Hospital Management System using Java and MySQL

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ABSTRACT

Hospital Management System (HMS) is a software application designed to simplify hospital operations by digitising patient and staff records. Traditional systems rely on manual paperwork, which is time-consuming and error-prone. The proposed system is developed using Java and MySQL to manage patient registration, staff details, and appointment scheduling efficiently.

The system provides role-based access through separate dashboards for Admin, Doctor, and Receptionist, ensuring better organisation and security. It uses Java Swing for the graphical user interface and JDBC for database connectivity. The system supports basic operations, including adding, updating, deleting, and viewing records.

Overall, the system reduces paperwork, improves data accuracy, and enhances efficiency. It is user-friendly and can be further improved by adding features such as billing and report generation.

Keywords — **Hospital Management System, Java, MySQL, Java Swing, JDBC, Patient Management, Appointment System**

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I. INTRODUCTION

A Hospital Management System (HMS) is a computer-based application designed to efficiently manage and organise hospital operations. In traditional hospital systems, most work is done manually using paper records, leading to data redundancy, difficulty searching records, increased risk of errors, and time-consuming processes.

With advances in technology, computerised systems have become essential in healthcare management. The Hospital Management System helps maintain patient records, staff details, and appointment schedules in a structured, organised manner. It provides quick access to data and improves coordination across hospital departments.

The proposed system is developed using Java and MySQL, which ensures efficient data handling and secure storage. The system includes key features, including patient registration, staff management, and appointment scheduling. It also provides separate dashboards for Admin, Doctor, and Receptionist, enabling role-based access and improved system control.

Java Swing provides a user-friendly graphical interface, while JDBC enables smooth database interaction. The system is designed to be simple, reliable, and easy to use. Overall, the Hospital Management System improves efficiency, reduces manual workload, and enhances the quality of healthcare services.

II. OBJECTIVES

The main objective of this system is to automate hospital operations and reduce manual workload. The system provides an efficient way to manage patient and staff records.

A. Hospital Operations Automation

The system automates tasks such as patient registration and appointment scheduling. This reduces manual effort and minimises errors.

B. Patient and Staff Management

The system effectively manages patient and staff records. Users can easily add, update, delete, and view records, ensuring proper data organisation.

C. Appointment Management

The system allows scheduling and managing patient appointments. It helps organise patient visits and avoid scheduling conflicts.

D. User-Friendly Interface

The system provides a graphical user interface using Java Swing, which is simple and easy to use for all users.

III. SYSTEM ANALYSIS

A. Existing System

The existing hospital system is manual and paper-based. It requires maintaining records in files, leading to data redundancy, difficulty searching for information, and an increased risk of errors. It is also time-consuming and inefficient.

B. Proposed System

The proposed Hospital Management System is a computerised solution developed using Java and MySQL. It stores all data digitally, provides quick access to information, reduces errors, and improves efficiency. The system is user-friendly and supports multiple roles, including Admin, Doctor, and Receptionist.

IV. SYSTEM DESIGN

A. Architecture

The Hospital Management System is designed using a three-tier architecture, which helps organise the application into distinct layers for improved performance, scalability, and maintainability.

1. Presentation Layer – This layer represents the user interface of the system. It is developed using Java Swing and provides an interactive platform for users, including Admin, Doctor, and Receptionist. It includes forms, buttons, tables, and other GUI components that users can interact with.

2. Business Logic Layer – This layer handles the core functionality of the application. It processes user inputs, applies business rules, and controls the flow of data between the user interface and the database. It ensures proper validation and execution of operations such as adding, updating, and deleting records.

3. Database Layer – This layer is responsible for storing and managing all the data of the system. It is implemented using a MySQL database. The system uses JDBC to establish a connection between the Java application and the database for executing SQL queries.

B. Database Design

The database is designed to store and manage all the necessary information related to hospital operations. It consists of multiple tables that are interconnected to ensure efficient data handling.

The main tables used in the system are:

• Patient Table – Stores patient details such as patientId, name, age, gender, and contact information.

• Staff Table – Contains details of hospital staff, including userId, role, name, and contact.

• Appointment Table – Maintains appointment records such as appointmentId, patientId, doctorId, and appointment date.

The database design ensures data consistency, integrity, and efficient information retrieval. Structured Query Language (SQL) is used to perform operations such as INSERT, UPDATE, DELETE, and SELECT. Proper relationships between tables help maintain organised, reliable data.

V. WORKING

The Hospital Management System comprises several modules that work together to ensure smooth operation.

A. Login Module

The system provides secure login access. Only authorised users can access the system using valid credentials. The system verifies login details using database queries.

