

DEPARTMENT OF COMPUTER SCIENCE
NORTH CAROLINA A&T STATE UNIVERSITY

SYSTEM REQUIREMENTS SPECIFICATION

COMP 496: SENIOR DESIGN II Spring 2025



Stack Underflow

Lumi

Jolisa Fields

Maya Swan

Laila Donaldson

Dana Brunson

Nicolas Harris

REVISION HISTORY

Revision	Date	Author(s)	Description
0.1	02.09.2025	JF,MS, LD	document creation
0.2	02.12.2025	JF,NH,MS,	add picture
0.3	02.15.2025	LD,DB	Table of contents
1.0	02.20.2025	NH,JF,LD	Section Edits
1.1	02.23.2025	MS,JF,DB	Final Document

Contents

LIST OF FIGURES	7
1 PRODUCT CONCEPT	8
1.1 PURPOSE AND USE	8
1.2 INTENDED AUDIENCE	8
2 PRODUCT DESCRIPTION	8
2.1 FEATURES & FUNCTIONS.....	9
2.2 EXTERNAL INPUTS & OUTPUTS	9
2.3 PRODUCT INTERFACES	10
3 CUSTOMER REQUIREMENTS	11
3.1 Personalized Daily Check-Ins.....	11
3.1.1 DESCRIPTION	11
3.1.2 SOURCE	11
3.1.3 CONSTRAINTS.....	11
3.1.4 STANDARDS.....	11
3.1.5 PRIORITY.....	11
3.2 Text Analysis & Advice	11
3.2.1 DESCRIPTION	11
3.2.2 SOURCE	11
3.2.3 CONSTRAINTS.....	11
3.2.4 STANDARDS.....	11
3.2.5 PRIORITY.....	11
3.3 Emergency Detection.....	13
3.3.1 DESCRIPTION	13
3.3.2 SOURCE	13
3.3.3 CONSTRAINTS.....	13
3.3.4 STANDARDS.....	13
3.3.5 PRIORITY.....	13
3.4 Coping Tools & Resources.....	13
3.4.1 DESCRIPTION	13
3.4.2 SOURCE	13
3.4.3 CONSTRAINTS	13
3.4.4 STANDARDS.....	13
3.4.5 PRIORITY.....	13
3.5 Logging & Mood Tracking	13
3.5.1 DESCRIPTION	13

3.5.2	SOURCE	14
3.5.3	CONSTRAINTS.....	14
3.5.4	STANDARDS.....	14
3.5.5	PRIORITY.....	14
4	PACKAGING REQUIREMENTS	15
4.1	Cloud Deployment	15
4.1.1	DESCRIPTION	15
4.1.2	SOURCE	15
4.1.3	CONSTRAINTS.....	15
4.1.4	STANDARDS.....	15
4.1.5	PRIORITY.....	15
4.2	Augmented Reality (AR) Feature Packaging.....	16
4.2.1	DESCRIPTION	16
4.2.2	SOURCE	16
4.2.3	CONSTRAINTS.....	16
4.2.4	STANDARDS.....	16
4.2.5	PRIORITY.....	16
4.3	User Interface (UI) Packaging.....	17
4.3.1	DESCRIPTION	17
4.3.2	SOURCE	17
4.3.3	CONSTRAINTS.....	17
4.3.4	STANDARDS.....	17
4.3.5	PRIORITY.....	17
5	PERFORMANCE REQUIREMENTS	18
5.1	Fast Response Time for User Input	18
5.1.1	DESCRIPTION	18
5.1.2	SOURCE	18
5.1.3	CONSTRAINTS.....	18
5.1.4	STANDARDS.....	18
5.1.5	PRIORITY.....	18
5.2	Data Storage and Retrieval	19
5.2.1	DESCRIPTION	19
5.2.2	SOURCE	19
5.2.3	CONSTRAINTS.....	19
5.2.4	STANDARDS.....	19
5.2.5	PRIORITY.....	19

