PROJECT REPORT

CSE1005 – SOFTWARE ENGINEERING (LAB)
L4+L5

MOOD JAR:
PERSONALISED MENTAL HEALTH TRACKER

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1. Objective

The primary objective of the "MOODJAR" project is to provide a digital space where users can log their emotional states, gain insights into their mental health patterns, and access mood-enhancing resources. It aims to help users build emotional awareness and resilience through regular tracking and supportive content.

- The platform provides daily prompts to encourage routine check-ins, with the aim of helping users make emotional tracking a daily habit.
- Users can benefit from personalized suggestions based on their logged emotions, leading to better mental health care.
- "MOODJAR" aims to be a secure, reliable space where users feel safe expressing themselves without fear of judgment.
- Enhanced self-awareness through this tool could also lead to timely professional help when necessary.
- The platform intends to normalize emotional tracking, making it as routine as checking the weather. Through consistent mood logs, users can build a habit of self-awareness.
- "MOODJAR" promotes emotional literacy, enabling users to identify, name, and track emotions accurately, which can lead to better self-regulation and healthier responses to stressors.
- The system includes a privacy-first approach, ensuring all data is securely stored and accessible only to the user, promoting a safe space for personal expression.
- The objective encompasses not only individual well-being but also aims to contribute to a larger movement of mental health awareness, reducing stigma around discussing emotional states.
- In addition to individual tracking, the platform supports community well-being by potentially integrating with public health initiatives or educational programs, aiding collective emotional intelligence.

1.1 Goals

1. Encourage consistent emotional check-ins.
2. Provide a safe space for users to express their feelings.
3. Deliver curated content to help improve emotional well-being.
4. Offer data-driven insights through visual analytics on mood trends.
5. Promote positive coping strategies through suggested activities.

1.2 Key Benefits

1. Improved self-awareness by tracking emotional states.
2. Easier access to mental health resources.
3. Secure platform for storing sensitive emotional data.
4. Customizable journaling features for reflection.

2. Purpose of the Project

"MoodJar" is designed to be an emotional well-being companion for individuals seeking to understand and manage their mental health. By tracking moods daily, users can identify patterns, triggers, and areas of concern, allowing them to make informed decisions about self-care and professional support. The platform's user-friendly design makes it accessible to individuals with varying levels of technical expertise, while its comprehensive resource library caters to diverse emotional needs.

- The daily mood tracking feature allows users to note down their emotions along with optional notes, aiding in identifying patterns.
- With data visualization, users can see their emotional trends over time, enabling informed decisions about coping strategies.
- The content library offers articles and guides tailored to various emotional states, supporting users with diverse needs.
- The platform includes resources for reflection, such as journaling, and access to professional help if needed.
- "MOODJAR" prioritizes user-friendliness, ensuring ease of use even for individuals not tech-savvy.
- The platform’s design caters to diverse user needs—from individuals seeking personal growth to those requiring guidance during emotionally challenging times. The flexibility of the mood-tracking tools makes it suitable for both casual check-ins and deep emotional exploration.
- "MOODJAR" addresses the importance of early emotional intervention by helping users recognize negative patterns early. Timely self-awareness can encourage users to seek help when needed, preventing emotional downturns from worsening.
- The platform’s accessibility extends to different age groups, from adolescents dealing with school stress to adults managing work-life balance, and seniors seeking companionship.

2.1 Scope of the Project

The "MOODJAR" system is intended for individuals of all age groups who wish to monitor their mental health. The project scope includes:

- User Authentication: Secure registration and login system.
- Mood Tracking: Daily mood logs with options to add notes.
- Content Library: Articles and activities to improve mood.
- Data Visualization: Mood trends visualized through graphs and reports.
- Journaling: Private journal entries for self-reflection.
- User Feedback: Option for users to suggest content or give feedback on resources.

2.2 User Characteristics

1. General Users: Individuals who want to track their moods regularly and gain insights.
2. Mental Health Professionals: Professionals who may contribute content or recommend resources.
3. Administrators: Platform maintainers responsible for data integrity and resource curation.

3. Technology Stack

The project utilizes modern web development technologies to ensure a seamless user experience. The technology stack is designed for future scalability, allowing the integration of additional features like AI-driven insights.

3.1 Front-End Technologies

- HTML5 provides the structural backbone, ensuring compatibility with the latest web standards. This creates a solid foundation for accessibility and searchability.
- CSS3, enhanced with modern frameworks like Bootstrap, guarantees that the design is clean, responsive, and accessible. This is crucial for users who might access the platform on mobile devices or tablets.
- JavaScript drives client-side interactions, while additional libraries like jQuery or Vue.js could be considered for enhancing user experience with more interactive elements.

3.2 Back-End Technologies

- The backend utilizes Node.js for its non-blocking, event-driven architecture, suitable for handling multiple concurrent users—crucial for a scalable web app.
- Express.js serves as the lightweight framework to handle server-side logic, including API calls for mood data and authentication.
- MongoDB, as a NoSQL database, supports flexible data structures, ideal for mood logs that might evolve as the platform grows. The use of Mongoose helps enforce schemas, manage relationships, and validate data integrity.
- Data visualization is managed by Chart.js, which is capable of generating interactive and visually appealing graphs. Future considerations may include libraries like D3.js for more complex visual data representation.
- The project employs Git for version control, ensuring that all code changes are tracked and manageable across a development team.

3.3 Tools and Libraries

- Chart.js: Data visualization library for displaying mood trends.
- Axios: HTTP client for API calls.
- Passport.js: Authentication middleware for Node.js.
- Git: Version control to manage project changes.

4. Software Requirement Analysis and Planning

1. Detailed User Stories: Each functional requirement is derived from specific user stories, ensuring that the platform addresses real-world needs.
2. As a regular user, Sarah wants to log her mood daily to track patterns and reflect on her emotional state.
3. As a busy professional, John desires quick access to mood-related content to help him manage work-related stress.
4. As a mental health expert, Dr. Smith wants to contribute relevant articles to assist users based on common emotional patterns observed.
5. Feature Justification: Every feature, from mood logging to content management, is implemented with user scenarios in mind.
6. Risk Analysis: Potential challenges, such as ensuring data privacy and managing high server loads, are tackled through robust security measures and cloud scalability.

4.1 User Stories

To ensure the development covers the needs of the users, the following user stories were considered:

1. As a user, I want to log my mood daily, so I can track my emotional state over time.
2. As a user, I want to write journal entries to express my thoughts freely.
3. As a user, I want to access articles that match my current emotional state to help me improve my mood.
4. As an admin, I want to moderate user feedback and content suggestions to maintain platform quality.
5. As a therapist, I want to add content and suggest helpful resources based on common emotional patterns.

