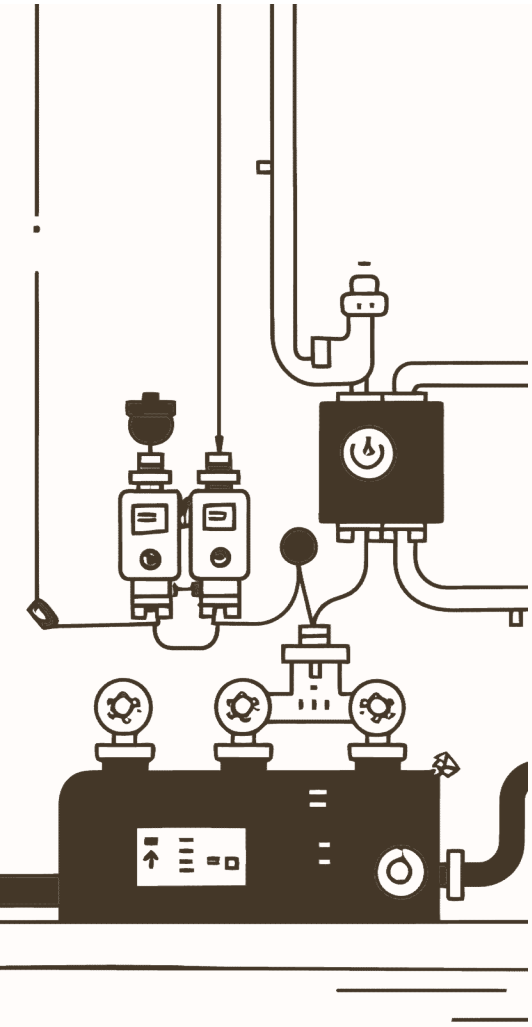

Warehouse Management System

Course: Software Engineering & Design Pattern Lab (CSE-516)

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Submitted To

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Project Overview

Technology Stack

Leveraging cutting-edge tools for robust performance.

Key Features

Comprehensive functionalities for efficient warehouse operations.

Agile Approach

Iterative development ensuring flexibility and continuous improvement.

Our Warehouse Management System (WMS) is designed to streamline inventory processes, optimize logistics, and enhance overall operational efficiency within modern warehouses.

Understanding the Need: Manual vs. Digital

The Problem with Manual Systems

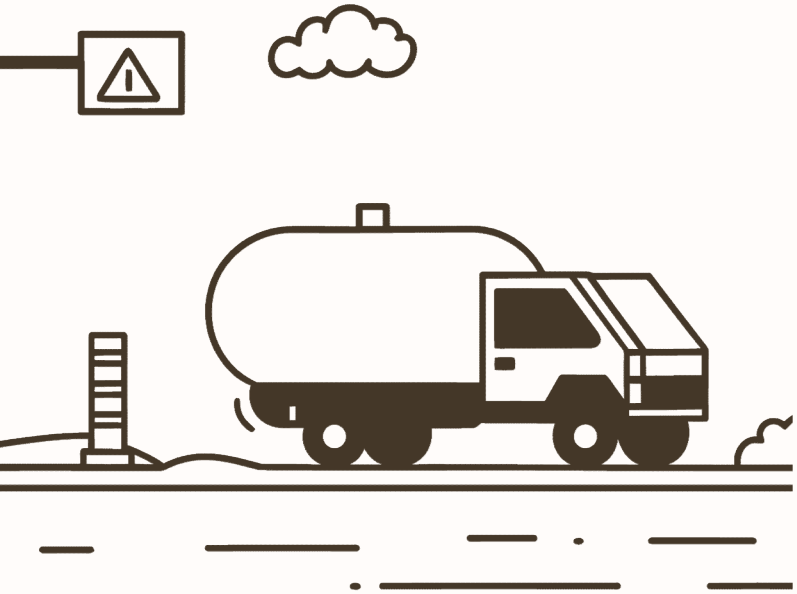
Traditional manual warehouse management is plagued by inherent inefficiencies and errors.

- Frequent human errors leading to discrepancies.
- Significant delays in processing and fulfillment.
- Lack of real-time visibility into stock levels.
- Cumbersome and time-consuming reporting.

The Digital Solution: Our WMS

Our WMS offers a transformative approach, addressing these pain points with automated precision.

- Real-time inventory tracking and updates.
- Automated data entry minimizing errors.
- Advanced analytics for informed decision-making.
- Streamlined workflows for faster operations.



Critical Challenges in Current Warehouse Operations

Inaccurate Stock

Discrepancies in inventory records leading to stockouts or overstocking.

Operational Delays

Slow processing of orders and shipments, impacting delivery times.

Poor Visibility

Lack of a comprehensive overview of warehouse activities and inventory movement.

High Error Rate

An estimated **12% error rate** in manual operations, severely affecting efficiency.

These challenges highlight the urgent need for a robust, automated system to mitigate risks and enhance operational performance.

Our Project Objectives

Achieve Full Automation

Automate inventory management, order processing, and stock tracking.

Enable Advanced Analytics

Provide insightful data analytics for better decision-making and forecasting.

Ensure Scalability

Design a scalable architecture to accommodate future growth and expansion.

Streamline Billing

Integrate efficient billing and invoicing processes within the system.

Implement Conversational Chatbot

Develop an AI-powered chatbot for quick query resolution and support.