5.3	Application Setup Time	19
5.3.1	DESCRIPTION	19
5.3.2	SOURCE	19
5.3.3	CONSTRAINTS.....	19
5.3.4	STANDARDS.....	19
5.3.5	PRIORITY.....	19
6	SAFETY AND SECURITY REQUIREMENTS	20
6.1	Data Protection and Encryption.....	20
6.1.1	DESCRIPTION	20
6.1.2	SOURCE	20
6.1.3	CONSTRAINTS.....	20
6.1.4	STANDARDS.....	20
6.1.5	PRIORITY.....	20
6.2	User Authentication & Authorization	21
6.2.1	DESCRIPTION	21
6.2.2	SOURCE	21
6.2.3	CONSTRAINTS.....	21
6.2.4	STANDARDS.....	21
6.2.5	PRIORITY.....	21
6.3	TEXT ANALYSIS & EMERGENCY RESPONSE PRIVACY.....	21
6.3.1	DESCRIPTION	21
6.3.2	SOURCE	21
6.3.3	CONSTRAINTS.....	21
6.3.4	STANDARDS.....	21
6.3.5	PRIORITY.....	21
6.4	SECURE API IMPLEMENTATION & DATA TRANSMISSION	22
6.4.1	DESCRIPTION	22
6.4.2	SOURCE	22
6.4.3	CONSTRAINTS.....	22
6.4.4	STANDARDS.....	22
6.4.5	PRIORITY.....	22
7	MAINTENANCE & SUPPORT REQUIREMENTS	23
7.1	System Monitoring and Bug Fixes	23
7.1.1	DESCRIPTION	23
7.1.2	SOURCE	23
7.1.3	CONSTRAINTS.....	23
7.1.4	STANDARDS.....	23

7.1.5	PRIORITY.....	23
7.2	Software Updates and Patches	24
7.2.1	DESCRIPTION	24
7.2.2	SOURCE	24
7.2.3	CONSTRAINTS.....	24
7.2.4	STANDARDS.....	24
7.2.5	PRIORITY.....	24
8	OTHER REQUIREMENTS	25
8.1	System Architecture	25
8.1.1	DESCRIPTION	25
8.1.2	SOURCE	25
8.1.3	CONSTRAINTS.....	25
8.1.4	STANDARDS.....	25
8.1.5	PRIORITY.....	25
9	FUTURE ITEMS	26
9.1	Advanced AI-Powered Virtual Therapist	26
9.1.1	DESCRIPTION	26
9.1.2	SOURCE	26
9.1.3	CONSTRAINTS.....	26
9.1.4	STANDARDS.....	26
9.1.5	PRIORITY.....	26

LIST OF FIGURES

1	Product Dashboard	8
2	Wellness Dashboard	10
3	Resource Hub	10
4	Journal Dashboard	10

1 PRODUCT CONCEPT

This section describes the purpose, use, and intended audience of the Augmented Reality (AR) Mental Health Companion, Lumi. The platform is designed to enhance emotional well-being through personalized daily check-ins, mood tracking, journaling, and AR-based coping exercises. Users can interact with the system to log their emotions, receive AI-driven insights, and access mental health resources, making it a self-care tool that integrates technology and mental health practices.

While the platform is intended for personal self-care, it is not a replacement for professional therapy. Instead, it serves as a tool to encourage mindfulness, emotional awareness, and positive mental health habits.

1.1 PURPOSE AND USE

Lumi is a web-based application that promotes emotional wellness through interactive features, AI-driven sentiment analysis, and AR-based mindfulness exercises. Users can log daily emotions and thoughts through personalized check-ins, track mood trends and self-care streaks over time, and engage in journaling for self-reflection and emotional processing. Users will also receive AI-powered suggestions and insights based on sentiment analysis. They would also use AR-based relaxation and mindfulness exercises to manage stress and access a resource hub with trusted mental health support links and helplines.

The system is designed to be user-friendly, accessible, and engaging, encouraging users to develop consistent self-care habits and manage their mental health.

1.2 INTENDED AUDIENCE

Lumi is designed for individuals seeking personalized emotional support and self-care tools. The primary audience includes users interested in mental wellness, self-care, and mood tracking. It more specifically includes students and young adults managing academic stress and mental well-being and professionals seeking mindfulness and stress management tools.

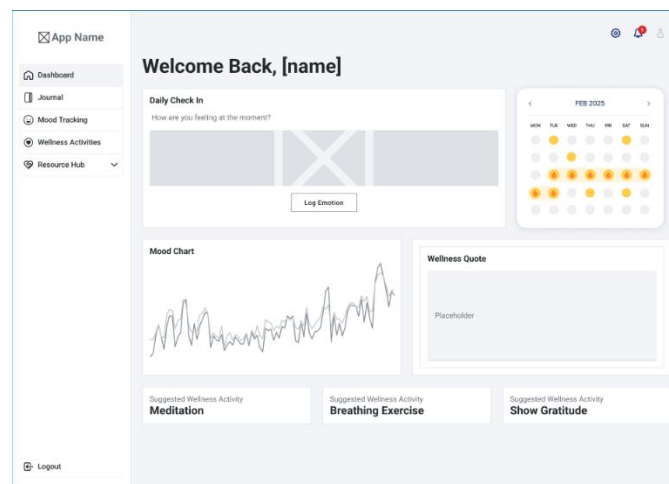


Figure 1: Product Dashboard

2 PRODUCT DESCRIPTION

This section provides the reader with an overview of Lumi's primary features. The primary operational aspects of the product, from the perspective of end users, maintainers and administrators, are defined here. The key features and functions found in the product, as well as critical user interactions and user interfaces, are described in detail.