4.2 Functional Requirements

1. **User Authentication:**
    - Secure registration with email verification.
    - Secure password storage using hashing algorithms.
    - Multi-factor authentication for added security.
2. **Mood Logging:**
    - Daily prompt for users to log their mood.
    - Option to tag entries with specific emotions or keywords.
    - Graphical representation of mood patterns over weeks, months, or years.
3. **Content Management:**
    - Admin panel to add, modify, and remove content.
    - Categories like "Anger Management," "Dealing with Anxiety," "Boosting Happiness."

- Content filters based on user mood trends.

4. **Data Visualization:**
    - Pie charts to show the distribution of moods over time.
    - Line graphs for mood changes and emotional progress.
    - Bar graphs for the frequency of specific emotions.
5. **Journal Feature:**
    - Private journal entries with the ability to tag and categorize.
    - Searchable database of past entries.
    - Export options for personal archives (PDF/CSV).

4.3 Non-Functional Requirements

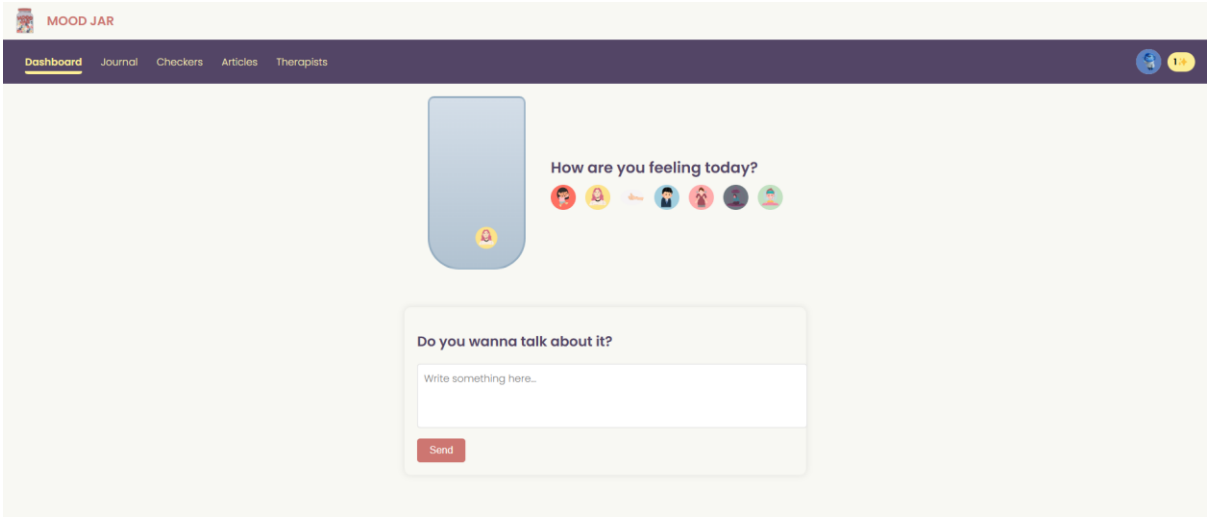
1. Usability: The interface should be intuitive and user-friendly.
2. Reliability: Data integrity must be maintained with backups.
3. Security: User data must be protected with encryption.
4. Performance: The application should load within a few seconds.
5. Scalability: Should handle a growing user base without degrading performance.

5. Design Documents

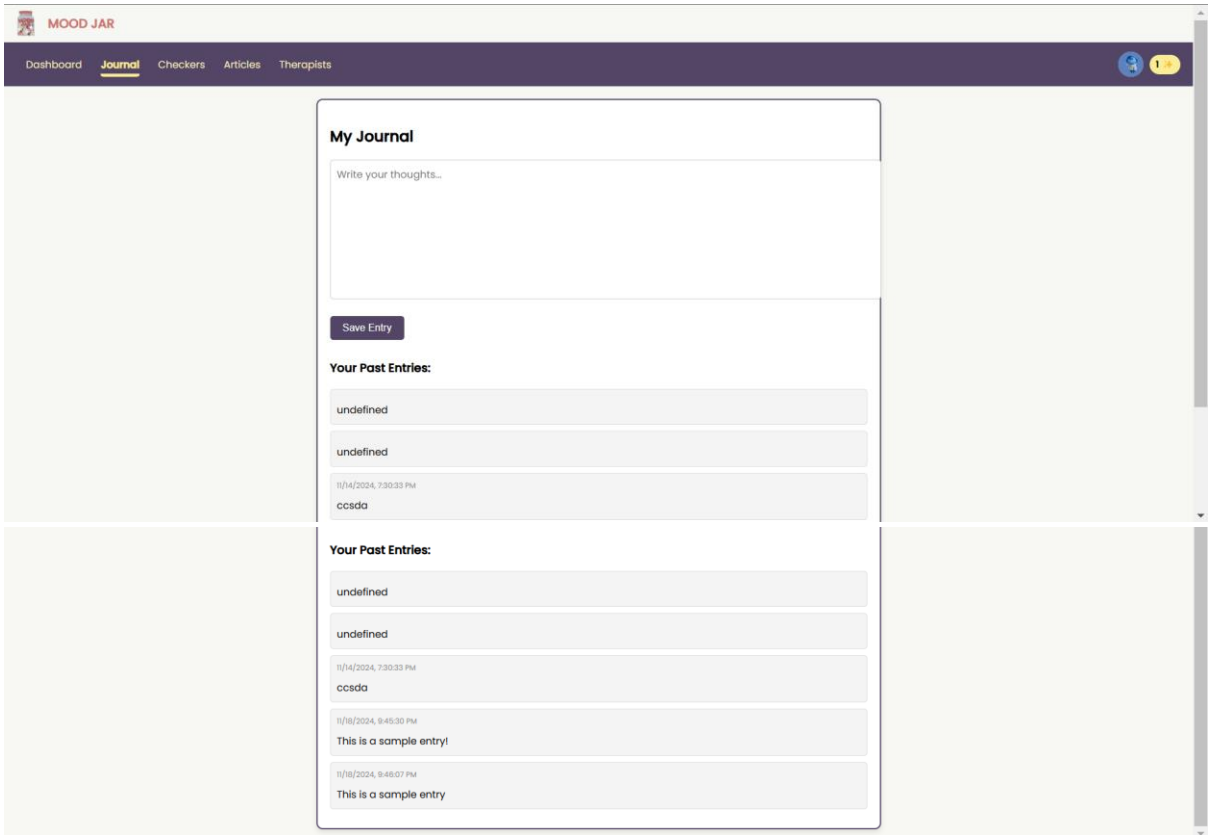
5.1 User Interface Design

1. **Signup Page:** A welcoming interface that asks for your basic info like Name and Nickname and the user's desired profile picture.

