# BETHLEHEM UNIVERSITY

SOFTWARE REQUIREMENTS ENGINEERING

Software Requirements Specification (SRS) Document

DermaBot Application

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# Table of Content

# 1. Introduction

## 1.1 Purpose

***DermaBot app is designed with a noble cause , to empower people with expertise and aid through superior disease analysis. Specifically, it aims to address the demanding situations confronted by means of millions global in acquiring correct records and guidance associated with pores and skin illnesses.***

***In addition to the overarching purpose of supplying a complete device for disorder prognosis, DermaBot app has a particular recognition on skin sicknesses and related situations. This is an essential area in which obtaining reliable insights and steering can be difficult for lots.***

***To gain this, DermaBot app harnesses the electricity of artificial intelligence and gadgets by getting to know algorithms. These technologies not most effective make a contribution to correct disorder identity however additionally play a pivotal position in symptom identification, making sure customers receive unique facts about their skin ailments.***

***The DermaBot app's motive extends beyond mere analysis; it actively contributes to the early detection of sicknesses. By doing so, it addresses the reluctance of individuals to search for scientific interest for what may additionally seem like minor skin problems however ought to potentially signify more severe underlying situations.***

***Furthermore, DermaBot app is committed to reducing remedy expenses. Unnecessary consultations and remedies may be financially burdensome for individuals. By supplying accurate data and early detection, DermaBot app aims to streamline the healthcare manner, minimizing needless charges for customers.***

## 1.2 Scope

***The scope includes supplying customers with a platform to input signs and obtain immediate remarks on ability health situations. It includes utilizing a comprehensive medical database continuously updated with the modern day studies for unique results. The DermaBot app can design pointers and remedy plans based on a man or woman fitness record.***

## 1.3 Document Conventions

### *1.3.1 Terminology and Acronyms:*

- ***DermaBot Application: Refers to the entire application incorporating features such as Symptom Checker and Personalized Health Recommendations.(Dermatologist Chatbot Application)***
- ***User Interface (UI): The graphical interface through which users interact with the application.***
- ***HIPAA: Health Insurance Portability and Accountability Act, a U.S. law ensuring the protection of sensitive patient health information.***
- ***HTTP: HyperText Transfer Protocol.***
- ***HTTPS: HyperText Transfer Protocol Secure.***
- ***TCP/IP: Transmission Control Protocol/Internet Protocol.***
- ***REST: Representational State Transfer.***
- ***JSON: JavaScript Object Notation.***
- ***XML: eXtensible Markup Language.***
- ***Protocol Buffers (protobuf): A binary serialization format developed by Google.***
- ***SOAP: Simple Object Access Protocol.***
- ***GraphQL: A query language for APIs.***

### *1.3.2 Formatting Conventions:*

- ***Headings for Features: Features are denoted with a bold heading, followed by a description and key components.***
- ***Subcomponents: Subcomponents within features are numbered and presented in a bulleted format.***
- ***External Interface Requirements: Each requirement is outlined with a hierarchical structure, specifying the interface, functionality, and details.***
- ***Hardware and Software Interfaces: Details about compatibility and requirements are provided in a structured list format.***
- ***Communication Interfaces: Protocols and data formats are presented with a numbering system and bulleted key points.***
- ***Non-functional Requirements: Each requirement is presented in a structured format, specifying the aspect, condition, and acceptable criteria.***

## 1.4 Intended Audience

### 1.4.1 Developers

***Developers, this segment outlines the technical factors of the DermaBot app. It uses Python for backend improvement, integration with a PostgreSQL database, and the implementation of a Restful API for seamless communication among components.***

### 1.4.2 Regulatory Compliance Specialists

***Regulatory compliance professionals, this DermaBot app is designed with privacy in mind. All consumer facts are encrypted and securely saved, adhering to strict privacy policies which includes HIPAA. Our commitment to compliance extends to everyday audits to make sure the DermaBot app meets enterprise requirements.***