2.1 FEATURES & FUNCTIONS

The photo above shows the mockup version of what the application dashboard looks like. There are different pages created for each of the core functions of the application. These functions are journaling, mood tracking, the resource hub, and wellness activities. The journaling feature offers users the chance to express their thoughts through writing, as is recommended for improving overall mental wellness. Their entries are saved into a database and offered AI suggestions on ways to further improve their mental wellness. The mood tracking feature is a way for users to further reflect on how they have been feeling every time they log into the app based on their response to the question “How are you feeling today?”, as seen in the app’s dashboard. The resource hub is a way for users to seek external resources for further help as they need it. Lumi is not a replacement for professional mental health services and plans to provide the user with easy access to resources for them to seek professional help. The wellness activities will include an AR component to help the user visualize relaxing scenes and further serve as another coping mechanism.

2.2 EXTERNAL INPUTS & OUTPUTS

Name	Description	Use
User Login Information (Input)	email/username and password	Secure login and user access management
User Profile Information (Input)	Other information stored with login information, account preferences	App personalization
Mood and Thought Logs (Input)	Short reflections from daily check-ins	Enables mood tracking and personalized support
Journaling Entries (Input)	Text input from users expressing their thoughts and feelings	Helps track emotional patterns
Sentiment Analysis Data (Input)	AI model-processed tone of user journal inputs	Systems responses to ensure relevant and helpful advice
Emergency Detection Flags (Input/Output)	Recognized keywords from user inputs	Triggers emergency alert and provides crisis resources
Progress Tracking Data (Output)	Mood trends, journaling patterns, streak logs	Helps users visualize their journey with the app and build positive logging habits
Resource Hub Links (Output)	External articles and professional services links	Provides additional help beyond app

2.3 PRODUCT INTERFACES

The different options for wellness activities as well as the resource hub are to be organized in card view as shown in the mockup above. Each card choice for the wellness activities will be linked to the corresponding AR component for the activity to be completed. Each card choice for the resource hub will be linked to the corresponding website for professional help to be utilized. The journal page shown above has a large text box for the journal entry, the date is recorded, and a button is added for the entry to be analyzed by the AI component to create a personalized suggestion for that journal entry.