2. **Dashboard/ Mood Logging Page:** An easy-to-use form with emojis representing different moods, followed by a textbox for additional notes.

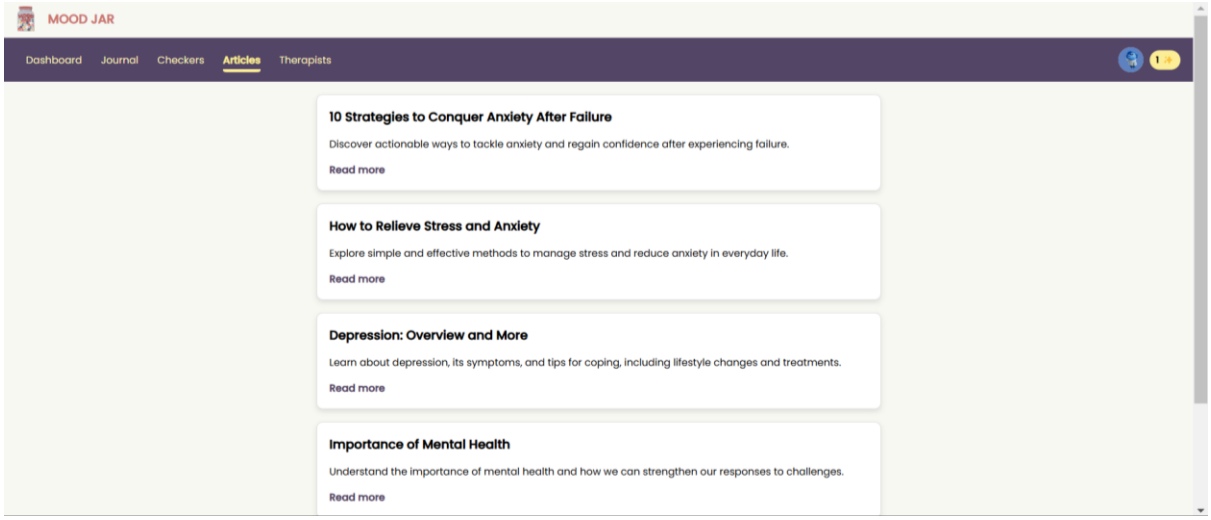


3. **Journal Page:** In this page, the user can write their own journal and save their journal as an entry which is visible for later purpose also.

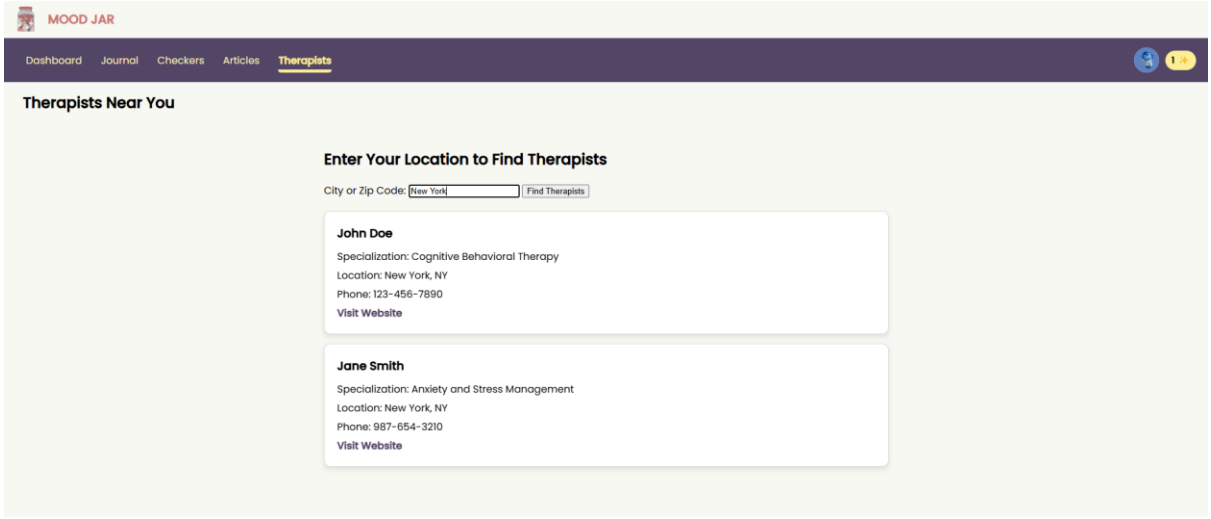


4. **Checkers Page:** Here the user the user can use the page as check box where they can mark their water intake, workout activity and productive hours.

5. **Articles Page:** Articles page provides few articles which will be helpful for the user regarding their Mental Health, Depression, Anxiety and many more mental health issues which also some instructions on how to overcome these problems.

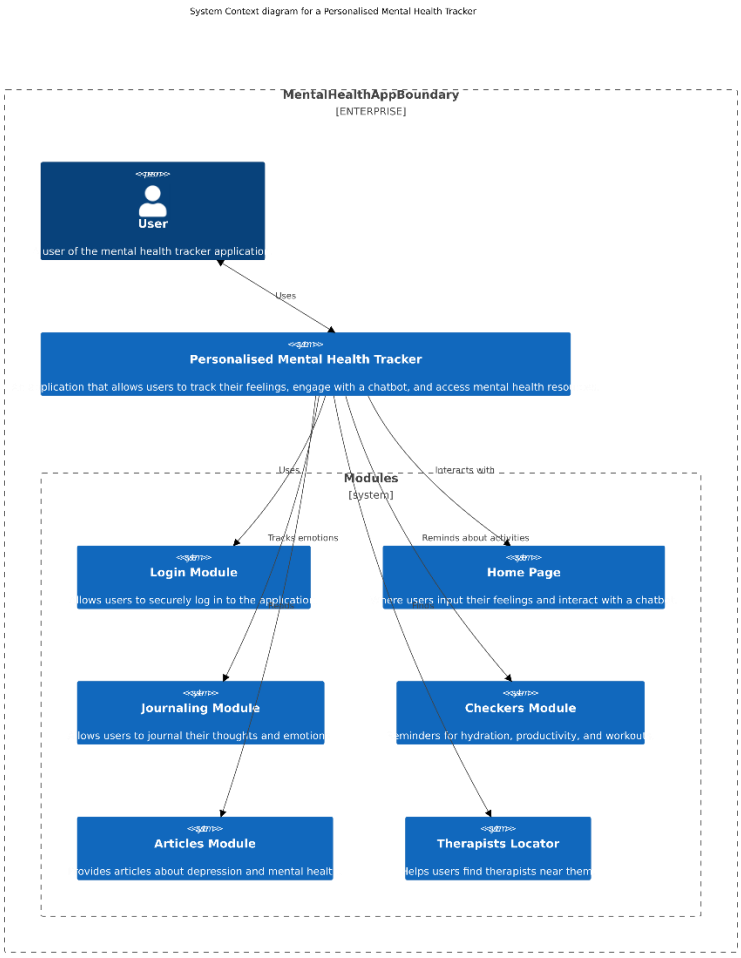


6. **Therapists Page:** This page gives the info of the therapists available in the given location.