### 1.4.3 Quality Assurance/Testers

***QA/testers, your position is vital in ensuring the reliability of the DermaBot app. Test scenarios include inputting not unusual signs and symptoms to validate correct diagnoses, assessing the DermaBot app's response time, and accomplishing security testing to ensure consumer information safety.***

### 1.4.4 Stakeholders

***Stakeholders, the DermaBot app pursuits to empower people with short and dependable health diagnoses. By contributing to early disorder detection, it addresses concerns about approximately growing healthcare prices and offers a treasured tool for customers seeking accurate health facts.***

### 1.4.5 Project Managers

***Project managers, this phase offers a timeline for the development of the DermaBot app. Milestones include finishing the backend architecture by way of month one, integrating the symptom checker characteristic by means of month two, and accomplishing user reputation testing via month 3.***

### 1.4.6 Medical Professionals

***Medical specialists, this DermaBot app guarantees accuracy in diagnosis via utilizing an enormous clinical database, often up to date with the brand new studies from legitimate resources together with WHO and CDC. The algorithms are designed in collaboration with healthcare professionals to reflect modern scientific requirements.***

### 1.4.7 People Seeking Self-Diagnosis

***Individuals are willing to enter their symptoms and get hold of preliminary information or suggestions concerning potential skin conditions.***

### 1.4.8 General Users Seeking Information

***Individuals inquisitive about studying more about pores and skin situations, signs and symptoms, treatments, and preventive measures. This group might encompass human beings experiencing moderate pores and skin troubles, looking for advice on skincare workouts, or seeking out data about particular pores and skin conditions.***

# 2. Overall Description

## 2.1 Product Perspective

***The DermaBot app will interact with customers through a person-friendly interface, using APIs to get entry to a complete clinical database. It will perform independently on customers' devices, ensuring privacy and ease of use.***

## 2.2 Product Functions

***Key capabilities of DermaBot encompass a symptom checker function where customers can input symptoms with the aid of writing it or taking a photograph and acquire immediate comments on ability fitness conditions (Supports three languages: English, Arabic, Hebrew ). Also, the person can ask about positive Skin Diseases. Additionally, DermaBot will offer customized suggestions and treatment plans based totally on character health statistics and a recommendation for nearby docs if it is available.***

## 2.3 User Classes and Characteristics

***User training consists of general users searching for health records, people experiencing symptoms, clinical specialists using DermaBot as a supplementary tool, and directors handling the DermaBot app's database. Characteristics vary from simple to superior scientific know-how, influencing the depth of facts provided.***

## 2.4 Operating Environment

### 2.4.1 Hardware

#### 2.4.1.1 Smartphones and Tablets:

- ***IOS Compatibility : Ensure that DermaBot is compatible with iPhones and iPads running the latest iOS versions.***

- ***Android Compatibility: Likewise, make sure DermaBot is optimized for a variety of Android devices and supports different screens.***

#### 2.4.1.2 Camera and Microphone:

- ***Camera Quality: Consider the varying camera capabilities on different devices and ensure DermaBot can handle a range of image qualities.***

- ***Microphone Access: If voice input is a feature, ensure DermaBot requests and properly use microphone permissions.***

### 2.4.2 Software

#### 2.4.2.1 Operating Systems:

- ***Updates: Stay abreast of the latest updates for both iOS and Android to maintain compatibility.***

- ***Cross-Platform Considerations: If DermaBot is developed using a cross-platform framework (e.g., React Native), ensure compatibility across both major operating systems.***

#### 2.4.2.2 Web Servers:

- ***API Compatibility: If your app communicates with a server, ensure the server's API is well-documented and follows industry standards.***

#### 2.4.2.3 Database Management System:

- ***Scalability: Consider the potential growth of the medical database and ensure the chosen database system can scale accordingly.***
- ***Data Security: Implement robust security measures to protect the integrity and confidentiality of stored health data.***