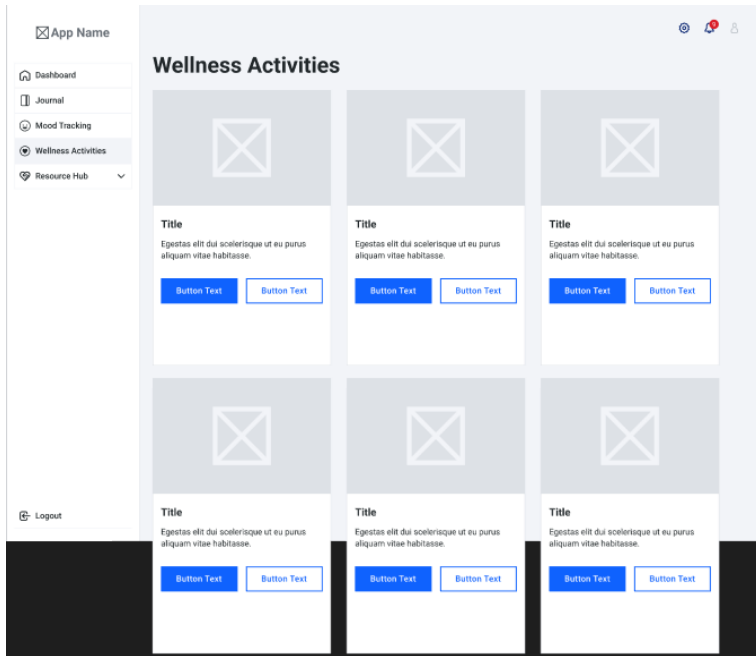


Figure 2: Wellness Dashboard

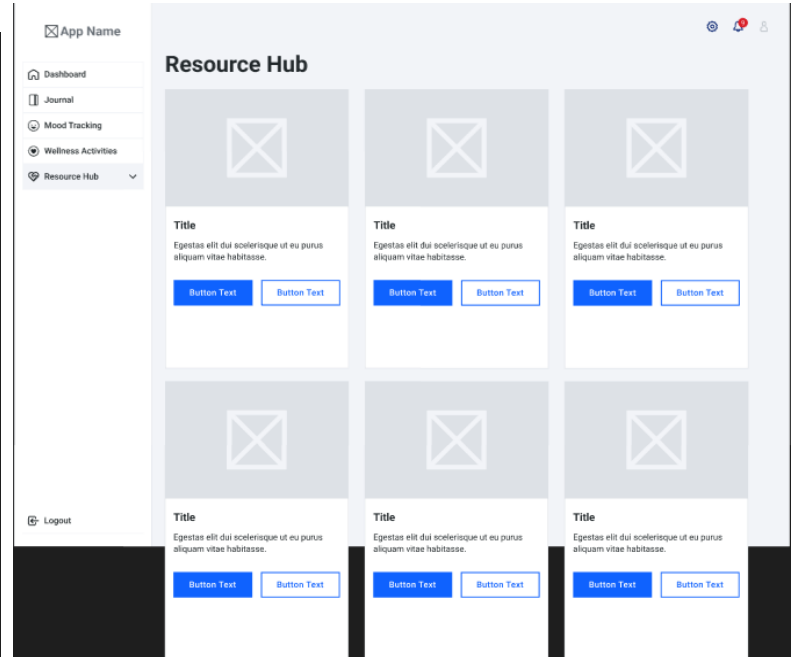


Figure 3: Resource Hub

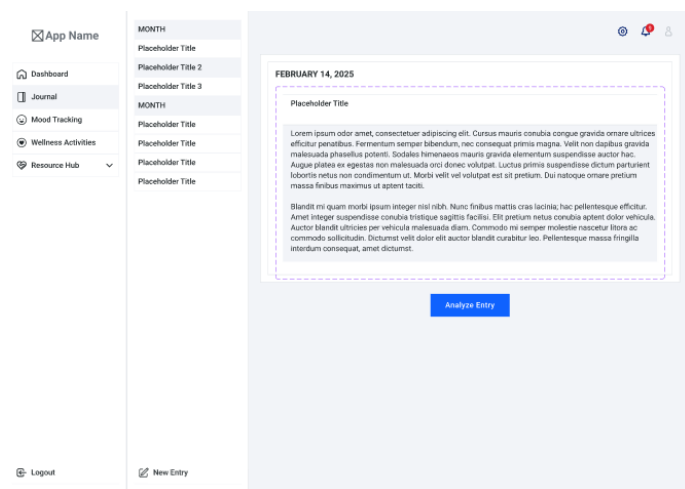
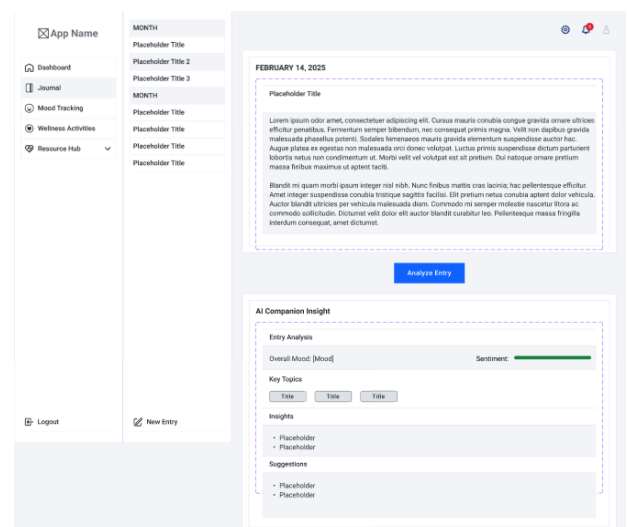


Figure 4: Journal Dashboard



3 CUSTOMER REQUIREMENTS

Lumi is a web application designed to support mental well-being by providing users with personalized daily check-ins, mood tracking, NLP-driven text analysis, emergency detection, and the utilization of virtual and augmented reality. The product aims to assist users in managing stress through coping tools, resource links, and journaling features while leveraging machine learning to enhance user interaction and mood prediction.

3.1 Personalized Daily Check-Ins

3.1.1 DESCRIPTION

The system will prompt users to complete daily check-ins, allowing them to log their mood, activities, and any relevant reflections. This daily engagement will help the user track their emotional well-being over time. Once a user completes their daily check-in, the data will be stored in the system for future analysis.

3.1.2 SOURCE

Advisor feedback, mental health best practices, and user engagement studies

3.1.3 CONSTRAINTS

User privacy must be maintained

Data storage must comply with data protection regulations (e.g., GDPR, HIPAA)

The interface must be intuitive to encourage daily engagement.