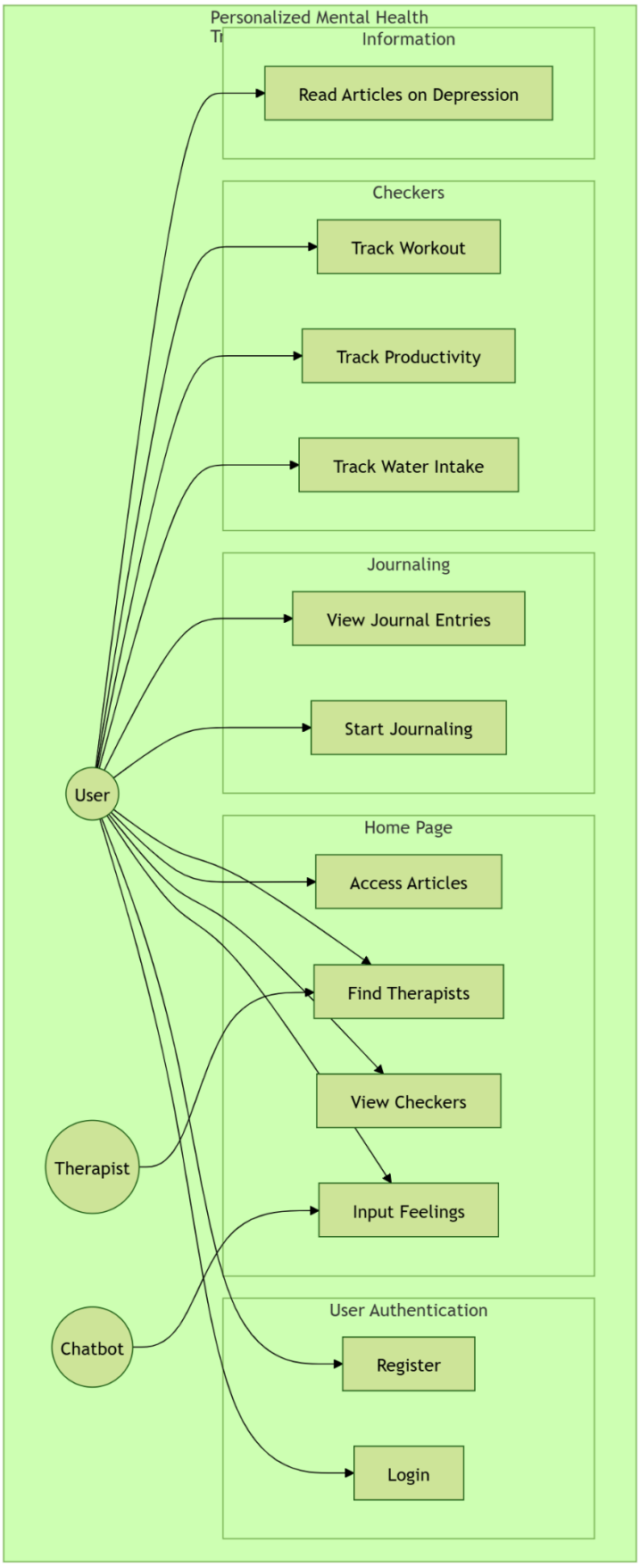


5.2 System Architecture

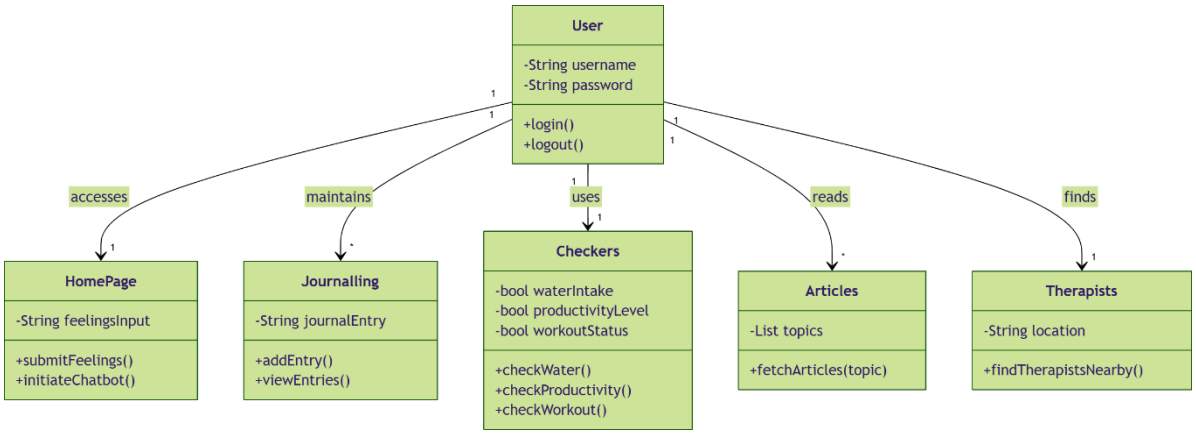
The system architecture of "MOODJAR" is designed to have a centralized database managing user profiles, emotional logs, and content. A web server will handle user requests and interface with the database for storing and retrieving information. The front-end will be a user-friendly interface for easy navigation and interaction.