#### 2.4.2.4 Programming Language and Frameworks:

- ***Maintainability: Choose languages and frameworks that are maintainable and have active community support for ongoing updates.***

### 2.4.3 Network

#### 2.4.3.1 Internet Connection

- ***Offline Functionality: Consider providing some level of functionality offline, and gracefully handle scenarios where the internet connection is intermittent.***

#### 2.4.3.2 Security Protocols

- ***End-to-End Encryption: Implement end-to-end encryption to protect user data from unauthorized access during transmission.***
- ***User Authentication: Use secure authentication methods to verify the identity of users accessing DermaBot.***

## 2.5 Design and Implementation Constraints

### 2.5.1 Regulatory Compliance

- ***Data Retention Policies: Comply with regulations regarding the retention and deletion of user data. Define clear policies on how long user data will be stored and when it will be permanently deleted.***
- ***Audit Trails: Implement audit trails to track access to sensitive data, ensuring accountability and compliance with regulatory requirements.***

### 2.5.2 Data Privacy and Security

- ***Incident Response Plan: Develop a comprehensive incident response plan to address potential security breaches promptly and effectively.***

- ***Regular Security Audits: Conduct regular security audits to identify vulnerabilities and weaknesses in the system. This helps in proactively addressing security concerns.***

### 2.5.3 Interoperability

- ***API Documentation: Provide thorough documentation for any APIs used in DermaBot to facilitate integration with external systems. This can be especially crucial if healthcare providers or systems need to interact with DermaBot.***

- ***Standardized Data Formats: Use standardized data formats for communication to enhance interoperability. Formats like FHIR (Fast Healthcare Interoperability Resources) can be considered.***

### 2.5.4 User Accessibility

- ***User Testing with Diverse Groups: Conduct user testing with individuals representing diverse abilities and backgrounds to ensure DermaBot is accessible to a wide range of users.***

- ***Adaptive Interfaces: Implement adaptive interfaces that adjust to different screen sizes, resolutions, and accessibility settings.***

### 2.5.5 Technological Limitations

- ***Performance Optimization: Employ performance optimization techniques to ensure DermaBot runs smoothly on devices with varying specifications.***

- ***Offline Functionality: Consider incorporating features that allow users to access certain functionalities even when they are offline.***

### 2.5.6 Continuous Updates and Maintenance

- ***Patch Management: Establish a patch management process to swiftly deploy updates and patches to address any security vulnerabilities.***

- ***User Education: Provide educational resources within DermaBot to keep users informed about the importance of updating DermaBot for security and performance enhancements.***

## 2.6 User Documentation

### 2.6.1 Installation Guide

- ***Platform-Specific Instructions: Provide detailed instructions for users on how to download and install DermaBot on their specific devices, including screenshots if possible.***

- ***Troubleshooting Tips: Anticipate common installation issues and provide troubleshooting tips to help users resolve them.***

### 2.6.2 User Manual

- ***Feature Descriptions: Offer in-depth explanations of each feature, outlining how they benefit the user and contribute to their overall experience.***

- ***Use Case Scenarios: Include real-life scenarios to illustrate how users can effectively utilize DermaBot for their health-related needs.***

### 2.6.3 Account Setup and Login Instructions

- ***Account Security Tips: Educate users on best practices for creating a secure password and enabling additional security features such as two-factor authentication if applicable.***

- ***Password Recovery Process: Clearly outline the steps for users to recover their account in case they forget their password.***

### 2.6.4 Privacy and Security Guidelines

- ***Data Handling Policies: Provide transparent information on how user data is collected, stored, and used within DermaBot.***

- ***Security Measures: Detail the security measures in place to protect user data, including encryption protocols and regular security audits.***

### 2.6.5 Symptom Checker Usage Guide

- ***Sample Interactions: Include step-by-step examples of using the symptom checker for different health scenarios.***

- ***Interpretation of Results: Explain how users should interpret the results provided by the symptom checker and guide them on the next steps to take.***