3.1.4 STANDARDS

Compliance with data security standards (e.g., TLS 1.3 encryption for data transmission).

UI accessibility standards (WCAG 2.1 for readability and usability).

3.1.5 PRIORITY

Critical (must have or product is a failure)

3.2 Text Analysis & Advice

3.2.1 DESCRIPTION

Using Natural Language Processing (NLP), the system will analyze user text inputs to detect mood patterns and provide relevant advice, support, or encouragement based on predefined models. The system will be able to identify emotional cues, tone, and key phrases in the user's input to tailor suggestions or guidance effectively. The journaling system uses Hugging Face transformer models—DistilBERT for sentiment and DistilRoBERTa for emotion classification—to process user entries. The backend provides real-time emotional feedback based on detected tone, using pre-trained machine learning models.

3.2.2 SOURCE

Machine learning best practices, existing AI mental health solutions, and user research.

3.2.3 CONSTRAINTS

AI must be trained on diverse datasets to avoid bias in advice.

The system should not replace professional mental health support but serve as a supplementary tool.

3.2.4 STANDARDS

AI/ML development standards for ethical AI use (e.g., IEEE P7003)

Compliance with privacy standards (GDPR, HIPAA).

3.2.5 PRIORITY

High

3.3 Emergency Detection

3.3.1 DESCRIPTION

The system will detect concerning language in user inputs, such as signs of distress or suicidal ideation, and provide emergency helpline contacts when necessary. This ensures that users in distress can quickly access professional help when needed.

3.3.2 SOURCE

Mental health research, crisis intervention guidelines

3.3.3 CONSTRAINTS

Detection must balance sensitivity to avoid false positives or negatives.

Must not store or act on emergency detections beyond providing relevant contacts (to avoid liability issues).

3.3.4 STANDARDS

Ethical AI standards for crisis response.

Legal compliance with mental health support regulations.

3.3.5 PRIORITY

Critical (must have or product is a failure)

3.4 Coping Tools & Resources

3.4.1 DESCRIPTION

The application will provide a library of stress management exercises and activities, along with curated links to external mental health resources. This will help users effectively manage stress and improve their mental well-being.

3.4.2 SOURCE

Psychological studies, advisor feedback, and research on mental health

3.4.3 CONSTRAINTS

Exercises must be evidence-based and appropriate for a wide range of users.

External links must be vetted for credibility and safety.

3.4.4 STANDARDS

Compliance with mental health guidelines from organizations like the American Psychological Association (APA).

3.4.5 PRIORITY

Moderate

3.5 Logging & Mood Tracking

3.5.1 DESCRIPTION

Users will be able to track their mental health over time through logging, streak tracking, and journaling features. These features will encourage engagement and provide insights into mood patterns, enabling users to monitor their emotional wellness over time.

3.5.2 SOURCE

User experience best practices, mental health tracking research.

3.5.3 CONSTRAINTS

Data storage must comply with privacy laws and offer encryption.
Users should have control over their data, including deletion options

3.5.4 STANDARDS

Data encryption standards (AES-256 for stored data).

3.5.5 PRIORITY

High

4 PACKAGING REQUIREMENTS

Lumi will be delivered as a web application and will therefore require no physical packaging or installation. Users will be able to access the application and its features directly through a web browser via a secure URL link. The backend and AI components will be deployed on a cloud-based platform. The app will be packaged with all necessary components for smooth operation, including authentication, mood tracking, journaling, and AR-based exercises.

4.1 Cloud Deployment

4.1.1 DESCRIPTION

The application will be hosted on a cloud-based hosting platform to allow secure and scalable access for users.

4.1.2 SOURCE

Stack Underflow Sprint Breakdown – Deployment

4.1.3 CONSTRAINTS

The web application must be accessible 24/7

4.1.4 STANDARDS

Hypertext Transfer Protocol (HTTPS) to encrypt data exchanged between the user and the server, securing data transmission

4.1.5 PRIORITY

High

4.2 Augmented Reality (AR) Feature Packaging

4.2.1 DESCRIPTION

AR features will be integrated into the web application and can be accessed via the web interface. These features will be delivered through the browser without requiring additional installation or downloads.

