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CS-665 Introduction Database Systems

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<div align="center">Project Proposal for Pharma-Sync: An effective Pharmacy Supply Management System</div>

1. Introduction

Efficient management of pharmaceutical supplies is needed in today's healthcare environment to foster the availability of drugs and reduce operational inefficiencies. PharmaSync is designed to address these needs through the streamlining of inventory management, supplier coordination, and data management for offline pharmacies. Implemented with MySQL, the system will offer data consistency, security, and fast retrieval. The incentive is to minimize manual errors, limit paperwork, and offer pharmacy managers an easy-to-use tool to successfully manage operations.

Objectives

- Design and develop a user-friendly and efficient computerized system.
- Eliminate data redundancy through a flexible and accurate database.
- Enhance the functionality of pharmacy supply management processes.
- Provide fast-processing software with a robust graphical user interface (GUI).
- Ensure immediate data storage and retrieval with security via login and password mechanisms.
- Reduce paperwork and improve medicine coordination arrangements.

2. Background and Rationale

Relational databases MySQL and PostgreSQL have been identified through studies as optimum for structured data handling due to performance, scalability, and support for security (**Elmasri and Navathe 45**). MySQL is proposed in the context of Pharma-Sync due to being

open-source and free, hence customizable to small- to medium-sized pharmacy undertakings.

Scholarship also reflects on the complexity of healthcare supply chains where good supply

management by effectiveness and timing translates directly into patients' wellness. Manual

systems currently in place, reliant on paper-based records, are afflicted with sluggish data entry,

over-redundancy, and insecure storage, necessitating a computerized system like PharmaSync.

3. Proposed Methodology

3.1 Database Design

Pharma-Sync will utilize a relational database model, designed with Entity-Relationship

(ER) diagrams and normalized to the 3rd Normal Form (3NF). Proposed tables include:

- *Users:* To store credentials (e.g., username, password) for secure access.
- *Medicines:* To record medicine details (e.g., id, name, amount, products).
- *Posts:* To log pharmacy shop details (e.g., medical_name, owner_name, phone_no, address).
- *Logs:* To track actions (e.g., insertions, deletions) with timestamps for auditing.

Primary and foreign keys will ensure data integrity, and normalization will minimize
redundancy.

3.2 Development Tools & Technologies

- *Frontend:* HTML, CSS, JavaScript, Bootstrap
- *Backend:* Python (Flask, SQL-Alchemy)
- *Database:* MySQL
- *Tools:* PyCharm Community (IDE), Sublime Text 3, AMPPS (Version 3.8)
- *Operating System:* Windows 11

3.3 Implementation Plan

1. Design the database schema using MySQL Workbench and normalize it.
2. Develop backend API endpoints with Flask for CRUD operations.
3. Create a responsive frontend using Bootstrap and HTML/CSS.
4. Implement triggers and stored procedures for automation and logging.
5. Test the system with sample data and deploy it locally for evaluation.

4. Anticipated Challenges

A few challenges are anticipated while developing Pharma-Sync:

- Manual Data Entry: The initial population of the database can be time-consuming.
- Query Optimization: Processing larger datasets might necessitate sophisticated indexing methods
- Browser Compatibility: Getting the GUI to function on browsers like Internet Explorer and Chrome can take extra effort.
- User Training: Pharmacy staff may require training to adapt to the new system.

Mitigation strategies include automating data imports where possible, investigating optimization techniques, and conducting thorough cross-browser testing.

5. Expected Outcomes

Pharma-Sync is expected to:

- Optimize pharmacy supply management with less than 300ms average query response time for small data.
- Enhance data protection through login/password authentication.
- Offer a user-friendly GUI, reducing the learning curve for users.
- Minimize paperwork and improve operating efficiency by at least 30% compared to manual processes.

Provide an extensible platform to further develop like online payments and transportation tracking.

6. Conclusion

Pharma-Sync is being submitted here as a practical implementation of relational database principles in addressing real pharmacy management problems. With the synergy of academic acquired in CS-665 and a sound development methodology, it is the project's aim to deliver an efficient, secure, and user-friendly system. The proposal highlights the necessity of planning and technology in revamping offline pharmacy operations, setting the stage for an implementation success.

Work Cited

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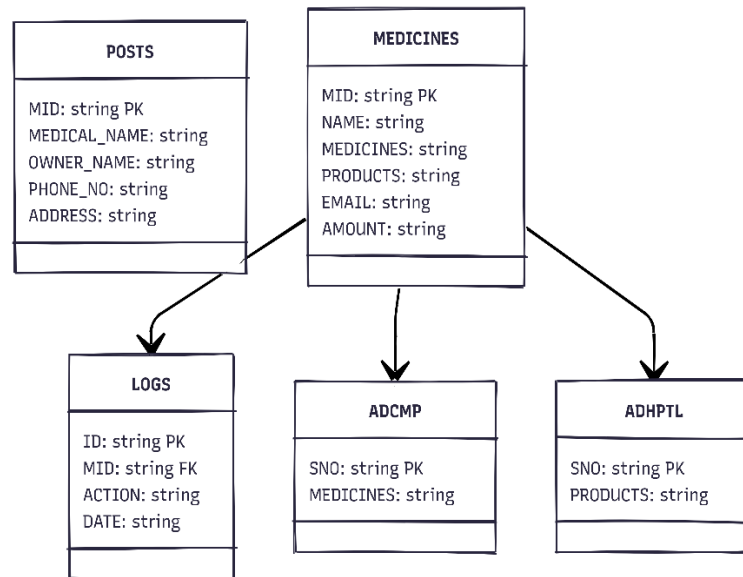 12-28-11-76901.pdf. Accessed 28 March 2025.

Appendices

Proposed ER Diagram
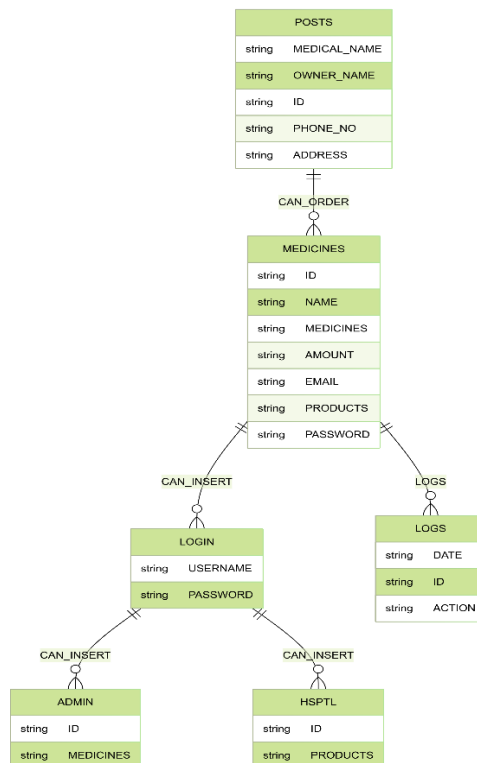
(Fig.1) ER diagram showing relationships between Users, Medicines, Posts, and Logs

Proposed Database Schema

(Fig.2) Database Schema for the Pharma-Sync