

# **Software Requirements Specification**

**for**

## **MEMOIR-COLLABORATIVE MEMORY KEEPER**

**Version 1.0 approved**

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**Revision History**

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# **1. Introduction**

## **1.1 Purpose**

The Memoir App is a digital platform designed to allow users to store and share their daily memories, including pictures, text, tasks, and music. The application enables collaborative memory-sharing among friends and family through secure access codes.

A key feature of the Memoir App is its mood analysis system, which uses AI to analyse uploaded pictures and text to determine the user's emotional state each day. The system then generates a weekly mood graph, providing insights into the user's mental well-being over time.

The app integrates Google Calendar API for structured memory organization and MongoDB authentication for secure access.

## **1.2 Document Conventions**

This document follows standard IEEE SRS conventions and uses:

- Bold text for section headers.
- *Italic text* for key terms.
- Monospace for code snippets (if required).
- Tables and bullet points for clarity where necessary.

## **1.3 Intended Audience and Reading Suggestions**

This document is intended for:

- Developers: To understand system functionalities, architecture, and API integrations.
- Project Managers: To track project scope and requirements.
- Testers: To verify system functionalities against requirements.
- Stakeholders & Users: To understand the features and capabilities of the application.

Readers are advised to follow the document in sequential order for clarity, especially for the Functional Requirements and System Architecture sections.

## **1.4 Project Scope**

The Memoir App will provide users with a seamless platform to record and relive memories while gaining insights into their emotional well-being. The key features include:

- Memory Logging: Users can store text, images, and music for each day.

- Collaborative Sharing: Memories can be shared with specific individuals through an access code.
- Mood Analysis: AI-based sentiment analysis of text and emotion detection in images to determine the user's daily mood.
- Weekly Mood Graph: A visual representation of mood trends over a week based on analysed data.
- Google Calendar Integration: Memories are organized in a calendar view for easy navigation.
- Secure Authentication: MongoDB authentication ensures data privacy.

This system aims to provide a personalized, insightful, and interactive memory-keeping experience.

### **1.5 References**

- IEEE Std 830-1998: Recommended Practice for Software Requirements Specification.
- Google Calendar API Documentation: <https://developers.google.com/calendar>
- MongoDB Authentication Guide: <https://www.mongodb.com/docs/security/authentication/>
- OpenAI Sentiment & Emotion Analysis APIs (for mood detection).

## **2. Overall Description**

### **2.1 Product Perspective**

The Memoir App is designed as a personalized digital diary that allows users to log daily memories in various formats, including text, images, music, and tasks. The system integrates with Google Calendar API to provide an organized calendar-based structure for easy navigation and retrieval of past entries.

A key feature of the app is mood analysis, which utilizes AI-based sentiment detection to analyse users' daily text entries and uploaded images. Based on this analysis, the app provides:

1. Daily Mood Detection – Automatically determines the emotional state for each day.
2. Weekly Mood Graph – Visual representation of mood trends over time, allowing users to track emotional well-being.

The application is built as a responsive web platform, ensuring accessibility across different devices and browsers. It uses MongoDB authentication to secure user data and enable private or shared access to memories.

### **2.2 Product Features**

#### **Memory Management**

- Users can add, edit, and delete memory entries.
- Memories can contain text, images, audio, and tasks.
- Entries are automatically categorized by date using Google Calendar API.
- Users can search for specific memories using a keyword or date filter.
- Each memory can be shared with specific individuals via an access code.

#### **Mood Analysis & Tracking**

- AI-based analysis evaluates the sentiment of text and emotional expression in images.
- The system categorizes moods into predefined emotional states (e.g., Happy, Sad, Neutral, Excited, Stressed).
- A daily mood indicator is displayed based on the user's input.
- A weekly mood graph is generated, providing a visual representation of emotional trends.

## User Access & Security

- Secure login & authentication using MongoDB authentication.
- Users can set privacy settings to determine who can view their memories.
- Only invited collaborators can access shared memories using an access code system.