4.2.2 SOURCE

Stack Underflow Sprint Breakdown – Deployment

4.2.3 CONSTRAINTS

The web application must be accessible 24/7

4.2.4 STANDARDS

Hypertext Transfer Protocol (HTTPS) to encrypt data exchanged between the user and the server, securing data transmission

4.2.5 PRIORITY

Low

4.3 User Interface (UI) Packaging

4.3.1 DESCRIPTION

The User Interface (UI) will be packaged as part of the web-based application, accessible directly through a web browser. The UI will be designed to ensure a seamless and consistent experience across different screen sizes and resolutions. It will be delivered with all necessary front-end components integrated to support the app's functionalities, such as mood tracking and journaling.

4.3.2 SOURCE

Stack Underflow Sprint Breakdown – Core Functionality

4.3.3 CONSTRAINTS

The UI must be responsive and function correctly across various devices and screen sizes. It should be accessible through major web browsers without requiring additional plugins.

The web-based UI must be accessible through standard web browsers (e.g., Chrome, Firefox, Safari, Edge)

4.3.4 STANDARDS

Responsive Web Design principles for optimal display and usability across various devices.

4.3.5 PRIORITY

Critical

5 PERFORMANCE REQUIREMENTS

This section outlines the performance expectations for the AR Mental Health Companion to ensure it functions efficiently under various operating conditions. The performance requirements will ensure that the system meets speed, responsiveness, usability, and efficiency standards for the user experience. These requirements are crucial to guarantee smooth operation, fast response times, and proper functionality under varying conditions

5.1 Fast Response Time for User Input

5.1.1 DESCRIPTION

The system must process and respond to user input within 5 seconds to maintain a seamless and engaging user experience. This includes the time taken to analyze mood logs, perform sentiment analysis, and generate advice or coping mechanisms based on user input.

5.1.2 SOURCE

Industry best practices for user experience in web-based applications

5.1.3 CONSTRAINTS

Backend Processing: Machine learning models and NLP algorithms must be optimized to handle large volumes of data while maintaining a fast response time.

Hardware: Response times must be consistent even on low-end devices, with the system optimizing performance for different hardware capabilities.

5.1.4 STANDARDS

Web Content Accessibility Guidelines (WCAG 2.1) for responsiveness.

Performance optimization best practices for web applications

5.1.5 PRIORITY

High

5.2 Data Storage and Retrieval

5.2.1 DESCRIPTION

The system must be able to retrieve user data (e.g., logs, check-ins, mood tracking data) within 2 seconds after user request. The database should support fast query times for large data sets to ensure the platform remains responsive. Journaling data and numeric mood logs are stored in the database and visualized using trend line graphs on the dashboard. Backend API endpoints such as /api/moodGraph, /getJournal, and /saveJournal support data retrieval and display.

5.2.2 SOURCE

Performance standards for scalable web applications and user data management.

5.2.3 CONSTRAINTS

Database Design: Efficient indexing and querying mechanisms must be implemented.

Data Volume: The system must support growing data over time, with performance maintained as the number of active users increases.

5.2.4 STANDARDS

Database indexing standards.

Cloud-based storage optimization standards for fast access.

5.2.5 PRIORITY

High

5.3 Application Setup Time

5.3.1 DESCRIPTION

The system must allow users to set up their accounts and complete the onboarding process within 5 minutes. This includes creating an account, completing basic user preferences, and configuring notifications for daily check-ins.

5.3.2 SOURCE

User experience research

5.3.3 CONSTRAINTS

User Input: Users should be able to skip or postpone non-essential setup steps.

Simplified Onboarding: The process should be simple, and clear, and only ask for essential information to avoid overwhelming the user.

5.3.4 STANDARDS

Accessibility standards for onboarding processes.

5.3.5 PRIORITY

Medium

6 SAFETY AND SECURITY REQUIREMENTS

Lumi will prioritize user privacy and data security. The app will not collect personally identifiable information (PII) without user consent, and any sensitive data, such as journal entries or mood logs, will be securely stored. Basic security measures, including password encryption and session management, will be implemented to protect user accounts.

6.1 Data Protection and Encryption

6.1.1 DESCRIPTION

To protect sensitive user data from journal entries and mood logs, all data will be encrypted to ensure that personally identifiable information (PII) is not exposed to unauthorized access during storage or while being transmitted over the network.

6.1.2 SOURCE

Stack Underflow Sprint Breakdown – Backend Development

6.1.3 CONSTRAINTS

Passwords and other sensitive information must be encrypted using a secure hashing algorithm

6.1.4 STANDARDS

Transport Layer Security (TLS 1.2/1.3)

Secure Hashing Algorithm (SHA) for password and data encryption

6.1.5 PRIORITY

High

6.2 User Authentication & Authorization

6.2.1 DESCRIPTION

The application will include a secure user authentication system which will require users to have a valid username and password to access web-features. Passwords will be stored using a strong encryption technique and session management practices will be implemented to ensure users are logged out after a period of inactivity. This will help protect user accounts from unauthorized access and that only authenticated users can access their data.