### 2.6.6 FAQ Section

- ***Categorized FAQs: Organize frequently asked questions into categories for easy navigation.***

- ***Visual Elements: Consider using visual elements such as icons or infographics to enhance understanding.***

### 2.6.7 Contact and Support Information

- ***Availability Hours: Clearly state the hours during which customer support is available.***

- ***Response Expectations: Set expectations regarding response times for user inquiries.***

### 2.6.8 Updates and Release Notes

- ***User Benefits: Highlight how updates improve the user experience, introduce new features, or address common user concerns.***

- ***Scheduled Maintenance Notices: Inform users in advance about any scheduled maintenance that might temporarily affect app access.***

### 2.6.9 Terms of Service and Privacy Policy

- ***User Consent: Clearly communicate that using DermaBot implies user consent to the terms of service and privacy policy.***

- ***Plain Language Summaries: Provide simplified, plain-language summaries of key points in the terms of service and privacy policy.***

### 2.6.10 Feedback Mechanism

- ***User-Friendly Feedback Forms: Implement easy-to-use forms within DermaBot for users to submit feedback.***

- ***Acknowledgment and Follow-up: Let users know their feedback is valued, and if possible, provide follow-up responses to submitted feedback.***

## 2.7 Assumptions

### 2.7.1 User Engagement

- ***Assumption: Users will actively engage with features like the symptom checker and treatment recommendations.***

- ***Implication: The success of DermaBot relies on a user base that actively utilizes its key features. Strategies for user engagement, such as push notifications or personalized recommendations, should be considered.***

### 2.7.2 Data Accuracy

- ***Assumption: The medical database used for symptom checking is accurate and frequently updated.***

- ***Implication: Regular collaboration with reputable medical sources and professionals is necessary to ensure the accuracy of information. A system for prompt database updates should be in place to reflect the latest medical knowledge.***

### 2.7.3 User Privacy Awareness

- ***Assumption: Users are aware of and comfortable with DermaBot's data collection practices for symptom checking and health recommendations.***

- ***Implication: Incorporate user-friendly privacy notifications within DermaBot , clearly explaining how user data is used and emphasizing security measures. Consider implementing an opt-in approach to foster user trust.***

### 2.7.4 Mobile Device Usage

- ***Assumption: The primary mode of access is through mobile devices (smartphones and tablets).***

- ***Implication: Design DermaBot with a mobile-first approach, optimizing user interfaces for smaller screens. Consider the varying screen sizes and resolutions of different devices to ensure a consistent and pleasing user experience.***

## 2.8 Dependencies

### 2.8.1 API Integration

- ***Dependency: Integration with external APIs for real-time updates and data retrieval.***

- ***Implication: Establish service level agreements (SLAs) with external providers to ensure data availability and uptime. Regularly monitor API performance and have contingency plans in case of disruptions.***

### 2.8.2 Regulatory Compliance

- ***Dependency: Adherence to healthcare regulations, including but not limited to HIPAA.***

- ***Implication: Collaborate with legal and compliance experts to ensure that DermaBot 's data handling practices comply with healthcare regulations. Regularly review and update policies to align with evolving regulatory standards.***

### 2.8.3 Server Infrastructure

- ***Dependency: A robust server infrastructure to handle user requests, store data securely, and manage the backend processes.***

- ***Implication: Invest in scalable server solutions to accommodate growing user numbers. Implement redundancy and failover mechanisms to minimize downtime. Regularly conduct performance testing to identify and address potential bottlenecks.***

### 2.8.4 User Feedback Loop

- ***Dependency: Regular user feedback for continuous improvement and feature enhancement.***

- ***Implication: Implement in-app feedback mechanisms and actively encourage user participation. Establish a process for analyzing and prioritizing user feedback to inform ongoing development cycles.***

### 2.8.5 Technological Compatibility

- ***Dependency: Compatibility with the latest versions of mobile operating systems (iOS and Android).***

