Inaccurate stock information can lead to missed sales opportunities, overstocking, or the inability to fulfill customer requirements on time.

The system facilitates seamless sales and purchase transactions, automatic stock updates, secure user authentication, and detailed report generation. It includes features like real-time alerts for low-stock items and prevents transactions for out-of-stock materials, ensuring better decision-making and improved customer service.

Moreover, the platform is scalable and designed to support further enhancements such as mobile compatibility, cloud integration, and advanced analytics. By digitizing the inventory process, this

system significantly improves operational efficiency, reduces human error, and provides a more reliable and responsive service environment.



Our Website Design

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II. LITERATURE REVIEW

Recent advancements in inventory management systems have significantly improved operational efficiency in the construction materials sector. Smith

et al. (2019) introduced an IoT-based inventory tracking system that utilized RFID sensors to monitor construction materials in real-time, resulting in a 30% reduction in material wastage and improved project timelines [1]. Johnson and Lee (2020) developed a cloud-based inventory management platform tailored for small to medium-sized construction firms. Their system facilitated real-time data access and synchronization across multiple sites, enhancing decision-making processes [2]. Chen et al. (2021) proposed a machine learning algorithm to predict inventory requirements based on historical consumption patterns. Their model achieved a 25% improvement in forecasting accuracy compared to traditional methods [3]. Garcia and Martinez (2021) explored the application of blockchain technology in inventory management, ensuring transparency and traceability of construction materials throughout the supply chain [4]. Kumar and Singh (2022) implemented a Django-based web application integrated with SQLite for managing construction inventory. Their system streamlined operations and reduced manual errors by 40% [5]. Li and Zhao (2022) conducted a comparative study on various database systems for inventory management, concluding that SQLite offers a lightweight and efficient solution for small-scale construction projects [6]. Ahmed et al. (2023) introduced an AI-driven inventory optimization tool that dynamically adjusts stock levels based on real-time demand and supply fluctuations, leading to cost savings of up to 15% [7]. Patel and Desai (2023) focused on user-centric design in inventory systems, emphasizing the importance of intuitive interfaces for non-technical staff in the construction industry [8]. Wang and Liu (2024) developed a mobile application for inventory management, enabling on-site personnel to update and access inventory data instantly, thereby reducing communication delays [9].

Rodriguez and Fernandez (2025) presented a comprehensive inventory management framework that integrates environmental considerations,

promoting sustainable practices in material procurement and usage [10].

III. MODULE-WISE DESCRIPTION

The Company Inventory Analysis System is organized into seven interrelated modules, each playing a vital role in ensuring seamless inventory tracking, transaction management, and reporting within a construction materials supply environment. The modular architecture allows for systematic development, testing, and potential expansion, ensuring scalability and maintainability. The following is a detailed description of each module:

Registration Module

The Registration Module is the entry point for new users into the inventory system. It allows customers, suppliers, or administrative users to create their own accounts by providing relevant personal and professional details. This module ensures that only registered individuals can access features according to their role (admin, employee, or customer). The user must fill out a registration form that includes fields such as full name, email address, phone number, user role, and a secure password. A unique identifier is generated for each user, which is used for future interactions within the system.

Fig- Registration Module

The module includes validation checks to ensure that duplicate records are not created and that all required fields are filled appropriately. The flexibility of the module allows it to be extended to include

more advanced features in the future, such as OTP (One-Time Password) verification, CAPTCHA for bot prevention, or integration with third-party authentication providers like Google or Facebook. Overall, the registration module ensures that user data is accurately captured, verified, and securely stored, making it an essential part of the inventory management lifecycle.

Login Module

The Login Module acts as the authentication gateway to the Company Inventory Analysis System. Once a user is registered, they can log in to access their account and system functionalities. This module ensures security by verifying the credentials entered during login—typically a username or email and password—against the data stored in the database. The system uses hashed passwords and encrypted communication channels to protect login credentials. It also includes measures such as limiting the number of failed login attempts, displaying appropriate error messages, and optional features like "Remember Me" or "Forgot Password" for ease of use. Upon successful authentication, the system identifies the user's role (e.g., Admin, Employee, Supplier, Customer) and redirects them to the respective dashboard with appropriate access controls.