6.2.2 SOURCE

Stack Underflow Sprint Breakdown – Backend Development

6.2.3 CONSTRAINTS

Passwords must be hashed before being stored in the database to prevent exposure of sensitive information.

The system must implement a session timeout feature, logging users out after a specified period of inactivity to prevent unauthorized access if a session remains open.

6.2.4 STANDARDS

SHA hashing for secure password
NIST Session Management Principles

6.2.5 PRIORITY

Moderate

6.3 TEXT ANALYSIS & EMERGENCY RESPONSE PRIVACY

6.3.1 DESCRIPTION

The AI system analyzes journal entries and check-ins using NLP to identify concerning emotional states or harmful language. If flagged, the user is alerted and provided with helpline contacts. Sensitive input data that triggers emergency alerts is not stored or transmitted to preserve privacy. Sentiment and emotion classification models are locally hosted using Hugging Face Transformers.

6.3.2 SOURCE

Stack Underflow Sprint Breakdown – Text Analysis and Emergency Detection

6.3.3 CONSTRAINTS

The distress detection model must minimize false alarms and unnecessary interventions to ensure accurate response.

The system should not store or transmit sensitive user inputs when detecting distress. Emergency contact details should be region-specific, ensuring that users are connected to the appropriate helplines based on their geographic location.

6.3.4 STANDARDS

Natural Language Processing (NLP) techniques and text pattern matching for sentiment analysis

6.3.5 PRIORITY

High

6.4 SECURE API IMPLEMENTATION & DATA TRANSMISSION

6.4.1 DESCRIPTION

All APIs integrated into the application to transmit or retrieve the user's data must be secured against unauthorized access. Basic authentication and input validation techniques will be implemented to prevent common security vulnerabilities and ensure data exchange between the front and backend are secure

6.4.2 SOURCE

Stack Underflow Sprint Breakdown – Deployment

6.4.3 CONSTRAINTS

API endpoints must require authentication using OAuth or API keys.
Input data must be validated to prevent common vulnerabilities like SQL injections.

6.4.4 STANDARDS

OWASP Security Guidelines

6.4.5 PRIORITY

Low

7 MAINTENANCE & SUPPORT REQUIREMENTS

This section outlines the maintenance and support requirements for Lumi, which are necessary for ongoing support after the product is deployed. These requirements ensure that the product can be effectively maintained and that issues can be addressed efficiently by the support team. The focus is on maintaining system uptime, resolving errors or bugs, providing user support, and keeping the software updated.

7.1 System Monitoring and Bug Fixes

7.1.1 DESCRIPTION

The system must be continuously monitored to detect and resolve bugs or performance issues. If errors or issues arise in production, they should be logged and categorized, with appropriate action plans for fixing them.

7.1.2 SOURCE

Industry standards for software maintenance and bug resolution in web applications

7.1.3 CONSTRAINTS

Availability: Support must be available during business hours (9 AM to 5 PM) with emergency support available 24/7.

Response Time: For critical issues (e.g., system outages), the response time should be within 1 hour. For less severe issues, response time should be within 24 hours.

7.1.4 STANDARDS

ITIL (Information Technology Infrastructure Library) standards for incident management.
ISO/IEC 20000 standards for IT service management.

7.1.5 PRIORITY

Future

7.2 Software Updates and Patches

7.2.1 DESCRIPTION

The software must be updated regularly to fix bugs, patch security vulnerabilities, and improve functionality. Updates must be delivered automatically, with users notified about updates, and they must have the option to schedule the updates for a convenient time. All critical updates, particularly related to security, must be deployed immediately.

7.2.2 SOURCE

Best practices for secure software maintenance

7.2.3 CONSTRAINTS

Compatibility: Updates must be backward compatible with previous versions to prevent disruptions for existing users.

Testing: All updates and patches should undergo rigorous testing in a staging environment before deployment to production to avoid breaking any functionality.

7.2.4 STANDARDS

NIST Cybersecurity Framework for managing software security.
OWASP Secure Software Development Lifecycle (SDLC) guidelines

7.2.5 PRIORITY

High

8 OTHER REQUIREMENTS

This section outlines additional requirements necessary for Lumi to be considered complete. It includes system architecture considerations, platform compatibility, and technical constraints. The product must support seamless deployment across web-based platforms, ensuring scalability, data security, and modularity for future feature enhancements.

