SOFTWARE REQUIREMENT SPECIFICATION (SRS)

MindCare v1.0 - A Chatbot for Mental Health Support

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Table of contents

1. Introduction

The software **MindCare Chatbot™ v1.0** is designed to provide real-time, empathetic mental health support through a conversational AI interface. MindCare Chatbot™ enables users to engage in meaningful conversations that offer emotional comfort, suggest personalized mental health resources, and detect signs of severe distress to guide users toward professional help or crisis services.

Through its intuitive and user-friendly interface, the chatbot ensures accessibility while prioritizing user privacy and security. The system leverages NLU to assess users' emotional states and deliver tailored responses that align with evidence-based mental health practices. The software aims to enhance accessibility to mental health support, making it more available, stigma-free, and personalized.

1.1 Purpose

This SRS document defines the External Interface, Performance, and Software System Attribute requirements of **MindCare Chatbot™ v1.0**. It serves as a comprehensive guide for the following stakeholders:

- **Developers** – For system development, maintenance, and future upgrades.
- **Mental Health Professionals** – To ensure ethical and evidence-based conversational responses.
- **Project Management Team** – For planning, execution, and oversight.
- **Quality Assurance (QA) Testers** – For validation, testing, and optimization.
- **End Users** – To understand the chatbot's capabilities and limitations.

1.2 Scope

The chatbot will be available as a **web application** with a text-based chat interface. User interactions will be encrypted to maintain privacy, and compliance with data protection regulations such as **the Personal Data Protection Bill (PDPB)** will be ensured.

Project Timeline & Cost Estimate

- **Expected Completion Time:** 3 months

1.3 Definitions, Acronyms, and Abbreviations

Term	Definition
AI	Artificial Intelligence
CBT	Cognitive Behavioral Therapy
GDPR	General Data Protection Regulation
HIPAA	Health Insurance Portability and Accountability Act
NLU	Natural Language Understanding
NLP	Natural Language Processing

1.4 References

The references for this project include:

1. GDPR Compliance: https://gdpr.eu/
2. HIPAA Regulations: https://www.hhs.gov/hipaa/
3. APA Guidelines on Mental Health Support: https://www.apa.org
4. IEEE 830-1998 – Software Requirements Specification Standard

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1.5 Overview

- **Section 1.0** discusses the purpose and scope of the software.

- **Section 2.0** describes the overall functionalities, constraints, and user characteristics.
- **Section 3.0** details all the external interface requirements needed to design the chatbot.
- **Section 4.0** defines the system features.
- **Section 5.0** outlines non-functional requirements such as performance, security, and availability.
- **Section 6.0** lists any additional requirements and business rules.

2. Overall Description

2.1 Product Perspective

MindCare Chatbot™ v1.0 is a **standalone conversational AI system** designed to provide mental health support through intelligent interactions. It operates as a **digital mental health assistant**, available as a web-based application, allowing users to engage in **empathetic and guided conversations**.

Key Features & Functional Components:

- **Conversational AI Engine:** Processes user inputs using NLP and Sentiment Analysis.
- **Personalized User Experience:** Adapts responses based on user preferences, history, and mental health needs.
- **Self-Help & Recommendation System**: Provides evidence-based CBT exercises, guided meditation, and relaxation techniques while suggesting relevant articles, personalized exercises, and crisis helpline numbers for additional support.
- **Crisis Intervention Mechanism:** Identifies distress signals and guides users toward professional help or emergency services.
- **Data Privacy & Security:** Ensures strict compliance with **HIPAA, GDPR, the Personal Data Protection Bill (PDPB)**, and other relevant data protection standards, with **end-to-end** encryption for all user interactions.

MindCare Chatbot™ interacts with users through an intuitive UI, ensuring accessibility while maintaining user anonymity. It does not replace professional therapy but serves as an **accessible, preliminary support system** for individuals seeking mental health guidance.

2.2 Product Functions

The primary functions of MindCare Chatbot™ are:

2.2.1. Onboarding & User Personalization:

- Users can **register anonymously** or sign in for a personalized experience.
    - A quick assessment helps the chatbot tailor responses based on user needs.

- Users can set preferred interaction modes: **text-based chat, or structured prompts**.

2.2.2. Emotional Support & Conversational AI:

- AI-driven dialogue provides **empathetic and meaningful responses**.
- Uses **sentiment analysis** to gauge emotional state and adjust its responses.
- Offers support through **structured conversations** or free-flow discussions.

2.2.3. Self-Help Exercises & Coping Strategies:

- Provides **guided breathing exercises, mindfulness techniques, and journaling prompts**.
- Suggests **CBT-based reframing exercises** for stress and anxiety management.
- Tracks user progress over time, offering personalized recommendations.

