SOFTWARE REQUIREMENT SPECIFICATIONS (SRS)

1. INTRODUCTION

1.1 Purpose

This SRS document outlines the functional and non-functional requirements for developing a comprehensive telemedicine platform – SwasthSetu - designed to address healthcare accessibility challenges in rural areas of Nabha, Punjab. The system aims to bridge the gap between rural patients and healthcare providers by leveraging digital technology and the internet to deliver remote consultation services, health record management, and medicine availability tracking.

1.2 Scope

SwasthSetu will include video consultation capabilities, digital health records management, medicine availability tracking, AI-powered symptom assessment, and support for multiple languages. The system is designed to be scalable for deployment across other rural regions in India while prioritizing low-bandwidth and offline functionality.

2. OVERALL DESCRIPTION

2.1 Product Features

- Multilingual video consultation interface supporting Hindi, Punjabi, and English
- Offline-accessible digital health records for rural patients
- Real-time medicine availability tracking across local pharmacies
- AI-powered symptom checker optimized for low-bandwidth areas
- Role-based access control for patients, doctors, pharmacy staff, and administrators

2.2 User Classes and Characteristics

The platform will serve the following user groups:

1. **Rural Patients**: Limited digital literacy, varying age groups, requiring offline capabilities and simple interfaces
2. **Healthcare Providers (Doctors)**: Moderate to high digital literacy, need for managing patient queues and consultation history
3. **Pharmacy Staff**: Require tools to update medicine inventory and respond to availability queries
4. **Hospital Administrators**: Need analytics, user management, and system monitoring capabilities

3. FUNCTIONAL REQUIREMENTS

3.1 User Authentication and Account Management

- **FR1.1:** The system shall support user registration with phone number verification using OTP (One-Time Password).
- **FR1.2:** The system shall provide secure login with option for biometric authentication (fingerprint/face recognition).
- **FR1.3:** The system shall support password reset functionality via SMS or registered email.
- **FR1.4:** The system shall maintain different role-based access levels (Patient, Doctor, Pharmacy Staff, Admin).

3.2 Video Consultation Module

- **FR2.1:** The system shall enable patients to book consultations with available doctors by selecting preferred time slots.
- **FR2.2:** The system shall support scheduled video consultations with adjustable quality (480p, 360p, 240p) based on bandwidth.
- **FR2.3:** The system shall allow doctors to manage consultation queue and access patient history during video calls.
- **FR2.4:** The system shall support screen sharing for doctors to show medical images or reports during consultation.
- **FR2.5:** The system shall record consultation metadata (duration, timestamp) and generate consultation summaries.
- **FR2.6:** The system shall support fallback to audio-only consultation if video is not possible due to bandwidth constraints.

3.3 Digital Health Records Management

- **FR3.1:** The system shall store comprehensive patient health records including medical history, prescriptions, and lab reports.
- **FR3.2:** The system shall allow patients to view their complete medical history and consultation records.
- **FR3.3:** The system shall support offline access to cached health records with automatic synchronization when connectivity is restored.
- **FR3.4:** The system shall enable doctors to update and add notes to patient records during and after consultations.
- **FR3.5:** The system shall support document attachment (prescriptions, reports, X-rays) with size compression for low-bandwidth transfer.
- **FR3.6:** The system shall maintain audit logs for all access and modifications to health records for security and compliance.

3.4 Medicine Availability Tracking

- **FR4.1:** The system shall allow pharmacies to maintain and update their medicine inventory with real-time stock levels.
- **FR4.2:** The system shall provide patients with a searchable database of available medicines and their locations.
- **FR4.3:** The system shall show nearest pharmacies with available medicines to patient based on location.
- **FR4.4:** The system shall send push notifications to pharmacies when prescriptions are issued, indicating required medicines.
- **FR4.5:** The system shall support integration with local pharmacy POS systems for automatic inventory updates.

3.5 AI-Powered Symptom Checker

- **FR5.1:** The system shall provide a symptom checker that asks guided questions in local languages.
- **FR5.2:** The system shall analyze symptoms and provide preliminary assessment with probability scores for possible conditions.
- **FR5.3:** The system shall recommend whether immediate consultation is needed or self-care measures can be tried.
- **FR5.4:** The system shall work in offline mode with cached symptom database.
- **FR5.5:** The system shall display appropriate disclaimers that symptom checker is not a replacement for professional medical advice.

3.6 Multilingual Support

- **FR6.1:** The system shall support interface in Hindi, Punjabi, and English with user-selectable language preference.
- **FR6.2:** The system shall support text-to-speech functionality for non-literate users.
- **FR6.3:** The system shall maintain language consistency across all modules and screens.