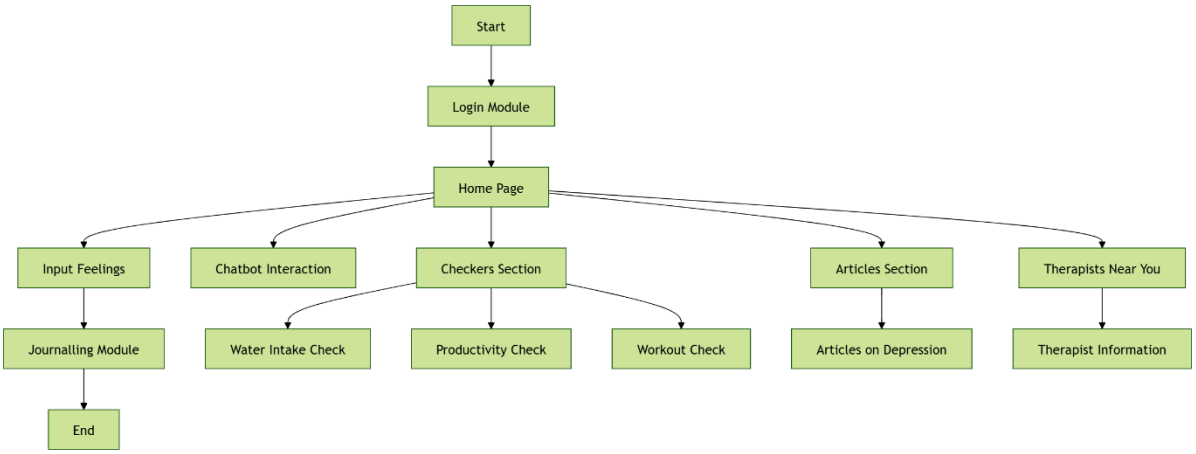
User Case Diagram



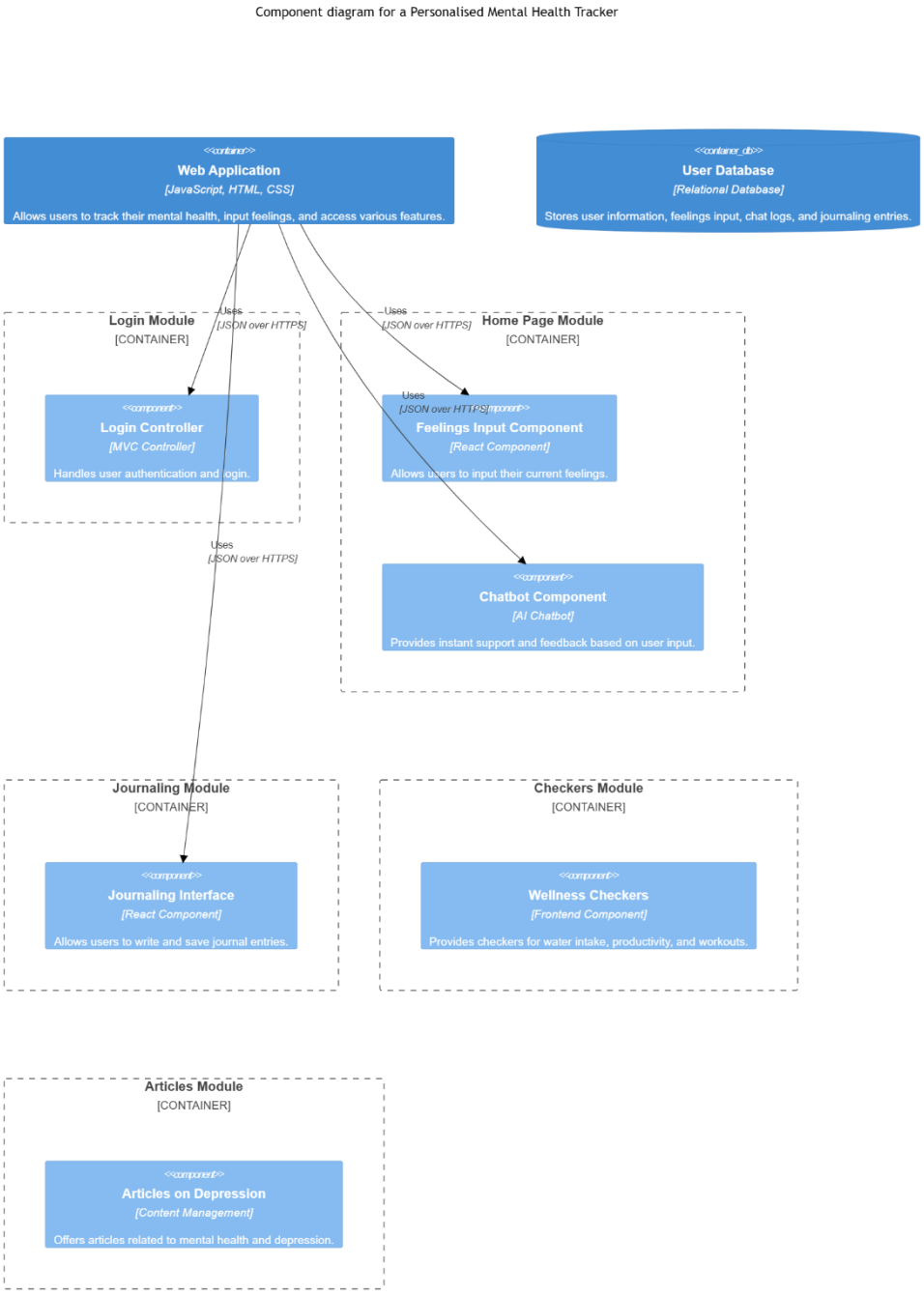
Class Diagram



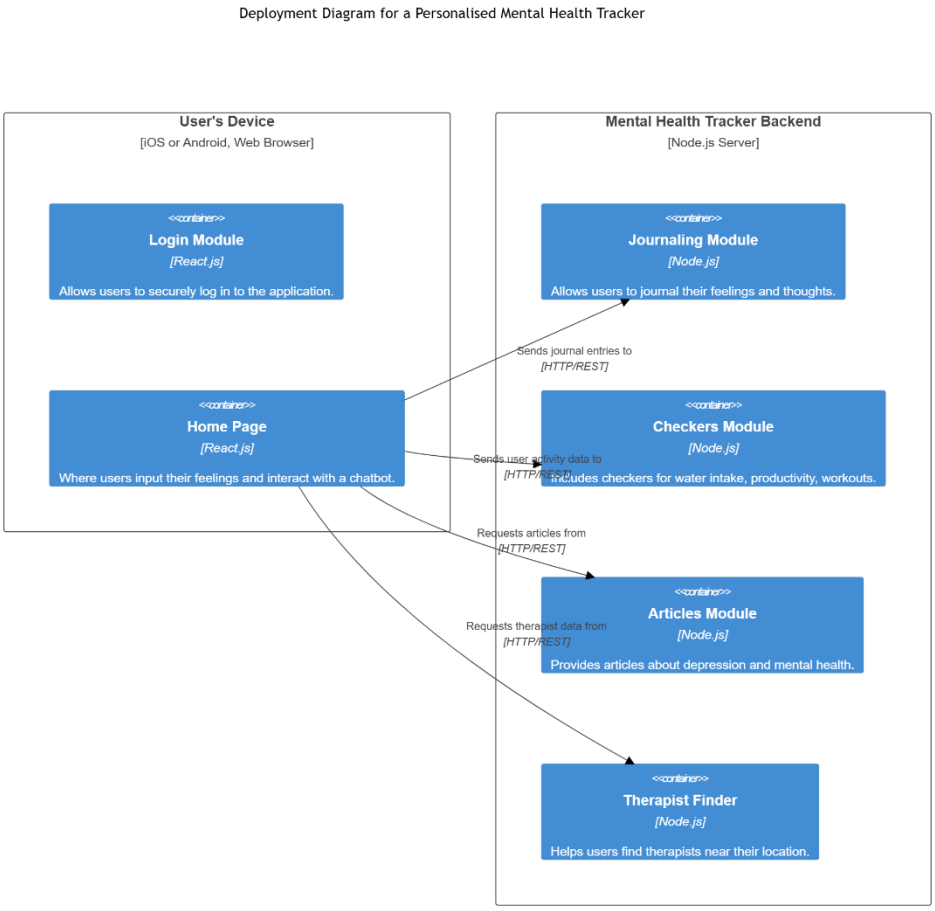
Activity Diagram



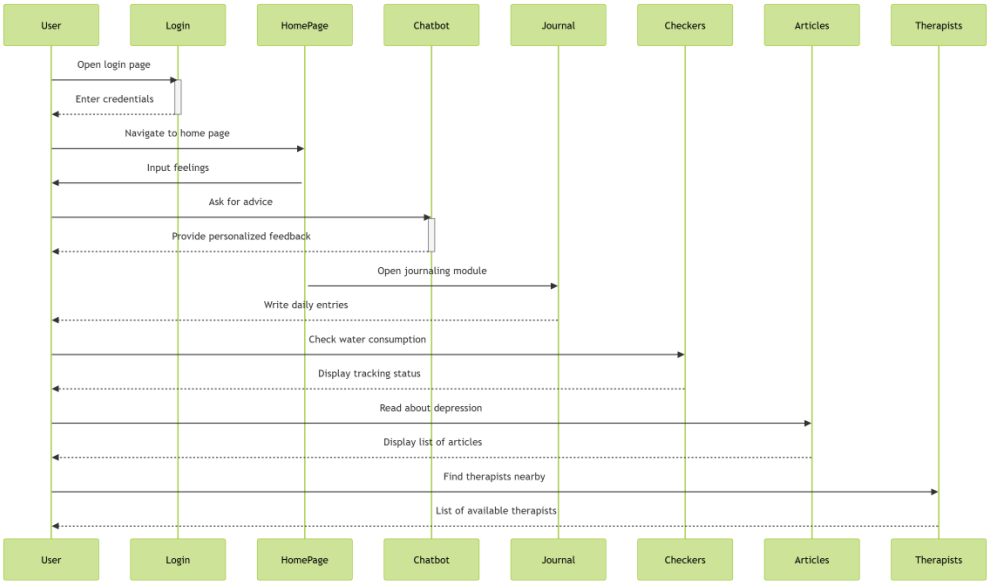
Component Diagram



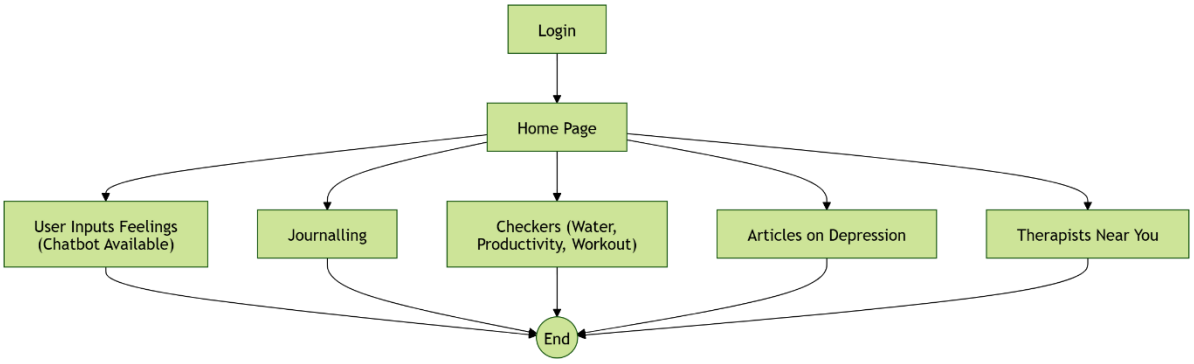
Deployment Diagram



Sequence Diagram



Collaboration Diagram



6. Implementation Details

6.1 User Authentication

- Using Passport.js for authentication.
- Implementing secure password storage with bcrypt.

6.2 Mood Logging Feature

- Integrating the mood logging form with MongoDB for data persistence.
- Using Chart.js for visualizing mood data.

6.3 Content Management

- Admin functionality to manage resources.
- Searchable database with indexed content for quick retrieval.

6.4 Data Visualization

- Custom charts for visualizing emotional trends.
- Interactive filters to adjust the time frame and data categories.

7. Security Features

Ensuring the security of user data is a core priority for "MOODJAR," given the sensitive nature of emotional and mental health information. The platform is built to protect user privacy, safeguard data, and ensure the integrity of all content. Below are comprehensive security measures broken down into specific categories:

7.1 Data Encryption

- **End-to-End Encryption**: All data transmitted between the user's device and the server is encrypted using industry-standard protocols like TLS (Transport Layer Security) to prevent interception during transit. This guarantees that mood logs, journal entries, and other sensitive data remain secure.
- **Database Encryption:** Sensitive data, including user passwords, mood logs, and journal entries, is stored in the database using AES-256 encryption, one of the most secure algorithms currently available. This ensures that even if the database is breached, the data remains unreadable without the encryption keys.
- **Encryption at Rest and in Transit:** The platform implements encryption both for data stored on servers (at rest) and during data transfer (in transit). This dual-layer encryption ensures comprehensive protection across all stages of data handling.
- **Key Management:** Encryption keys are stored and managed using a secure Key Management System (KMS), which controls access to keys and rotates them periodically to mitigate the risks of key compromise.