These objectives form the core of our WMS development, aiming to deliver a comprehensive and future-proof solution.

Key Features

Inventory & Stock Management

Real-time tracking of items, categories, and brands to maintain optimal stock levels.

Order & Billing System

Automated invoice generation with integrated print functionality for efficient transactions.

Analytics Dashboard

Provides sales insights, stock trends, and performance metrics for data-driven decisions.

Role-Based Authentication

Ensures secure access and data integrity with distinct permissions for Admin, Staff, and Customers.

AI Chatbot Support

Offers smart recommendations and instant assistance, enhancing user experience and problem-solving.

These core features are meticulously crafted to provide a comprehensive, secure, and intelligent solution for modern warehouse operations.

Our Agile Development Methodology

Our project embraced an Agile workflow, focusing on iterative development and continuous feedback.

Sprint Planning

Defining scope and user stories for each iteration.

Development & Integration

Coding features with Node.js and MySQL.

Rigorous Testing

Unit, integration, and system testing phases.

Deployment & Monitoring

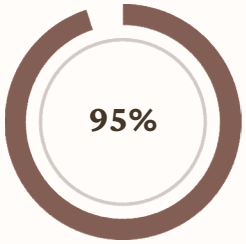
Staged deployment and performance monitoring.

Version control was managed using GitHub, ensuring collaborative and efficient code management.

Experimental Results and Performance Metrics

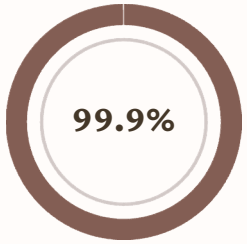
Average Response Time

Fast and efficient system feedback.



Throughput Efficiency

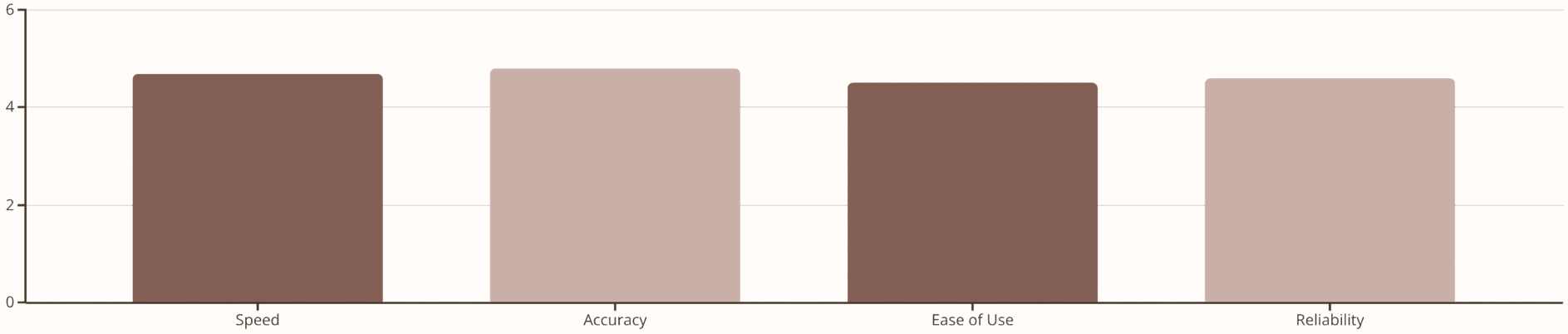
High volume transaction handling capacity.



System Uptime

Ensuring continuous availability.

User feedback indicates high satisfaction with the system's performance and ease of use.



All key performance indicators show significant improvements over manual processes.

Impact Analysis: Manual vs. Automated WMS

Our WMS demonstrates significant improvements across key operational metrics compared to manual methods.

Process Speed	Slow	66% Faster
Error Rate	12%	83% Fewer Errors
Real-time Visibility	Limited	Full
Data Accuracy	Moderate	High
Reporting	Manual	Automated

Before WMS

Complex, error-prone, and time-consuming manual processes.

After WMS Implementation

Streamlined, accurate, and efficient automated operations.

Quantitative Analysis and Financial Impact

Key Metrics and Efficiency Gains

Understanding the tangible benefits and cost efficiencies provided by our WMS.

Development Hours

$$3 \times 15 \times 10 = \textbf{450 hrs}$$

Total hours invested in project development.

Estimated Labor Cost

$$450 \times \$20 = \textbf{\$9,000}$$

Total cost for development resources.

Efficiency Gain

$$(15–5) \div 15 \times 100\% = \textbf{66\%}$$

Significant improvement in operational speed and task completion.

Error Reduction

$$(12–2) \div 12 \times 100\% = \textbf{83\%}$$

Dramatic decrease in operational errors, enhancing accuracy.

These calculations underscore the substantial return on investment and operational improvements delivered by the Warehouse Management System.

Conclusion and Future Directions

Achievements

Successfully developed and deployed a robust WMS with significant performance gains.

Impact

Transformed warehouse operations, reducing errors and enhancing efficiency.

Future Work

Continuous improvement with new features and expanded capabilities.

Future Enhancements:

- Offline Mode for uninterrupted operations.
- Integration with IoT devices for real-time asset tracking.
- Advanced AI Analytics for predictive insights.

Thank You!

Thank you for your time. Please feel free to ask any questions.