3.7 Notifications and Reminders

- **FR7.1:** The system shall send appointment reminders via SMS and push notification 24 hours before consultation.
- **FR7.2:** The system shall notify doctors of new consultation requests and patient queue updates.
- **FR7.3:** The system shall allow users to customize notification preferences and frequency.

4. NON-FUNCTIONAL REQUIREMENTS

4.1 Performance Requirements

- NFR1.1: The system shall load the home screen within 3 seconds on a 3G connection.
- NFR1.2: Video consultation initialization shall complete within 15 seconds.
- NFR1.3: Database queries shall respond within 2 seconds for typical operations.
- NFR1.4: The system shall support at least 100 concurrent video consultations without degradation.

4.2 Reliability and Availability

- NFR2.1: The system shall achieve 95+% uptime for patient-facing services.
- NFR2.2: The system shall implement automatic backup and disaster recovery with RPO of 1 hour.
- NFR2.3: The system shall continue basic functionality (offline health records, symptom checker) when internet is unavailable.

4.3 Security and Privacy

- NFR3.1: The system shall comply with Indian Digital Personal Data Protection (DPDP) Act 2023.
- NFR3.2: All health records shall be encrypted using AES-256 encryption in transit and at rest.
- NFR3.3: Video consultations shall use end-to-end encryption with TLS 1.2 or higher.
- NFR3.4: The system shall implement role-based access control with minimum privilege principle.
- NFR3.5: Authentication tokens shall expire after 30 minutes of inactivity.

4.4 Scalability

- NFR4.1: The system architecture shall support horizontal scaling for handling increased load.
- NFR4.2: The database shall support at least 10 million patient records with acceptable query performance.
- NFR4.3: The system shall be deployable to other rural regions in India with minimal configuration changes.

4.5 Usability

- NFR5.1: The system shall be usable by people with limited digital literacy through intuitive interface design.
- NFR5.2: All buttons and text shall be large enough for easy interaction on mobile devices.

5. DATA REQUIREMENTS

5.1 Data Types

The system shall manage the following data types: patient demographics, health records (diagnoses, medications, lab results), consultation metadata, video call recordings (optional), pharmacy inventory, medicine details, user accounts, and system audit logs. All personally identifiable information shall be treated as sensitive data requiring encryption and careful access control.

5.2 Data Storage

Patient data shall be stored in cloud databases with redundancy across multiple geographic locations. Local device storage shall cache frequently accessed data (health records, symptom database) for offline access. All data shall be encrypted at rest using AES-256 encryption.

6. SYSTEM CONSTRAINTS

1. Network Limitations: The system must function efficiently on 2G networks with average speeds of 50-100 kbps. Offline functionality is critical due to intermittent connectivity in rural areas.
2. Device Constraints: Must support devices with minimal specifications (100 MB free storage, 2 GB RAM) commonly found in rural areas.
3. Regulatory Compliance: Must comply with Indian data protection laws, telemedicine guidelines from Medical Council of India, and local health department regulations.
4. Language and Accessibility: Must support multiple local languages and be usable by people with limited digital literacy.
5. Budget and Resources: Development must be cost-effective to enable sustainability and scalability to other regions.

7. SYSTEM ARCHITECTURE

7.1 Architecture Overview

The system follows a three-tier architecture: Presentation Layer, Application Layer (APIs and Business Logic), and Data Layer (Cloud Databases).

7.2 Key Components

1. **Presentation Layer:** Native web application with offline-first design. Includes video consultation UI, health records viewer, medicine tracker, and symptom checker.
2. **API Layer:** RESTful APIs for patient management, consultation booking, health records, pharmacy integration, and analytics.

3. **Authentication Service:** OAuth 2.0-based authentication with JWT tokens and role-based access control.
4. **Video Service:** WebRTC-based solution for peer-to-peer video/audio streaming with adaptive quality adjustment.
5. **AI Service:** Machine learning models for symptom assessment and preliminary diagnosis suggestions.
6. **Notification Service:** Push notifications, SMS, and email delivery.
7. **Database Layer:** Cloud-managed databases for user accounts, health records, and transaction data. Caching layer for frequently accessed data. Distributed storage for media files.

Presentation

A web - based application with offline-first design. Video Consultation UI, Medicine Tracker, Health Records Viewer and Symptom Checker

Application

RESTful APIs for Patient Management, Consultation Booking Records and Pharmacy Integration

Data

Patient Demographics
Health Records
Consultation Metadata
Video Call Recordings
Pharmacy Inventory
Medicine Details

External

Integration of REST APIs with Hospital Management System
Integration with SMS Gateways
Optional Integration with Pharmacy POS Systems