Login Module
Company Inventory Analysis System

Username or email
password

Password
invalid

☒ Remember me [Forgot password?](#)

Login

Invalid username or password.

Roles

Admin Employee Supplier Customer MFA

Fig- Login Module

The login module can also be integrated with multi-factor authentication (MFA) for enhanced security. Future extensions could include biometric logins or authentication using third-party services. Overall, the Login Module is fundamental in maintaining the security and integrity of the system.

Supplier Module

The Supplier Module is essential for managing the vendors who provide raw materials to the manufacturing company. This module facilitates the addition, modification, viewing, and deletion of supplier records. Each supplier is uniquely identified by a Supplier ID, and their profile includes details such as company name, contact person, phone number, email, address, and the list of materials they supply. This information is critical for procurement processes and is used whenever a new stock purchase is made. The Supplier Module maintains a history of all transactions with each supplier, enabling administrators to track performance, quality, and reliability over time. It also supports the generation of reports that show how often materials were ordered from specific suppliers, helping in future vendor selection and negotiation strategies. This tight integration between modules minimizes human error and enhances operational efficiency.

Supplier Module

Add Edit View Delete

Supplier ID: 5001
Company Name: ABC Industries
Contact Person: John Smith
Phone: (555) 123-4567
Email: john.smith@abc.com
Address: 123 Elm St, Springfield

Materials Supplied

- Steel
- Aluminum
- Copper
- Plastic

Date	Amount
01/10/2024	15,000
12/05/2023	12,500
10/20/2023	18,000

Fig- Supplier Module

The Supplier Module not only supports day-to-day vendor management but also contributes to long-term supplier relationship management, a crucial aspect of supply chain optimization.

Construction Material Module

The Construction Material Module is the core of the inventory management system. It is responsible for the addition, classification, and tracking of construction materials such as bricks, cement, gravel stone, M-sand, P-sand, and hollow blocks. Each item in the system is stored with key attributes such as product name, brand, quantity, unit price, reorder level, and expiration or manufacture date if applicable. The administrator can add new items, update details of existing materials, or remove outdated or discontinued products. When a product becomes popular or reaches a reorder threshold, the module sends an automatic notification to the admin.

Additionally, it provides analytics and trends on material movement, enabling better decision-making regarding purchases and promotions. With future enhancements, the module can also support QR/barcode scanning and advanced filtering by supplier, material type, or quality grade, making it more intelligent and easier to manage.



Construction Material Module

Product Name	Brand	Quantity	Unit Price	Reorder Level	Exp. / Mfg Date
Bricks	BlueWall	5,000	10 ml	10 ml	12/11/2025
Cement	StrongMix	250	300 g	Popular	12/11/2025
Gravel Stone	QuarryCo	250	4.00	Popular	---
M-Sand	FlowSand	100	1.20	Pop	12/02/24
P-Sand	Prime	100	1.40	Pop	07/03/24
Hollow Blocks	StrongBlock	1,250	1.40	21/02	07/02/24

Analytics charts and features: Automatic Notification, QR / Barcode Scanning, Advanced Filtering.

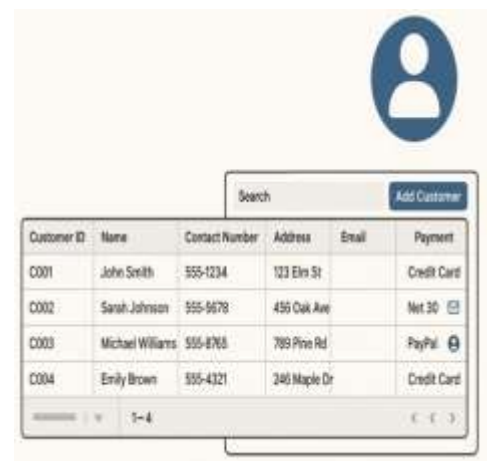
Fig- Construction Material Module

Customer Module

The Customer Module is designed to handle all customer-related operations within the system. It enables the addition of new customers, updating of

existing customer records, and viewing customer-specific purchase histories. Each customer is identified by a unique Customer ID and has associated details such as name, contact number, address, email, and payment preferences. This module is vital for maintaining long-term relationships with customers by storing historical data that can be used for analysis, customer support, and personalized marketing. It plays a key role in sales tracking, as each transaction is tied to a specific customer record. For credit-based purchases, the module keeps track of outstanding balances and payment due dates, which can be useful for sending reminders or generating credit reports. The admin or staff can quickly pull up a customer's history to resolve disputes, issue refunds, or verify prior orders. Search and filter capabilities allow employees to find specific customers quickly.