7.2 User Privacy

- **Data Anonymization:** User data is anonymized wherever possible, particularly when analyzed for broader trends. This means that individual mood patterns and entries cannot be linked back to specific users, ensuring privacy even in aggregated data.
- **Strict Access Controls:** Access to user data is limited to the user themselves. Even administrators or developers are restricted from accessing personal data without explicit user consent, enforced by strict access protocols.
- **User Consent Management:** Before any data is collected, users are prompted for consent, with detailed explanations on how their data will be used. They can modify or revoke consent at any time, with clear options in the settings to delete their account and data permanently.
- **Privacy by Design:** The system adheres to GDPR (General Data Protection Regulation) and other relevant privacy frameworks, embedding privacy features in every stage of the development process. This includes data minimization, purpose limitation, and integrating robust privacy defaults.

7.3 Authentication

- **Secure Password Storage:** User passwords are hashed using algorithms like bcrypt, which employs a salted hash technique, ensuring that even if passwords are compromised, they remain extremely difficult to crack.
- **Multi-Factor Authentication (MFA):** Users are encouraged to enable multi-factor authentication, which requires an additional layer of verification (such as a code sent to a mobile device) when logging in. This significantly reduces the risk of unauthorized access.
- **Session Management**: Implementing secure session management through JWT (JSON Web Tokens) to ensure that sessions are valid, with auto-expiry for inactive sessions. Additionally, active session information is tracked, allowing users to review and terminate any suspicious sessions.
- **Brute Force Protection:** To prevent brute force attacks, the platform employs rate-limiting techniques, temporarily blocking accounts after several failed login attempts. Users are prompted to verify identity through email or phone in case of multiple failed attempts.
- **OAuth Integration:** Users have the option to log in via secure OAuth providers (e.g., Google, Facebook) which offer additional security benefits and eliminate the need for password storage on the platform.

7.4 Content Moderation

- **Manual Review by Admins:** All content, especially user-submitted articles or feedback, goes through a manual review process conducted by trained moderators. This ensures that the content is accurate, relevant, and safe for the user community.
- **Content Filtering Algorithms:** A combination of AI-based filtering tools and manual moderation is used to detect inappropriate content, ensuring a safe environment. NLP (Natural Language Processing) models can flag content containing potentially harmful language, spam, or misinformation.

- **User Reporting System:** Users have the ability to report any content they find inappropriate or misleading. These reports trigger immediate reviews by the admin team, which follows a predefined escalation path for severe violations.
- **Verification of Professional Contributors:** Professionals who contribute content (like mental health experts) undergo a verification process to confirm credentials. This includes identity checks and validation of their qualifications to ensure that content comes from reliable sources.
- **Secure Admin Access:** Admin access to moderation tools is protected by multi-layer authentication, including MFA and IP whitelisting, reducing the risk of unauthorized administrative actions.

7.5 Backup & Recovery

- **Regular Data Backups:** The system performs automated daily backups of all critical data, including user mood logs, journal entries, and platform configurations. These backups are securely stored in geographically distributed data centers to prevent data loss.
- **Disaster Recovery Plan:** A robust disaster recovery plan is in place, detailing the procedures for restoring data in the event of a server failure, cyber-attack, or natural disaster. This includes predefined Recovery Time Objectives (RTO) and Recovery Point Objectives (RPO) to minimize downtime.
- **Version Control:** The platform uses Git for version control, allowing for quick rollbacks in case of bugs or unexpected behavior. This is crucial for maintaining a stable and consistent user experience during updates.
- **Data Integrity Checks:** Regular integrity checks are performed on the database to detect any corruption or discrepancies. Automated scripts verify the integrity of encrypted data, ensuring that backup files are valid and unaltered.

8. Testing and Quality Assurance

8.1 Unit Testing

Testing individual components like the login feature, mood logging form, and content search functionality.

8.2 Integration Testing

Ensuring that mood logging data integrates seamlessly with the data visualization module.

8.3 System Testing

Evaluating the system's overall performance with multiple concurrent users, stress-testing the database under heavy load.

8.4 User Acceptance Testing

Gathering feedback from a small group of users to refine the interface and ensure features align with user expectations.

8.5 Test Reports *(Expanded)*

Test Case ID	Test Condition	Test Case Input	Expected Output	Pass/Fail
1	Valid User Registration	Email, password, and username	Account created successfully	Pass
2	Invalid Login Attempt	Incorrect password	Error message shown	Pass
3	Mood Entry	Select emotion, add notes	Entry saved, mood graph updated	Pass
4	Access Article	Search keyword	Relevant articles displayed	Pass
5	Journal Search	Search for past journal keyword	Matching entries retrieved	Pass
6	Data Visualization	Date range filter applied	Graph updates to show filtered data	Pass

9. Future Scope

The "MOODJAR" project has immense potential for growth and development, with numerous avenues for expanding functionality, enhancing user engagement, and leveraging emerging technologies. Here's a comprehensive exploration of future possibilities:

9.1 Mobile App Development

- Develop a **cross-platform mobile app** using frameworks like **Flutter** or **React Native**. This would ensure a seamless experience on both Android and iOS, providing users with the flexibility to track their moods and access resources on-the-go.
- Introduce **push notifications** for reminders to log moods daily, engage in wellness activities, and access relevant content. This will help maintain user engagement and reinforce consistent emotional tracking habits.
- Implement **offline mode** for mobile users, allowing them to record mood entries without internet access, which will sync once they are online.

9.2 Integration with Wearable Devices

- Synchronize the platform with **wearable health devices** like smartwatches (Fitbit, Apple Watch, Garmin). These devices can track physiological metrics such as heart rate, sleep patterns, and physical activity levels.
- Use these physiological data points to **correlate with mood entries**, providing users with deeper insights into how physical health impacts their emotional well-being. This could involve visualizing patterns like increased anxiety during periods of poor sleep.
- Enable **automatic mood predictions** based on biometric data. For instance, if a user's heart rate indicates prolonged stress, the app can prompt a mood log or suggest calming activities.

9.3 Advanced AI Analysis

- Integrate **machine learning algorithms** for predictive analytics. These algorithms could analyze user data to detect patterns and predict potential emotional states, offering proactive suggestions for maintaining or improving mood.
- Use **Natural Language Processing (NLP)** to analyze user journal entries and provide feedback or insights based on sentiment analysis. This could identify keywords associated with negative emotions and recommend targeted resources.
- Develop an AI-driven **recommendation engine** that provides personalized content, articles, and mood-improving activities based on the user's past emotional patterns.
- Implement **chatbots** or virtual assistants to interact with users, offering empathetic guidance, answering questions, and suggesting relevant content based on their current emotional state.

