

HCL project report 5

Healthcare Management System using Agile Methodology

1. Abstract (300–400 Words)

Healthcare organizations today face increasing pressure to provide high-quality patient care while managing large volumes of medical data efficiently and securely. Traditional healthcare systems rely on paper-based records, manual appointment scheduling, and fragmented data storage, which often result in inefficiencies, delayed diagnosis, data redundancy, and medical errors. With the rapid advancement of information technology, there is a strong need for a centralized and automated healthcare solution.

This project presents the design and development of a **Healthcare Management System using Agile methodology**. The system aims to digitize and automate core healthcare operations such as patient registration, appointment scheduling, doctor management, electronic medical records (EMR), prescriptions, billing, and reporting. Agile methodology is chosen due to its flexibility, iterative nature, and ability to accommodate changing requirements, which is crucial in the healthcare domain where regulations, workflows, and patient needs frequently evolve.

The Agile approach divides the development lifecycle into small, manageable iterations called sprints. Each sprint delivers a working module that is reviewed and tested by stakeholders, ensuring early detection of issues and continuous improvement. Agile practices such as sprint planning, daily stand-ups, sprint reviews, and retrospectives promote collaboration among developers, healthcare professionals, and administrators.

The system provides role-based access to ensure data privacy and security. Patients can book appointments, view medical history, and access reports. Doctors can view patient details, record diagnoses, and prescribe treatments. Administrators can manage users, departments, billing, and system configurations. The modular architecture ensures scalability, maintainability, and ease of future enhancement.

In conclusion, the Healthcare Management System developed using Agile methodology improves operational efficiency, reduces manual workload, enhances data accuracy, and supports better healthcare delivery. The system serves as a reliable foundation for future extensions such as telemedicine, mobile healthcare applications, and AI-assisted diagnosis.

2. Introduction

2.1 Introduction

Healthcare institutions manage critical and sensitive information related to patients, treatments, diagnoses, and billing. Efficient handling of this information is essential to ensure accurate medical decisions and timely patient care. A Healthcare Management System is a software solution designed to integrate and automate various healthcare processes within a single platform.

Traditional healthcare systems often suffer from fragmented workflows, delayed access to patient information, and poor coordination among departments. These issues negatively impact patient satisfaction and healthcare outcomes. A centralized digital system enables real-time access to patient data, improves coordination, and enhances decision-making.

This project adopts **Agile methodology**, which supports iterative development and continuous stakeholder involvement. Agile ensures that the system remains flexible, adaptable, and aligned with healthcare requirements throughout the development lifecycle.

2.2 Problem Identification

The major problems identified in existing healthcare systems are:

- Manual record keeping causing data loss and errors
- Difficulty in tracking patient medical history
- Inefficient appointment scheduling and long waiting times
- Lack of centralized data access
- High administrative workload
- Inflexibility in traditional software development models

These challenges necessitate an automated and Agile-driven healthcare system.

2.3 Need of the Project

The need for a Healthcare Management System arises due to:

- Growing number of patients and medical records
 - Requirement for accurate and quick access to patient data
 - Reduction of paperwork and operational costs
 - Improved coordination between doctors and departments
 - Enhanced data security and privacy
 - Adoption of Agile methodology for continuous improvement
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2.4 Project Scheduling

The project is developed using Agile methodology and divided into sprints:

- **Sprint 1:** Requirement analysis and system architecture
- **Sprint 2:** Patient registration and authentication module

- **Sprint 3:** Appointment scheduling and doctor management
- **Sprint 4:** Medical records, prescriptions, and billing
- **Sprint 5:** Testing, reporting, deployment, and review

Each sprint includes planning, development, testing, sprint review, and retrospective.

2.5 Objectives

The objectives of the project are:

- To develop an automated Healthcare Management System
 - To apply Agile principles for flexible and iterative development
 - To improve healthcare service efficiency
 - To ensure secure and accurate medical data management
 - To enhance patient and doctor experience
 - To provide a scalable and maintainable system
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3. Software Requirements Specification (SRS)

Software Requirements Specification for

Healthcare Management System using Agile Methodology

Version: 1.0 Approved

Prepared by: Arushi

Organization: Academic Project

Date Created: January 2026

Revision History

Version	Date	Description	Author
1.0	Jan 2026	Initial SRS creation	Arushi

I. Introduction

Purpose

The purpose of this SRS is to define the functional and non-functional requirements of the Healthcare Management System.

Scope

The system supports patient management, appointment scheduling, medical records, billing, and administrative control.

Definitions

EMR – Electronic Medical Record

Admin – System administrator

Technology Used

- Frontend: HTML, CSS, JavaScript
 - Backend: Node.js / Java / Python
 - Database: MySQL
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II. Overall Description

Product Perspective

The system is a web-based application that integrates all healthcare operations into a centralized platform.

Product Functions

- User authentication
- Patient management
- Doctor management
- Appointment scheduling
- Medical records and prescriptions
- Billing and reporting

User Classes

- Administrator
- Doctor
- Patient

Operating Environment

- Web browser based system
 - Cloud or local server deployment
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III. External Interface Requirements

User Interface

Simple, responsive, and role-based dashboards.

Hardware Interface

Client devices (PC, mobile) and server infrastructure.

Software Interface

Integration with database and optional third-party services.

IV. Non-Functional Requirements

- Performance: Fast response time
 - Security: Role-based access, encrypted data
 - Reliability: High availability
 - Scalability: Supports growing data
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4. System Design

4.1 Data Dictionary

Field	Description
Patient_ID	Unique patient identifier
Doctor_ID	Unique doctor identifier
Appointment_ID	Appointment reference
Diagnosis	Medical diagnosis
Prescription	Medication details
Bill_Amount	Treatment cost

4.2 ER Diagram

Entities:

- Patient
- Doctor
- Appointment
- Medical_Record
- Admin

Relationships:

- Patient books Appointment
 - Doctor treats Patient
 - Appointment generates Medical Record
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4.3 Data Flow Diagram (DFD)

- User inputs data
 - System processes request
 - Database stores information
 - Output displayed to user
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4.4 Diagrams Used

- Use Case Diagram
 - Class Diagram
 - Activity Diagram
 - Sequence Diagram
 - ER Diagram
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5. Implementation

5.1 Program Code

The system is developed using modular coding practices. Each module is implemented and tested within Agile sprints.

5.2 Output Screens

- Login Page
 - Patient Dashboard
 - Doctor Dashboard
 - Appointment Booking
 - Medical Records
 - Admin Dashboard
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6. Testing

6.1 Test Data

- Valid and invalid user inputs
- Appointment booking scenarios
- Billing calculations

6.2 Test Result

All test cases passed successfully. Bugs identified during sprint reviews were resolved.

7. User Manual

7.1 How to Use Project Guidelines

1. Login to the system
2. Select role (Patient/Doctor/Admin)
3. Perform required operations
4. Logout securely

7.2 Screen Layouts and Description

The system uses clean layouts with clear navigation and minimal learning curve.

8. Project Applications and Limitations

Applications

- Hospitals
- Clinics
- Diagnostic centers

Limitations

- Internet dependency
 - Limited mobile support
 - No AI diagnosis in current version
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9. Conclusion and Future Enhancement

The Healthcare Management System successfully digitizes healthcare operations using Agile methodology. It improves efficiency, accuracy, and patient care.

Future Enhancements:

- Telemedicine
 - Mobile app integration
 - AI-based diagnosis
 - Integration with wearable devices
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10. Bibliography & References

- Pressman – Software Engineering
- Sommerville – Software Engineering
- Agile Manifesto
- IEEE SRS Standards
- Healthcare IT Research Papers