8.1 System Architecture

8.1.1 DESCRIPTION

The system must be designed using modular architecture to allow future enhancements. Key components include:

- Frontend: React.js dashboard for journaling, check-ins, and mood visualization
- Backend: Node.js and Express with RESTful APIs for journal storage, sentiment analysis, and mood tracking
- Database: MongoDB stores journal entries and mood logs securely
- NLP Services: Python-based backend using Hugging Face models for sentiment and emotion tagging
- AR Integration: Web-based AR features for interactive coping exercises.

8.1.2 SOURCE

Product development brainstorming session

Research about best practices in mental health tech

Research about industry standards for cross-platform web applications

8.1.3 CONSTRAINTS

The system must ensure data integrity, meaning no data is lost

Must be responsive and adaptable to different screen sizes

8.1.4 STANDARDS

ISO 9241 (User Experience & Usability Standards)

HIPAA

ISO 27001 (Information Security Management System - ISMS)

8.1.5 PRIORITY

High

9 FUTURE ITEMS

This section outlines features and functionalities that were considered but will not be included in the initial prototype due to constraints such as budget, time, skill availability, technology limitations, and feasibility concerns. These features may be implemented in future iterations of Lumi.

9.1 Advanced AI-Powered Virtual Therapist

9.1.1 DESCRIPTION

The system would feature an AI-powered virtual therapist, capable of conversational interactions, deeper emotional analysis, and the ability to advise a human therapist. It would provide real-time responses based on user input and be able to recall conversations from previous sessions.

9.1.2 SOURCE

Industry best practices in AI-driven mental health tools

9.1.3 CONSTRAINTS

Requires advanced NLP models beyond our coding abilities.
Ethical and regulatory concerns for AI in mental health.

9.1.4 STANDARDS

NIST AI Risk Management Framework
HIPAA & GDPR Compliance

9.1.5 PRIORITY

Future

REFERENCES

Personalized Daily Check-Ins

American Psychological Association. (2019). APA guidelines for psychological practice with telepsychology. <https://www.apa.org/practice/guidelines/telepsychology>

Text Analysis & Advice

Russell, S., & Norvig, P. (2021). Artificial intelligence: A modern approach (4th ed.). Pearson.

IEEE. (2020). IEEE P7003 - Algorithmic bias considerations. Institute of Electrical and Electronics Engineers. <https://standards.ieee.org>

Emergency Detection

National Suicide Prevention Lifeline. (2021). Guidelines for digital mental health interventions. <https://suicidepreventionlifeline.org>

World Health Organization. (2021). Live life: An implementation guide for suicide prevention. <https://www.who.int/publications/i/item/9789240026629>

Coping Tools & Resources

Mayo Clinic. (2020). Stress management: Techniques and strategies. <https://www.mayoclinic.org>

National Institute of Mental Health. (2022). Coping with stress and anxiety. <https://www.nimh.nih.gov>

Logging & Mood Tracking

Schueller, S. M., Neary, M., O'Loughlin, K., & Adkins, E. C. (2021). Discovery of and interest in self-guided mental health apps. Digital Health, 7, 1-10. <https://doi.org/10.1177/2055207621991276>

User Authentication & Security

OWASP Foundation. (2023). OWASP top ten security risks for web applications. <https://owasp.org/www-project-top-ten/>

National Institute of Standards and Technology (NIST). (2022). Digital identity guidelines: Authentication and lifecycle management. <https://csrc.nist.gov>

AI Model Training & Optimization

Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep learning. MIT Press.

IEEE. (2022). Ethical considerations in AI and machine learning. Institute of Electrical and Electronics Engineers. <https://standards.ieee.org>

Performance Requirements

Amazon Web Services. (2023). Best practices for scalable web applications. <https://aws.amazon.com/architecture/>

Google Developers. (2023). Web performance optimization. <https://web.dev/performance/>

Design Constraints

European Commission. (2018). General Data Protection Regulation (GDPR). <https://gdpr.eu>

U.S. Department of Health & Human Services. (2021). Health Insurance Portability and Accountability Act (HIPAA). <https://www.hhs.gov/hipaa>

Maintenance & Support

IEEE. (2019). IEEE 14764-2019 - Software maintenance and software life cycle processes. Institute of Electrical and Electronics Engineers. <https://standards.ieee.org>

Red Hat. (2022). Best practices for software maintenance and support. <https://www.redhat.com>

System Architecture & Modularity

Bass, L., Clements, P., & Kazman, R. (2012). Software architecture in practice (3rd ed.). Addison-Wesley.

Fowler, M. (2019). Refactoring: Improving the design of existing code (2nd ed.). Addison-Wesley.