- ***Implication: Stay informed about upcoming OS releases and plan for timely updates to ensure compatibility. Test DermaBot thoroughly on beta versions of new OS releases to identify and resolve potential issues in advance.***

### 2.8.6 Health Information Sources

- ***Dependency: Access to reputable sources for continuously updating the medical database.***

- ***Implication: Establish partnerships with medical institutions, research organizations, and authoritative health websites to ensure a diverse and reliable information feed. Implement a content validation process to verify the credibility of new data before inclusion in the database.***

# 3. System Features

## 3.1 Feature 1 : Symptom Checker

- ***Description: The Symptom Checker is a sophisticated tool designed to assist users in self-assessing their health conditions. It employs advanced algorithms and a continually updated medical database to analyze user-input symptoms and provide insightful feedback.***

- ***Key Components:***

    a) ***User-Friendly Interface***

    ***The Symptom Checker features an intuitive interface, guiding users through a series of questions related to their symptoms. The language used is simple and non-technical to cater to users of varying health literacy levels.***

    b) ***Multi-Symptom Analysis***

    ***Users can input multiple symptoms simultaneously, allowing for a more accurate and nuanced analysis. The Symptom Checker considers the interplay of symptoms to provide a comprehensive assessment.***

c) ***Image Upload Capability***

***Users can upload images related to their symptoms, such as skin conditions or injuries. The app employs secure image processing and storage methods, ensuring privacy and compliance with healthcare regulations.***

d) ***Instant Feedback***

***The Symptom Checker provides real-time feedback on potential health conditions based on the entered symptoms. The results are presented in a clear and understandable format, empowering users with immediate insights into their health concerns.***

e) ***Recommendations for Further Action***

***Depending on the severity of the symptoms, the app offers recommendations for further action. This could include advice on self-care, scheduling a doctor's appointment, or seeking urgent medical attention.***

f) ***Privacy Assurance***

***A robust privacy framework is in place to assure users that their health data, including symptoms and images, is handled with the utmost confidentiality. Compliance with privacy regulations, such as HIPAA, is a top priority.***

## 3.2 Feature 2 : *Personalized Health Recommendations*

- ***Description: The Personalized Health Recommendations feature goes beyond the Symptom Checker, leveraging user-specific data to offer tailored advice and interventions. It aims to assist users in achieving their health goals and maintaining overall well-being.***

- ***Key Components:***

    a) ***User Health Profile: without internet connection***

    ***Users can create a detailed health profile within the app, including medical history, allergies, current medications, and lifestyle choices. This forms the foundation for personalized recommendations.***

    b) ***Integration with Symptom Checker Data***

    ***The feature seamlessly integrates data from the Symptom Checker. This ensures that health recommendations are not only based on the user's stated health profile but are also influenced by real-time symptoms and conditions.***

c) ***Goal Setting and Monitoring***

***Users can set personalized health goals, whether related to weight management, fitness, or stress reduction. The app provides regular updates on progress, adjusting recommendations based on the user's achievements.***

d) ***Medication Reminders***

***DermaBot includes a medication management system. Users can input their medications, dosages, and schedules, and the app sends timely reminders to ensure adherence.***

# 4. External Interface Requirements

## 4.1 User Interfaces

***The functionalities of the DermaBot application are designed to be easy to use and convenient for users and administrators, ensuring an interactive experience.***

### 4.1.1 User registration and verification interface

- ***Secure access screens handle the authentication process.***
- ***Users will have access to a user registration interface where they can provide information, such as their email address.***

### 4.1.2 Symptom Tester Communication

- ***Users can easily input skin symptoms.***
- ***The interface will guide users step by step through the signal testing process to ensure clarity and completeness.***

### 4.1.3 Photo upload interface

- ***The user-friendly interface allows users to effortlessly upload photos of their skin condition.***
- ***The interface will support images (JPEG,PNG) Provide feedback on successful placements.***