## Integration & Notifications

- Google Calendar API integration for seamless organization and retrieval of memories.
- Email notifications remind users to log their memories daily.
- Users receive weekly reports summarizing their mood trends based on the AI analysis.

## 2.3 User Classes and Characteristics

The Memoir App is designed for different types of users, each with unique needs:

### 1. General Users (Primary Users)

- Purpose: To record and track personal memories while analyzing their emotional well-being.
- Technical Expertise: Basic familiarity with web applications.
- Permissions: Can add, edit, and delete memories; access mood reports; and share specific memories with others.

### 2. Collaborators (Friends & Family Members with Access)

- Purpose: To view and contribute to shared memories.
- Technical Expertise: Basic familiarity with web applications.
- Permissions: Can view shared memories and comment (if allowed by the memory owner).

### 3. Administrators (Developers, Project Managers)

- Purpose: To manage the database, authentication, and application performance.
- Technical Expertise: Advanced knowledge of web development, database management, and APIs.
- Permissions: Can manage user accounts, monitor API performance, and troubleshoot technical issues.

## 2.4 Operating Environment

The Memoir App will operate in the following environments:

### Client-Side (Frontend)

- Platform: Web-based application, accessible via browsers.
- Supported Browsers:
  - Google Chrome (latest version)
  - Mozilla Firefox
  - Microsoft Edge
  - Safari
- Responsive Design: Optimized for desktops, tablets, and mobile devices.

### Server-Side (Backend)

- Backend Framework: Node.js
- Database: MongoDB (for user authentication and memory storage)
- Authentication: MongoDB authentication for secure user access
- Hosting & Deployment: Cloud-based (AWS, Google Cloud, or Firebase)
- Third-Party APIs:
  - Google Calendar API – For structured memory storage.
  - AI-based Mood Analysis API – For detecting user emotions from text and images.

## 2.5 Design and Implementation Constraints

### 1. Data Privacy & Security

- User memories must be securely stored and encrypted to prevent unauthorized access.
- Authentication and access control mechanisms must ensure that only authorized users can view and modify data.

### 2. Real-Time Mood Analysis

- AI-based mood detection must analyse text and images instantly upon user upload.



- The accuracy of sentiment analysis must be continuously improved using feedback mechanisms.

### 3. Storage & Performance Optimization

- Large image and audio files may increase storage costs; therefore, cloud storage may be necessary.
- The application must ensure fast loading speeds and efficient database queries.

### 4. API Limitations

- The Google Calendar API has request limits, so proper API call optimization is needed.
- AI-based mood analysis APIs may have inherent biases that need to be tested and refined.

## **2.6 User Documentation**

The following documentation will be provided to help users navigate the system:

### 1. User Guide

- How to register, log in, and create an account.
- How to add, edit, and delete memories.
- How to share memories with friends and family.
- How to view mood analysis reports and interpret the mood graph.

### 2. Developer Documentation

- API integration details for Google Calendar & AI-based Mood Analysis APIs.
- Database structure and authentication mechanisms.
- System architecture and deployment guidelines.

### 3. FAQs & Support

- Common troubleshooting issues (e.g., login problems, memory retrieval issues, API errors).
- How to contact support for further assistance.

## **2.7 Assumptions and Dependencies**

### **Assumptions**

- Users will have a stable internet connection to interact with the web app.
- AI-based mood detection provides accurate sentiment analysis (with ongoing improvements).
- Users will provide honest and meaningful text and image inputs for better mood analysis.

### **Dependencies**

- Google Calendar API – Required for structured memory organization.
- AI-based Mood Analysis API – Required for analysing text and images.
- MongoDB Authentication – Required for secure user access and memory storage.
- Cloud Hosting Services – Required for storing and retrieving high-resolution images efficiently.

## **3. System Features**

### **3.1 User Authentication**

Description:

The system provides secure authentication to ensure only authorized users can access personal memories.

Features:

- **User Registration & Login:** Users can create accounts using email and password authentication via MongoDB authentication.
- **Password Encryption:** User passwords are securely stored using hashing algorithms.
- **Session Management:** Users remain logged in until they manually log out or after a session timeout.
- **Access Control:** Users can set privacy settings to manage who can view or edit shared memories.
- **Shared Access via Access Codes:** Users can share their memory collection with trusted individuals using an access code system.