Overall, the Customer Module not only supports day-to-day sales operations but also enables customer-centric strategies to improve satisfaction and retention.



Customer Module

Customer ID	Name	Contact Number	Address	Email	Payment
C001	John Smith	555-1234	123 Elm St		Credit Card
C002	Sarah Johnson	555-5678	456 Oak Ave		Net 30
C003	Michael Williams	555-8765	789 Pine Rd		PayPal
C004	Emily Brown	555-4321	240 Maple Dr		Credit Card

Fig- Customer Module

Transaction Module

The Transaction Module is the operational backbone of the inventory system, managing all sales and purchase activities. It handles the recording, validation, and processing of

transactions involving construction materials. Every time a customer places an order or the company procures stock from a supplier, the transaction is recorded in this module with essential details like transaction date, item name, quantity, rate, total amount, and parties involved. Each transaction is assigned a unique ID for traceability. The module automatically updates the stock levels in the inventory: sales reduce stock, while purchases increase it. Future extensions may include payment gateway integration and support for real-time data synchronization across multiple branches. The Transaction Module ensures financial accuracy, improves operational transparency, and enhances the user experience through seamless transaction management.

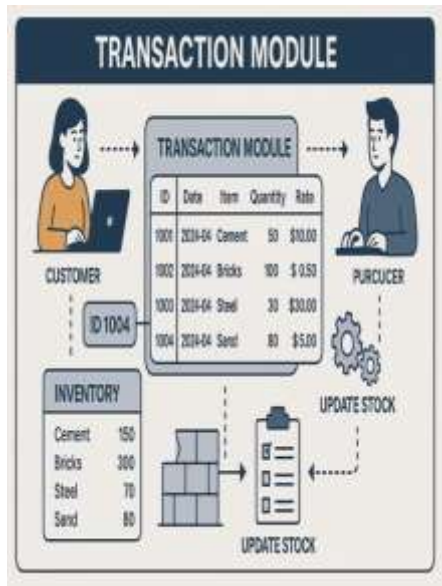


Fig- Transaction Module

Reports Module

The Reports Module is responsible for aggregating and presenting data from various other modules in a meaningful and actionable format. It allows users, especially administrators, to generate detailed reports on sales, purchases, inventory status, supplier performance, customer activity, and overall business performance. Reports can be generated daily, weekly, monthly, or yearly based on specific parameters like date ranges, product categories, or

customer IDs. The system provides both tabular and graphical formats, making it easier to analyze trends, detect anomalies, and make informed decisions.

Sales reports include metrics such as total revenue, number of transactions, and most frequently sold items. Inventory reports highlight current stock levels, reorder alerts, and material movement.



Fig- Customer Module

V. CONCLUSION

The Company Inventory Analysis System provides a comprehensive and efficient solution for managing construction material inventory in a manufacturing company. Through the integration of modern technologies like Python, Django, and SQLite, the system successfully addresses the limitations of traditional, manual inventory processes, which are often prone to delays, human error, and inefficiencies. By automating tasks such as stock tracking, transaction logging, supplier and customer management, and report generation, the system ensures that real-time information is available for all stakeholders, leading to faster decision-making and improved operational performance.

The modular design of the system allows for focused functionality within each component—registration, login, suppliers, materials, customers, transactions, and reports—while maintaining strong integration and data consistency across the entire platform.

Features such as low-stock alerts, role-based access control, and detailed reporting provide added value by enhancing accuracy, reducing waste, and promoting accountability.

By automating and streamlining the inventory management process, the system contributes to better stock control, increased customer satisfaction, and improved business intelligence, making it a valuable asset for modern manufacturing operations. With proper deployment and training, this solution can revolutionize how inventory is handled in similar industrial sectors.

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