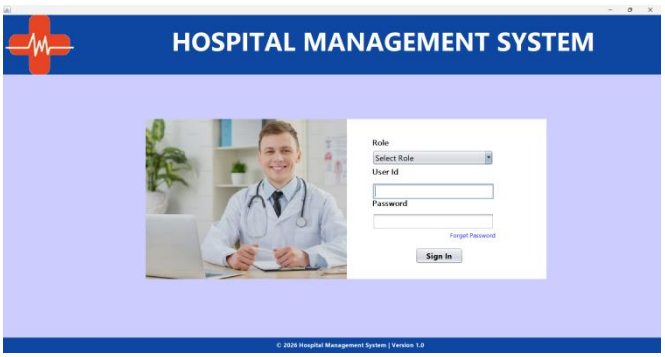

Fig. 1 Login Page

B. Dashboard Module

The system provides different dashboards for different users, such as Admin, Receptionist, and Doctor. Each dashboard displays relevant information based on the user's role and responsibilities.

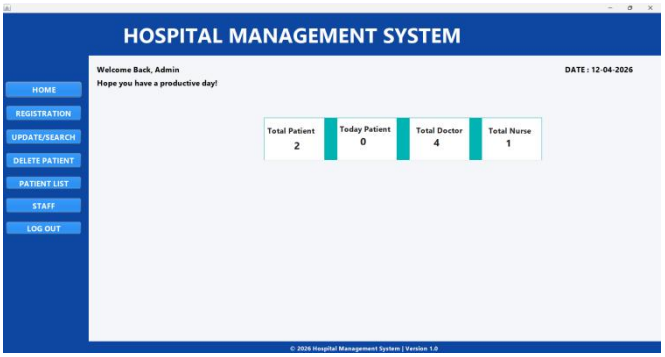

Fig. 2 Admin Dashboard

C. Patient Management Module

This module allows users to manage patient records. Users can add new patients, update details, delete records, and view all patient information in a structured format.

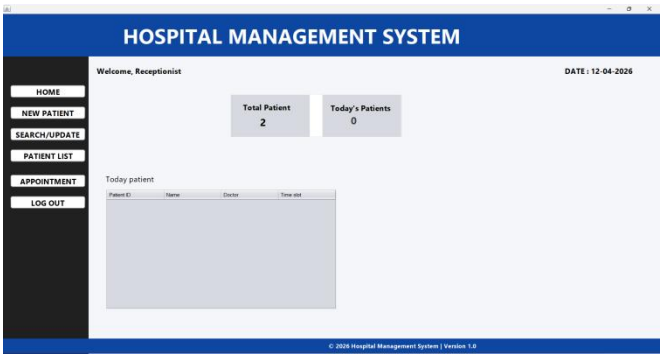

Fig. 3 Receptionist Dashboard

D. Staff Management Module

The staff management module is used to manage hospital staff, including doctors and other employees. It allows staff records to be added, updated, deleted, and viewed.

E. Appointment Module

This module is responsible for scheduling and managing patient appointments. It ensures proper organisation of patient visits and avoids overlapping schedules.

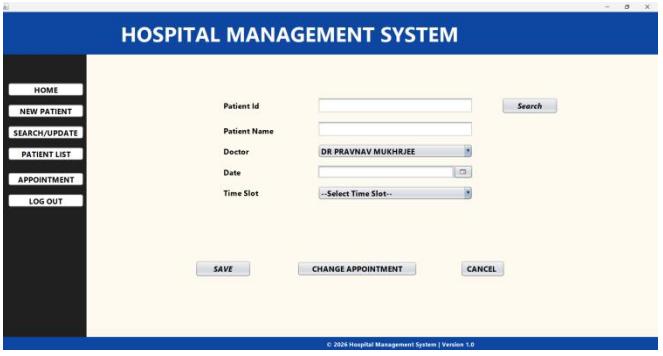

Fig. 4 Appointment Page (Receptionist Dashboard)

F. Database Connectivity (JDBC)

The system uses JDBC to connect the Java application with the MySQL database. It allows execution of SQL queries such as INSERT, UPDATE, DELETE, and SELECT.

G. Event Handling and User Interaction

The system uses event handling to respond to user actions like button clicks and form submissions. Java Swing components such as buttons, text fields, and tables are used to create an interactive interface.

VI. FUTURE SCOPE

The system can be further improved by adding advanced features.

A. Advanced Features

Future improvements may include:

- Billing system integration
- Report generation system
- Online appointment booking
- SMS/email notifications

B. System Scalability

The system can be extended to support multiple hospitals and cloud-based storage, making it more scalable and accessible.

VII. RESULTS AND DISCUSSION

The system was successfully tested across different scenarios. It showed significant improvements compared to the manual system.

The results include:

Faster patient registration process

- Efficient appointment scheduling

- Easy data retrieval

- Reduced paperwork

- Improved accuracy

The system provides a smooth user experience through different dashboards for Admin, Doctor, and Receptionist.

VIII. CONCLUSION

The Hospital Management System effectively demonstrates how software can automate hospital operations. It provides an efficient way to manage patient records, staff details, and appointments while ensuring data accuracy and consistency.

The use of Java and MySQL makes the system reliable and easy to maintain. The project also helps in understanding concepts like database connectivity, GUI design, and event handling.

Overall, the system is a practical solution for modern hospitals and can be enhanced further with additional features.

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