Preconditions:

- Users must have an active internet connection.
- A valid email ID is required for account creation.

### **3.2 Memory Management**

Description:

Users can create, edit, delete, and organize memories using an intuitive calendar-based interface.

Features:

- **Add Memories:** Users can add memories in various formats, including:
  - Text (daily journal entries)
  - Images (photos of events or moments)
  - Audio/Music (voice notes or mood-related songs)
  - Tasks (to track events or to-dos)

- **Edit/Delete Memories:** Users can modify or remove their saved memories.
- **Google Calendar Integration:** Each memory is automatically assigned to a date and linked with Google Calendar for structured storage.
- **Memory Search & Filters:** Users can find past memories based on:
  - Date (Calendar View)
  - Keywords (Search Bar)
  - Mood Tags (Filtered by Sentiment Analysis)
- **Shared Memory Access:** Users can share specific memories with family or friends using an access code.
- **Mood Analysis Integration:**
  - AI-based sentiment detection analyses text and images to determine daily mood.
  - Generates a weekly mood graph to help users track emotional trends.

**Preconditions:**

- Users must have an active account and internet access.
- Google Calendar API access is required for structured storage.

## **4. External Interface Requirements**

### **4.1 User Interfaces**

Description:

The user interface will be designed to be intuitive, aesthetically pleasing, and accessible across different devices. The primary interface includes:

Features:

- Login & Registration Page: Secure authentication using email and password.
- Home Dashboard: Displays a calendar view where users can navigate through memories.
- Memory Entry Form: Allows users to add memories with text, images, audio, or tasks.
- Mood Analysis Dashboard:
  - Displays mood insights based on text and images.
  - Weekly mood trend graph showing emotional variations.
- Search & Filter Bar: Allows users to search memories using keywords, date, or mood tags.
- Settings Page: Allows users to customize:
  - Profile settings
  - Privacy controls (who can access shared memories)
  - Notification preferences
- Mobile-Friendly Design: The interface will be responsive, ensuring usability across smartphones, tablets, and desktops.

User Interface Technologies:

- Frontend: HTML, CSS, JavaScript, Bootstrap, React.js
- Styling Frameworks: Tailwind CSS, Material UI

## 4.2 Hardware Interfaces

Supported Devices:

- Smartphones (Android, iOS)
- Tablets (Android, iPads)
- Desktops/Laptops (Windows, macOS, Linux)

Minimum Hardware Requirements:

- RAM: Minimum 4GB (Recommended: 8GB+)
- Storage: Minimum 100MB free space for application cache and data
- Processor: Minimum 1.6 GHz dual-core processor
- Internet Connection: Required for cloud storage, authentication, and AI-based mood analysis

## 4.3 Software Interfaces

Operating System Compatibility:

- Windows 10 & 11
- macOS (10.15 and later)
- Linux (Ubuntu 20.04+, Fedora, etc.)
- Android (Version 8 and above)
- iOS (Version 12 and above)

Backend & Database:

- Backend: Node.js (Express.js)
- Database: MongoDB (for user authentication and memory storage)
- Hosting: Firebase / AWS (for cloud-based access and real-time data updates)

APIs & External Services:

- Google Calendar API – To store and manage memories with timestamps
- Google Vision API – For image sentiment analysis
- Natural Language Processing (NLP) API – To analyze text mood
- Chart.js / Recharts.js – To display weekly mood trend graphs

## **4.4 Communications Interfaces**

### **Internet & Cloud Connectivity:**

- The app requires an active internet connection for:
  - Authentication & User Data Storage (MongoDB, Firebase)
  - Google APIs integration (Calendar & Vision API)
  - AI-based sentiment analysis

### **Notifications & Alerts:**

- Users will receive notifications via:
  - Email alerts for memory updates
  - Push notifications for reminders and mood trends (if enabled)

### **Data Transfer & Encryption:**

- HTTPS Protocol: Ensures secure data transfer.
- End-to-End Encryption: Used for memory storage and shared access codes.