### 4.1.4 Survey Response Link

- ***Clear and informative interfaces provide users with feedback on skin condition.***
- ***Detailed, relevant information about diagnosed skin conditions will be provided in a format that is easy for users to understand.***

### 4.1.5 User-friendly suggestion feature

- ***The application will offer personalized recommendations and treatment options through the user interface.***
- ***Users can easily do so. Use these tips to effectively manage their skin problems.***
- ***It's not enough.***

### 4.1.6 Management interface, for dermatologists

- ***Dermatologists and administrators will have access to an interface specifically designed to manage and update the dermatology database.***
- ***This interface will provide us with tools to add, change, or remove information about the skin condition.***

## 4.2 Hardware Interfaces

***DermaBot application has minimal hardware requirements and is designed to be compatible with standard computing devices:***

- ***Personal Computers (PCs)***
- ***Laptops***
- ***Tablets***
- ***Smartphones***

## 4.3 Software Interfaces.

### 4.3.1 Work Plan

- ***The application is compatible with these operating systems (Windows, macOS, iOS, and Android.)***

### 4.3.2 Web Browser

- ***Users can access applications through these web browsers ( Chrome, Firefox, Safari, Brave,Toor and Edge.)***

### 4.3.3 Database Operating System

- ***The application interfaces with a database management system to store and retrieve dermatological information like (Skin Condition Records , Patient Information Management , Image Storage..)***

## 4.4 Communication Interfaces.

***Interactivity in a dermatology chatbot application is essential for real-time updates and feedback. The following protocols and data formats are used.***

### 4.4.1 Communication Protocols

- HTTP/HTTPS

  **Purpose:** Transfers hypertext documents on the web.

  **Key Points:** Stateless, request-response cycle, uses methods like GET and POST.

- TCP/IP

  **Purpose:** Ensures reliable data transfer over the internet.

  **Key Points:** Three-Way Handshake (SYN, SYN-ACK, ACK), suite of protocols.

- REST:

  **Purpose:** Architectural style for web services.

  **Key Points:** Uses HTTP, resources identified by URIs, stateless.

- WebSocket:

  **Purpose:** Real-time, full-duplex communication.

  **Key Points:** Single, long-lived connection.

### 4.4.2 Data Formats

- ***JSON***

  ***Purpose: Lightweight data interchange.***

  ***Key Points: Key-value pairs, easy to read and parse.***

- ***XML***

  ***Purpose: Data storage and transport.***

  ***Key Points: Uses tags to define elements, more verbose.***

- ***Protocol Buffers (protobuf)***

  ***Purpose: Binary serialization format.***

  ***Key Points: Compact size, fast encoding/decoding.***

- ***SOAP***

  ***Purpose: Exchange structured information in web services.***

  ***Key Points: XML-based messaging protocol.***

- ***GraphQL***

  ***Purpose: Query language for APIs.***

  ***Key Points: Clients define response structure, flexible.***

# 5. Non-Functional Requirements

## 5.1 Accuracy:

Deram must have a hit rate of at least 95% when answering questions in a standardized test suite.

## 5.2 Response speed:

Deram should provide a response in less than 1 second on 90% of user requests.

## *5.3 Scalability:*

Deram must be able to handle at least 1000 concurrent requests with an average response time of fewer than 2 seconds.

## 5.4 Reliability:

Deram should have an error rate of less than 0.1% when providing responses to users.

## 5.5 Security:

Deram must use end-to-end encryption and data protection to protect user information and pass regular security tests.

## 5.6 Adaptability:

Deram must be able to customize responses based on information provided by users, such as past conversation history and language preferences.

## 5.7 Ease of use:

Deram should be rated by at least 90% of users as easy to use and intuitive, with constant user feedback being incorporated for improvements.

## 5.8 Availability:

Deram must be guaranteed to be available at least 99.9% of the time, with a contingency process to recover from failures in less than 30 minutes.

## 6- Use-Case Diagram: