

Telemedicine Consultation System

1. Introduction

1.1 Purpose of this Document

This document outlines the Software Requirement Specification for the Telemedicine Consultation System designed for rural healthcare access. It describes in detail how the system should behave, the features it will support, the workflows of various users, and the constraints under which it must operate. The intention is to ensure that all stakeholders share a uniform understanding of the system's objectives and functionalities before development begins.

1.2 Scope of this Document

The system aims to streamline the complete lifecycle of a telemedicine consultation — from the patient's arrival at a telemedicine center, to case creation, doctor consultation, prescription generation, and dispensing of medicines. The scope also includes patient registration, appointment scheduling, report uploads, doctor dashboards, pharmacist verification, and administrator activities.

1.3 Overview

The Telemedicine Consultation System functions as a multi-user healthcare platform. A patient arrives at a telemedicine center where a community health worker records vitals and initiates a teleconsultation. The system notifies a doctor, provides them with all case details, and enables a secure video consultation. After reviewing the case, the doctor issues a digital prescription that is shared with both the patient and the pharmacist. Medicines are then dispensed accordingly.

The system ensures a coordinated, step-by-step medical experience for rural patients while minimizing travel and wait times.

2. General Description

The system supports five major user groups: patients, community health workers, doctors, pharmacists, and administrators. Each group interacts with the system through dedicated modules. The patient receives assistance from the CHW, who enters initial information and initiates calls. Doctors operate through a structured dashboard where they review cases, conduct consultations, and generate prescriptions. Pharmacists verify and dispense medicines digitally, and administrators oversee schedules, system maintenance, and usage reports.

The system has been designed with rural limitations in mind. Interfaces are simple, instructions are clear, and the system supports essential workflows even with inconsistent network connectivity. The architecture ensures smooth transitions between online and offline operations wherever applicable.

3. Functional Requirements

3.1 Patient Module

- Register or log in to the system.
- View upcoming and past appointments.
- Join scheduled video consultations.
- Upload medical reports.
- Access digital prescriptions.
- Provide feedback after consultations.

3.2 Community Health Worker Module

- Verify and register patient details upon arrival.
- Record initial vitals and symptoms.
- Initiate telemedicine call with doctor.
- Assist patient during consultation when required.

3.3 Appointment and Case Management

- Allow scheduling based on doctor availability.
- Create a case automatically when the CHW initiates a session.
- Notify the doctor of new cases or appointments.
- Support appointment cancellation and rescheduling.

3.4 Doctor Module

- Review patient case and uploaded medical documents.
- Conduct video consultations.
- Request laboratory tests if needed.
- Generate and submit digital prescriptions.
- Update patient records after consultation.

3.5 Teleconsultation Module

- Securely connect doctor and patient via video session.
- Provide real-time access to patient history.
- Support audio/video quality adjustments based on bandwidth.
- Log consultation details for future reference.

3.6 Prescription and Pharmacy Module

- Notify pharmacist whenever a new prescription is issued.
- Allow pharmacist to view, verify, and dispense medicines.
- Update system records after dispensing.

3.7 Admin Module

- Manage doctor schedules and availability.
- Add or remove system users.
- Access usage logs and generate administrative reports.

4. Interface Requirements

4.1 User Interface

- Simple, clean interface for patients and CHWs with minimal steps.
- Web-based dashboard for doctors, pharmacists, and admins.
- Mobile-optimized screens for rural telemedicine centers.
- Local language support depending on region.

4.2 Integration Interfaces

- Secure WebRTC-based video conferencing integration.
- Support for uploading and storing medical documents.
- Optional future integration with government health systems.

5. Performance Requirements

- The system should respond to basic actions such as loading records or booking appointments within 2–3 seconds.
- Video consultations should adapt to varying network strength through automatic bitrate adjustments.
- The backend should support multiple simultaneous consultations from different centers without performance degradation.
- Patient data synchronization must occur reliably whenever network connectivity is restored.

6. Design Constraints

- Must operate efficiently on low-end smartphones commonly used by CHWs.
- Should function in low-bandwidth environments.
- Must use a relational database (e.g., PostgreSQL) to maintain structured records.
- Should comply with standard software design practices suitable for UML modeling.

7. Non-Functional Attributes

7.1 Security

- Mandatory authentication for all users.
- Encrypted storage of patient data, prescriptions, and medical records.

7.2 Reliability

- The system should maintain high availability, with minimal downtime.
- Recovery measures must exist to restore interrupted sessions.

7.3 Scalability

- Capable of supporting additional telemedicine centers without architectural changes.

7.4 Usability

- Interfaces must be easy to understand for users with limited digital experience.

7.5 Portability

- Compatible with Android devices and major web browsers.

7.6 Compatibility

- Must work smoothly across Chrome, Firefox, Edge, and Safari.

7.7 Data Integrity

- Ensure consistency of records during case creation, prescription generation, and pharmacy updates.

8. Preliminary Schedule and Budget

The project will be executed over a 6-month timeline with key phases including requirements analysis, system design, core development with AI integration, and comprehensive testing. A pilot deployment will be conducted in the final phase to validate system performance in real-world rural healthcare scenarios.

Project Timeline: 6 Months

Phase	Duration	Key Activities	Deliverables
Phase 1: Planning & Analysis	3 weeks	<div>- Requirements gathering</div> <div>- Workflow validation</div> <div>- Stakeholder consultations</div>	<div>- SRS document</div> <div>- Use case diagrams</div> <div>- Activity diagrams</div>
Phase 2: Design	4 weeks	<div>- UI/UX mockups</div> <div>- Database design</div> <div>- System architecture</div>	<div>- Prototypes</div> <div>- Class diagrams</div> <div>- System architecture document</div>
Phase 3: Development	12 weeks	<div>- Frontend development</div> <div>- Backend APIs</div> <div>- AI integration</div> <div>- Video module</div>	<div>- Mobile app</div> <div>- Doctor dashboard</div> <div>- Admin panel</div>
Phase 4: Testing	4 weeks	<div>- Unit testing</div> <div>- Integration testing</div> <div>- Field trials (2 centers)</div>	<div>- Test reports</div> <div>- User feedback</div> <div>- Performance metrics</div>
Phase 5: Deployment	3 weeks	<div>- Pilot launch</div> <div>- Training programs</div> <div>- Documentation</div>	<div>- Live system</div> <div>- Training materials</div> <div>- User manuals</div>

Table 1: Project Timeline and Phase-wise Deliverables