**FUNCTIONAL DOCUMENT: HEART DISEASE PREDICTION SYSTEM**

**1. Introduction**

The Heart Disease Prediction System aims to revolutionize preventive healthcare by enabling early detection of cardiovascular risks using machine learning and artificial intelligence. This sprint focuses on implementing the vitals-based risk scoring model and integrating it with user health profiles to provide real-time diagnostic support and alerts.

**2. Product Goal**

The primary goal is to provide users and healthcare professionals with an intelligent tool for assessing heart disease risk. The system uses user-submitted vitals, wearable data, and historical records to predict cardiac events and suggest preventive actions. This sprint targets the core AI model deployment, frontend integration, and user dashboard setup.

**3. Demography (Users, Location)**

**Users**

* Target Users: General public, patients with existing conditions, cardiologists, healthcare professionals.
* User Characteristics: Varying tech literacy, age groups (30–75), chronic condition monitoring.

**Location**

* Target Locations: Urban and semi-urban health centers, telemedicine hubs, and personal home use across India and other emerging markets.

**4. Business Processes**

**User Registration and Profile Setup:**

* Secure signup using mobile/email.
* Input personal details, medical history, lifestyle habits.

**Vitals Upload and Integration:**

* Upload vitals manually or via connected devices.
* Sync with wearable APIs like Google Fit or Apple Health.

**Risk Score Prediction and Feedback:**

* AI model calculates risk score (low, moderate, high).
* Personalized health tips and alert generation.

**Doctor Dashboard and Alerts:**

* Doctors monitor assigned patients.
* System triggers alerts for abnormal readings or risk spikes.

**Data Logging and Report Generation:**

* Periodic report creation.
* Exportable PDF for teleconsultations or in-person reviews.

**5. Features**

This sprint includes implementation of the following features:

**Feature #1: AI-Based Risk Score Calculator**

**Description:**  
An ML model processes vitals (heart rate, BP, ECG readings, SpO2, cholesterol, glucose) and lifestyle factors to classify users into risk categories.

**User Story:**  
As a user, I want to receive an automated risk analysis based on my vitals so that I can understand my heart health status in real-time.

**Feature #2: Vitals Upload via Manual Entry and Wearables**

**Description:**  
Users can either input their vitals manually or sync data via smartwatches and fitness bands.

**User Story:**  
As a user, I want to sync my smartwatch data with the app so I don’t have to enter vitals manually.

**6. Authorization Matrix**

| **Role** | **Access Level** |
| --- | --- |
| Patient/User | Input vitals, view personal risk reports, export data |
| Cardiologist | Access assigned patient data, respond to alerts, adjust user profile |
| Admin | Manage users, models, reports, and system settings |
| Guest (optional) | Limited access to education content and registration features |

**7. Assumptions**

* Wearable APIs (Google Fit, Fitbit, etc.) will be stable and accessible throughout the sprint.
* Model accuracy will be initially benchmarked on UCI and PhysioNet datasets.
* Healthcare professionals will validate predictions with clinical judgement.
* Users will consent to health data being used for AI risk analysis.
* Cloud infrastructure and security protocols are pre-approved.