9.4 Community Features

- Create a **community forum** or discussion board within the platform where users can share experiences, coping strategies, and offer mutual support. This can foster a sense of belonging and reduce feelings of isolation.
- Develop **user groups or circles** around shared emotional experiences (e.g., stress management, dealing with anxiety) where members can participate in topic-specific discussions and share insights.
- Introduce a **peer support feature**, allowing users to opt into a peer counseling program where they can receive or offer guidance, moderated by trained professionals to ensure safety.

9.5 Integration with Professional Services

- Build a **directory of mental health professionals** where users can search and connect with therapists, counselors, or coaches. This would include filters by specialization, location, and user reviews to help find the right professional fit.
- Develop a **teletherapy module**, enabling video calls or text-based consultations directly through the platform with mental health experts. This would be particularly useful for users who prefer the convenience of online sessions.
- Allow mental health professionals to **contribute content**, like articles, guides, and tips, fostering a direct connection between professionals and the user base. Professionals can also provide **workshops or webinars** through the platform.

9.6 Gamification

- Introduce **gamification elements** to increase user engagement. This could involve a points or badge system where users earn rewards for regular mood logging, completing self-care activities, or accessing helpful resources.
- Create **achievement milestones** that celebrate consistent use (e.g., "Logged Mood 7 Days in a Row," "Completed 5 Journaling Entries") to motivate users and make emotional tracking a more enjoyable habit.

- Add a **progress tracker** where users can set emotional wellness goals and track their achievements over time. This could be tied to visual badges or personalized feedback to encourage sustained engagement.

9.7 Enhanced Data Visualization and Insights

- Expand data visualization capabilities with more interactive and complex graphs using libraries like **D3.js**. Include detailed drill-down features, allowing users to examine emotions by date, category, or trigger.
- Develop **emotion heatmaps** to show the most frequently logged emotions over certain periods (e.g., by time of day or month) to help users identify patterns.
- Provide **personalized dashboards** that adapt to the user's needs, highlighting critical trends and changes in emotional states over time.

9.8 Integration with Social Media and External Platforms

- Allow users to **share anonymized emotional insights** or progress on social media, encouraging a broader discussion around mental health. This could also raise awareness for the platform and foster community growth.
- Enable **cross-platform integration**, allowing users to sync mood data with their Google Calendar, Apple Health, or similar tools for a holistic view of their daily activities and emotional patterns.
- Consider creating **browser extensions** or desktop widgets that prompt users to log their mood directly from their devices without navigating to the main platform.

9.9 Mental Health Campaigns and Collaborations

- Partner with **mental health organizations** to run campaigns, challenges, or awareness drives through the platform. This could involve regular events, Q&A sessions, and mental health challenges that motivate users to engage with their well-being.
- Launch **seasonal challenges**, like a "30 Days of Self-Care" challenge, to inspire users to engage consistently with their emotional health.
- Collaborate with **educational institutions** to integrate "MOODJAR" as a mental health resource for students, promoting emotional awareness within schools and colleges.

9.10 Localization and Cultural Adaptation

- Implement **localization features**, allowing the platform to be used in multiple languages to cater to a global audience. This includes culturally relevant content and mood tracking features that align with diverse cultural norms around emotional expression.
- Adapt content to reflect **cultural sensitivity**, providing articles and resources that respect different cultural views on mental health and emotional well-being.

9.11 Customization and Personalization

- Enable **customizable interfaces** where users can choose themes, color schemes, and mood icons that best resonate with their personal style.

- Provide options for **custom mood categories**, allowing users to track emotions that are most relevant to their personal experiences. This could also include the ability to rename or add emojis/icons for specific moods.

9.12 AI-Driven Coaching and Virtual Counseling

- Develop a **virtual emotional coach** that uses AI to provide personalized advice, encouragement, and feedback based on a user's emotional history.
- Use AI to simulate **cognitive-behavioral therapy (CBT)** techniques, guiding users through structured exercises that help reshape thought patterns.
- Implement AI tools that **recommend journaling prompts** or reflection questions tailored to recent mood logs, encouraging deeper self-exploration and self-care.

10. User Manuals

10.1 Getting Started

1. Visit the "MOODJAR" website using a compatible web browser (Chrome, Firefox).
2. Register by providing a unique username, a valid email, and a strong password.
3. Confirm registration via email.

10.2 Logging Moods

1. Log in to the dashboard.
2. Click on "Log Mood" to select an emotion and add any notes.
3. Save the entry to update your emotional graph.

10.3 Accessing Content

1. Navigate to the "Content" section.
2. Browse articles and activities sorted by mood categories.
3. Use the search bar for specific topics.

10.4 Journal Entries

1. Go to the "Journal" tab.
2. Write and save entries.
3. Use the search function to locate past reflections.

10.5 Admin Functions *(For Administrators)*

1. Access the admin panel via a special login.
2. Add or remove content.
3. Moderate user feedback and suggestions.

11. References

1. Wang, K., Varma, D. S., & Prosperi, M. (2021). "A systematic review of the effectiveness of mobile apps for monitoring and managing mental health." *Journal of the American Medical Informatics Association, 28*(8), 1624-1635.

2. Chittaro, L., & Combi, C. (2019). "Data visualization for mental health: A systematic approach to developing emotional tracking apps." *International Journal of Human-Computer Interaction, 35*(10), 945-959.

3. Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., & Arango, C. (2020). "How mental health care should change as a consequence of the COVID-19 pandemic." *The Lancet Psychiatry, 7*(9), 813-824.

4. Torous, J., Jän Myrick, K., Rauseo-Ricupero, N., & Firth, J. (2020). "Digital mental health and COVID-19: Using technology today to accelerate the curve on access and quality tomorrow." *JMIR Mental Health, 7*(3), e18848.

5. Wasil, A. R., Venturo-Conerly, K. E., Shingleton, R. M., & Weisz, J. R. (2019). "A review of popular smartphone apps for depression and anxiety: Assessing the inclusion of evidence-based content." *Behavior Research and Therapy, 123*, 103498.

6. Larsen, M. E., Nicholas, J., & Christensen, H. (2020). "A systematic assessment of smartphone tools for suicide prevention." *PLOS One, 15*(4), e0231861.

7. Pratap, A., Neto, E. C., Snyder, P., Stepnowsky, C., Elhadad, N., Grant, D., & Mooney, S. (2020). "Indicators of retention in remote digital health studies: A scoping review." *Digital Medicine, 3*, 21.