

Healthcare Management System Using Agile Methodology

(Java – Console Based Application)

1. Abstract

The healthcare industry plays a crucial role in ensuring the well-being of individuals and communities. With the increasing number of patients and medical records, traditional manual healthcare management systems have become inefficient, time-consuming, and prone to errors. Maintaining patient information, doctor schedules, appointments, and medical records manually can lead to data inconsistency, delays in service, and lack of proper coordination among healthcare staff.

This project focuses on the design and development of a **Healthcare Management System using Agile methodology**, implemented as a **Java-based console application**. The proposed system automates essential healthcare operations such as patient registration, appointment booking, doctor management, and viewing medical records. The system provides a menu-driven interface that allows users to perform healthcare-related tasks efficiently with minimal effort.

Agile methodology is adopted to ensure flexibility, continuous improvement, and faster delivery of functional modules. The system is developed in short iterations called sprints, where each sprint focuses on implementing specific features such as patient management, appointment scheduling, or record viewing. Continuous testing and user feedback during each sprint help improve system quality and reliability.

The application is developed using Java due to its object-oriented features, platform independence, security, and robustness. This project helps in understanding Agile development practices and demonstrates how automation can improve healthcare service management. Future enhancements may include database integration, graphical user interfaces, and online consultation features.

2. Introduction

2.1 Introduction

A Healthcare Management System is a software application designed to manage healthcare-related activities such as patient details, doctor information, appointments, and

medical records. It helps healthcare organizations improve efficiency, accuracy, and quality of service by automating routine operations.

2.2 Problem Identification

Traditional healthcare systems often rely on paper-based records or partially automated systems, which can result in misplaced data, duplication of records, slow appointment scheduling, and difficulty in accessing patient history. As patient numbers increase, managing healthcare data manually becomes highly inefficient.

2.3 Need of the Project

There is a strong need for an automated healthcare system that reduces manual effort, improves data accuracy, and ensures quick access to patient and doctor information. A Java-based console application provides a cost-effective and easy-to-understand solution for small healthcare centers and academic learning purposes.

2.4 Project Scheduling

The project follows the Agile development process and is divided into the following phases:

- Requirement Analysis and Planning
- System Design
- Implementation
- Testing
- Documentation

Each phase is completed in short iterations to allow continuous improvement and flexibility.

2.5 Objectives

- To develop a Healthcare Management System using Java
- To apply Agile methodology in software development
- To automate patient and appointment management

- To understand object-oriented programming concepts
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3. Software Requirement Specification (SRS)

3.1 Purpose

The purpose of this Software Requirement Specification (SRS) is to describe the functional and non-functional requirements of the Healthcare Management System. It serves as a reference document for understanding system behavior and constraints.

3.2 Scope

The scope of the project includes patient registration, doctor management, appointment scheduling, and viewing medical records. Advanced features such as online payments, cloud storage, and real-time notifications are beyond the current scope.

3.3 Hardware / Software Requirements

Hardware Requirements:

- Processor: Intel i3 or above
- RAM: Minimum 4 GB
- Hard Disk: Minimum 10 GB free space

Software Requirements:

- Operating System: Windows 10 / Windows 11
- Programming Language: Java (JDK 8 or above)
- IDE: Eclipse IDE

3.4 Tools

- Java Development Kit (JDK)

- Eclipse IDE
- GitHub (for report hosting)

3.5 Software Process Model

The Agile Software Development Model is used in this project. Agile promotes iterative development, continuous testing, customer collaboration, and adaptability to changing requirements.

4. System Design

4.1 Data Dictionary

Field Name	Description
PatientID	Unique patient identification number
PatientName	Name of the patient
Age	Patient age
Gender	Male / Female
DoctorName	Assigned doctor
Appointment Date	Date of appointment

Disease

Patient diagnosis

4.2 ER Diagram

The Entity Relationship (ER) diagram includes entities such as **Patient**, **Doctor**, **Appointment**, and **Admin**. Each appointment is associated with a patient and a doctor.

4.3 Data Flow Diagram (DFD)

The Data Flow Diagram represents how patient data flows through the system. It includes processes such as patient registration, appointment booking, and viewing medical records.

4.4 Use Case Diagram

Actors involved are **Patient** and **Admin**. Main use cases include Register Patient, Book Appointment, View Records, Manage Doctors, and Generate Reports.

5. Implementation

5.1 Program Code

The Healthcare Management System is implemented using Java with a menu-driven console interface. Object-oriented concepts such as classes, objects, encapsulation, inheritance, and collections are used to manage healthcare data efficiently.

5.2 Output Screens

The application displays text-based menus allowing users to register patients, book appointments, and view medical details through the console.

6. Testing

6.1 Test Data

Sample patient records and appointment details are used for testing. Invalid inputs are also tested to ensure proper validation and error handling.

6.2 Test Result

All test cases were executed successfully. The system produced accurate results for valid inputs and appropriate error messages for invalid operations.

7. User Manual

7.1 How to Use Project Guidelines

1. Run the Java application
2. Select the desired option from the main menu
3. Enter patient or appointment details as prompted
4. View confirmation messages on the console
5. Exit the application safely

7.2 Screen Layouts and Description

The system uses a simple console-based interface with clear menu options for easy navigation and usage.

8. Project Applications and Limitations

Applications

- Small hospitals and clinics
- Educational institutions
- Healthcare training programs

Limitations

- Console-based interface
 - No database connectivity
 - No online consultation or payment features
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9. Conclusion and Future Enhancement

The Healthcare Management System developed using Agile methodology successfully demonstrates the automation of basic healthcare operations. The project improved understanding of Agile practices, system design, and Java programming. Future enhancements may include database integration, graphical user interface, online appointment booking, and electronic medical record management.

10. Bibliography & References

- Agile Manifesto
- Java Programming Documentation
- Software Engineering Textbooks