## **5. Nonfunctional Requirements**

### **5.1 Performance Requirements**

Description:

The system should provide a fast, responsive, and seamless experience across different devices.

Key Requirements:

- Response Time:
  - Login & Authentication: Should complete in  $\leq 2$  seconds.
  - Memory Retrieval & Display: Should load  $\leq 3$  seconds per request.
  - Mood Analysis Processing: Should complete in  $\leq 5$  seconds for each memory entry.
- Scalability:
  - The system should support multiple users simultaneously without performance degradation.
  - Must handle at least 100,000 memory entries efficiently.
- Concurrent Users:
  - The system should support at least 10,000 active users at a time.
- Database Performance:
  - Queries on MongoDB should execute in  $\leq 2$  seconds.
- Mobile Responsiveness:
  - The app must be optimized for mobile devices with smooth scrolling and navigation.

### **5.2 Safety Requirements**

Description:

Since the Memoir app handles personal memories and emotions, safety is crucial to protect user well-being.

Key Requirements:

- Data Backup & Recovery:
  - Automatic daily backups to prevent accidental data loss.



- Users should have an option to export and restore memories.
- Error Handling & Crash Recovery:
  - The system should gracefully handle errors and recover from failures without data loss.
- Mental Health Considerations:
  - If the AI detects negative moods over time, the app should suggest well-being tips or provide resources for mental health support.

### **5.3 Security Requirements**

Description:

The system should ensure data privacy, authentication, and encryption to protect user information.

Key Requirements:

- User Authentication & Access Control:
  - All user logins must be verified via MongoDB authentication.
  - Shared memories should be accessible only through access codes.
- Data Encryption:
  - End-to-End Encryption (E2EE) for stored memories and shared access codes.
  - AES-256 encryption for sensitive data storage.
- Data Protection & Privacy Compliance:
  - Adheres to GDPR (General Data Protection Regulation) & CCPA (California Consumer Privacy Act).
  - Users should be able to delete their data permanently.
- Session Management & Auto Logout:
  - Sessions expire after 30 minutes of inactivity for security.
- Secure API Communication:
  - All API requests must use HTTPS (SSL/TLS encryption) to prevent data interception.

## 5.4 Software Quality Attributes

Description:

The system should maintain high quality in terms of usability, maintainability, and reliability.

Key Attributes:

Attribute	Requirement
Usability	The UI should be intuitive, easy to navigate, and visually appealing for all users.
Maintainability	The system should use modular code (React.js & Node.js) to allow easy updates.
Reliability	Should maintain 99.9% uptime and avoid system crashes.
Availability	The system should be accessible 24/7, ensuring minimal downtime.
Portability	The app should work seamlessly across Android, iOS, Windows, and macOS.
Efficiency	The app should be optimized for low CPU and memory usage.
Flexibility	Users should be able to customize privacy settings and modify their mood analysis preferences.

## 6. Other Requirements

- Compliance: Adhere to GDPR, CCPA, HIPAA guidelines.
- Data Retention: Option for users to set auto-deletion after a set period.
- Offline Mode: Users can view memories offline.
- Multi-Language Support: Future versions should support multiple languages.

## Appendix A: Glossary

Term	Definition
Memoir App	App to store and analyse personal memories.
Mood Analysis	AI analysis of text and images to detect moods.
NLP	AI technology for analysing text emotions.
Shared Access Code	A link/code to share memories securely.

## Appendix B: Analysis Models

- Use Case Diagram: User interactions with memory creation, mood analysis, and sharing.
- Data Flow Diagram: Describes how data flows between the user, memory storage, and AI mood analysis.
- Entity-Relationship Diagram: Relationships between Users, Memories, and AI.

## Appendix C: Issues List

Issue	Solution
Data Privacy	Use AES-256 encryption for data protection.
AI Mood Accuracy	Allow users to edit mood results.
Server Downtime	Use cloud hosting for high availability.
API Costs	Optimize usage or explore open-source alternatives.