2.2.4. Mental Health Resource Recommendations:

- Suggests **articles, podcasts, guided meditations, and external support networks**.
- Offers access to curated **mental health blogs and research-backed strategies**.

2.2.5. Crisis Detection & Emergency Assistance:

- Recognizes **red-flag phrases and high-stress indicators** in conversations.
- Provides **immediate guidance** on coping strategies or professional helplines.
- Notifies the user's **emergency contact** when severe distress is detected, ensuring timely intervention.
- Directs users to **emergency services** when severe distress is detected.

2.3 User Characteristics

MindCare Chatbot™ is designed to cater to different user groups, each with varying levels of familiarity with mental health resources and technology.

1. **User A: First-Time or Novice User**
    - Has minimal experience with mental health chatbots or digital therapy.
    - May need step-by-step guidance for self-help techniques.
    - Requires simple, structured prompts and reassurance.
2. **User B: Experienced User**

    - Regularly uses digital tools for mental health support.
    - Prefers quick, targeted responses with less hand-holding.
    - May use advanced features like self-help tracking and AI-driven insights.
3. **User C: Anonymous User**
    - Prefers not to create an account or log in for privacy reasons.
    - Seeks immediate, confidential support without long-term tracking.
    - May have heightened concerns about data security and anonymity.
    - Can access chatbot features with limitations on saved progress or personalized insights.

2.4 Constraints

1. **Ethical and Privacy Constraints:**
    - Must **not replace** professional therapy; chatbot is only a **preliminary support tool**.
    - Adheres to **GDPR, HIPAA, and AI Ethics guidelines** for responsible AI deployment.
2. **Technical Constraints:**
    - AI sentiment analysis accuracy should be **at least 60%**.
    - Securing user details using encryption.
3. **Crisis Detection & Legal Limitations:**
    - AI must **identify but not diagnose** mental health disorders.
    - Crisis detection should **avoid false positives** while ensuring safety.
    - Emergency response must comply with **local regulations** for mental health assistance.

2.5 Assumptions

The effectiveness of MindCare Chatbot™ is dependent on the following factors:

Assumptions:

- Users **understand that the chatbot is NOT a substitute for professional therapy**.
- Crisis intervention will **not guarantee real-time emergency responses**, but will guide users toward professional help.
- The chatbot assumes **a reliable internet connection** for smooth functioning.

3. External Interface Requirements

3.1 User Interface Requirements

The **MindCare Chatbot™** interface must be **user-friendly, accessible, and intuitive**, ensuring seamless interaction for all users, including first-time users and mental health professionals.

3.1.1 General User Interface Features

- **Conversational UI:** Supports **text-based chat,, and structured prompts**.
- **Guided Assistance:** Provides **interactive help** for each feature.

3.1.2 User Flow

Login & Authentication:

- Users can log in anonymously or via a secure account-based system.
- Failed login attempts allow ten retries before prompting a password reset.

Onboarding Session:

- After login, users go through an onboarding session to set preferences for mental health support.
- Users can provide their emergency contact details for crisis intervention (optional).
- Preferences help personalize chatbot responses and resource recommendations.

Dashboard:

- Displays available mental health tools, chatbot interface, and recommended resources.

Chatbot Interface:

- Allows users to start conversations, ask mental health-related questions, and access self-help exercises.

Self-Help & Resources:

- Users can access CBT exercises, guided meditation, and relaxation techniques.
- Provides links to external mental health resources and crisis helplines.

Crisis Detection & Intervention:

- If distress signals are detected, the chatbot prompts the user to contact a mental health professional.
- In severe cases, the chatbot can notify the user's emergency contact if they have opted in.

3.1.3 Display & Input Requirements

- **Screen Size:** Minimum **10-inch** for web.
- **Keyboard Support:** Supports **physical or virtual**.
- **Reports:** Users can request a **session summary** via **email or downloadable PDF**.

3.2 System Requirements

- **Supported Devices**: Web browsers (requires a stable internet connection), mobile devices (Android/iOS). Gmail authentication is required for login.
- **Security & Performance**: Implements Cipher encryption for stored data to ensure data protection and compliance with security standards.

3.3 Software Interface Requirements

MindCare Chatbot™ interacts with multiple software components for authentication, sentiment analysis, and resource management.

3.3.1 Software Dependencies

- **NLP:** Uses **Hugging Face models**.
- **Sentiment Analysis:** Integrated with **NLTK models**.
- **Database:**
    - Uses **MongoDB** for storing anonymized user preferences.
    - Implements a **Pinecone vector database** for efficient semantic search and retrieval of mental health resources.

4. System Features

4.1 AI-Powered Mental Health Assistance

4.1.1 Description

The system is designed to provide users with **AI-driven mental health support**, allowing them to engage in confidential and intelligent conversations for emotional well-being. The chatbot will assist users in managing stress, anxiety, and depression without requiring human intervention.

