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MediVax Inventory Control: A Smart Pharmaceutical Inventory Management System Integrating Vaccine Temperature Monitoring

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Abstract - Developed to optimize operations in the veterinary and healthcare industries, MediVax Inventory Control is a desktop-based pharmaceutical inventory management system. The system, which was constructed with Java and MySQL, provides strong inventory tracking, real-time vaccine temperature monitoring, and secure user identification. Sales, procurement, reporting, and alarms for temperature irregularities or inventory shortages are important components. The platform, which was created with regulatory standards in mind, guarantees compliance, lowers waste, and improves operating efficiency.

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Key Words: Inventory, Pharmaceutical, Temperature, Vaccine, Java, MySQL

1.INTRODUCTION

Managing pharmaceutical inventory is a critical task that ensures drug availability, safety, and efficacy. Challenges like temperature-sensitive vaccine handling, expiry monitoring, and regulatory compliance demand a robust system. MediVax aims to overcome these issues by digitizing inventory operations and integrating temperature monitoring.

2. SYSTEM OVERVIEW

MySQL was used as the backend database and Java (AWT for the GUI) in the development of MediVax. Among the primary features are:

- User Management: Role-based access and login.
- Batch tracking and expiry warnings are features of the inventory module.
- Purchases and sales: Real-time stock updates are made.
- Temperature Monitoring: The storage temperature of vaccines is monitored by simulated APIs.
- Reports: Sales, inventory, and profit/loss exports (in Excel and PDF formats).

2.1 Architecture

A modular structure follows a Waterfall model and includes use case, ER, and DFD diagrams. The system runs on a local machine with basic hardware (i3 processor, 4GB RAM).

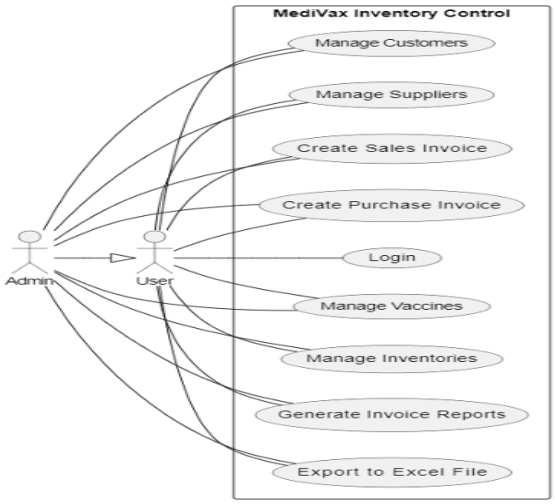


Fig -1: Use case diagram

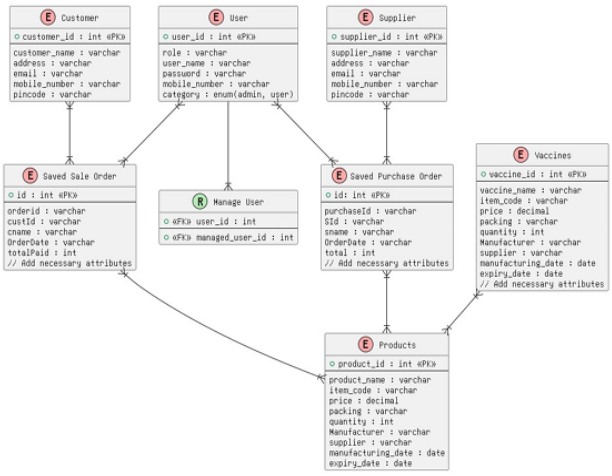


Fig -2: ER Diagram

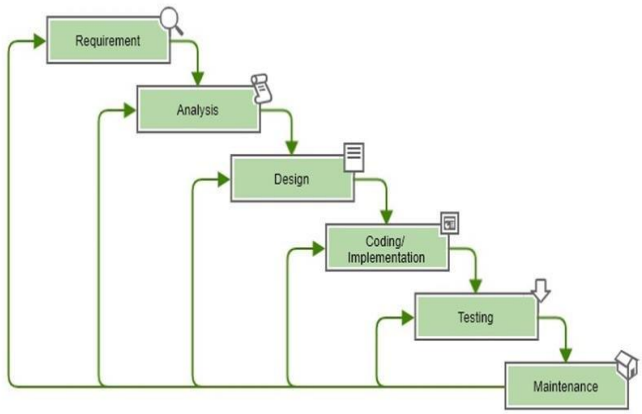
3. METHODOLOGY

Using the Waterfall methodology, the following phases were completed:

- Requirement Analysis – Focus on pharmaceutical-specific inventory needs.
- System Design – Created ERD, DFD, and UML diagrams.

- Implementation – Java AWT frontend, JDBC connectivity.
- Testing – Manual and automated test cases for all modules.

For temperature simulation, random values between 2°C and 8°C were used. Alerts were programmed to trigger if thresholds were breached.



4. RESULTS & DISCUSSION

- Accuracy: Inventory and transaction accuracy maintained at 100%.
- Performance: System remained stable under moderate load (2 concurrent users).
- Alerts: All test anomalies in temperature were captured correctly.
- Usability: Interface rated "easy to use" by test users in feedback.

The integration of temperature monitoring significantly boosts reliability in vaccine storage.

5. CONCLUSION

MediVax successfully demonstrates how digital tools can enhance pharmaceutical inventory management. With features like real-time monitoring, accurate reporting, and compliance with storage norms, the system is a suitable model for small to medium pharmacies and clinics. Future plans include migrating the platform to cloud and integrating IoT-based sensors.

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BIOGRAPHIES (Optional not mandatory)

Sachin Ganesh Rathod is a final-year MCA student at Trinity Academy of Engineering, Pune. He is passionate about software development and applying IT solutions in healthcare and supply chain management.