The system functions as follows:

- **Login & Authentication:**
    - The user is provided with a login screen, where they enter their username and password for verification.
    - In case of an unsuccessful login, the user is given up to ten attempts to enter correct credentials. If all attempts fail, the account is temporarily locked and requires admin approval for reactivation.
- **Onboarding Session:**
    - After successful login, users are directed to an onboarding session where they:
        - Provide **personal preferences** for mental health support (e.g., preferred coping strategies, resources, etc.).
        - Enter their **emergency contact information** (optional but recommended for crisis intervention).
    - At the end of the onboarding session, users get **a summary** of the session.
- **Main Chat Interface:**
    - After onboarding, users are directed to the main chat interface, where they can begin interacting with the chatbot.
    - The chatbot provides various self-help options, including:
        - Guided **breathing exercises** to manage anxiety.
        - **CBT** tips for stress management.
        - **Daily mental health check-ins** to track emotional well-being.
        - **Emergency helpline recommendations** in case of crisis situations.

    Additional Features:

    - **Self-help Resource Library:** Provides articles, podcasts, and videos on mental health topics.
- **Session Summary:**

    - After the chat ends, users can download a summary of the session, including:
        - Emotional check-ins.
        - Resources used or recommended.
        - The status of any crisis intervention initiated during the session.

4.1.2 Validity Checks

- Users must enter their **correct login credentials** to access the chatbot.
- If an account remains inactive for a long period, a **session timeout** will occur, requiring re-login.
- Users can only engage with one chat session at a time.

4.1.3 Sequencing Information

- User information and chat history should be **stored securely in a database**.

4.1.4 Error Handling & Response to Abnormal Situations

- If a user enters incorrect login details, appropriate **error messages** will be displayed.
- If the chatbot fails to generate a response, a **fallback message** will be displayed, directing the user to alternative support options.

4.2 Chat Summary and Session Report Generation

4.2.1 Description

After each session, a **chat summary** is generated, providing the user with insights into their conversation. The format of the summary is as follows:

MindCare Chatbot™ v1.0

Session Summary

- **Date:** [DD/MM/YYYY]
- **User ID:** [User's unique identifier]
- **Chat Duration:** [Time spent in session]
- **Mood Trends:** [Detected emotions throughout the chat]

- **Suggested Coping Strategies:**
    - [E.g., Deep breathing exercises]
    - [E.g., Journaling for self-reflection]
- **Recommended Resources:**
    - [E.g., Article on managing stress]
    - [E.g., Video on mindfulness techniques]
- **Emergency Contact Suggestions (if applicable):**
    - [Helpline number based on user location]

Thank you for using MindCare Chatbot™. Take care!

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The following list provides a brief summary of the performance requirements for the MindCare Chatbot™ software:

5.1.1 Capacity

- The chatbot shall provide **24/7 availability** for mental health support.

5.1.2 Quality

The primary objective is to ensure **high-quality** chatbot interactions. As software quality is difficult to measure quantitatively, the following guidelines will be used:

1. **Consistency** – All chatbot responses and user interface components will be consistent in terms of design and interaction.
2. **Testing** – All chatbot features will undergo **extensive testing**, including unit tests, integration tests, and real-world scenario testing.

5.2 Software System Attributes

5.2.1 Reliability

- The chatbot shall ensure user privacy by using secure data transmission protocols and storing session data in encrypted databases to prevent unauthorized access and data loss.

5.2.2 Availability

- The chatbot shall be available **24/7** with minimal downtime.

5.2.3 Security

- The chatbot shall comply with mental health data security regulations, including **HIPAA, GDPR, and the Personal Data Protection Bill (PDPB)**, along with other relevant local and international data protection standards.
- User **passwords shall be 8-16 characters long** and must contain at least one uppercase letter, one number, and one special character.

- User login attempts shall be **limited to 10**, after which account access will be temporarily blocked.
- All sensitive user data shall be stored using **Cipher encryption**.
- Chat logs shall be anonymized to protect user privacy.
- In case of an **emergency keyword (e.g., "I need help")**, the chatbot shall **immediately connect the user to a crisis helpline**.**Sends a notification** to the user's provided **emergency contacts** (if available) with the user's permission.

5.2.4 Maintainability

- The chatbot shall have a **modular architecture**, allowing easy updates and bug fixes.

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6. Business Rules

The business rules for the MindCare Chatbot™ software are as follows:

- If a user **requests account deletion**, their **personal data must be permanently removed** from the system within **24 hours**.
- The system shall maintain a **log of the following records**:
    - User session details (without storing chat content).
    - Security incidents and response actions.