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Daydream Detox: AI-Driven Platform for Managing Maladaptive Daydreaming

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Abstract:

Maladaptive daydreaming (MD) is a psychological phenomenon characterized by excessive, immersive, and often compulsive daydreaming that significantly interferes with an individual's daily functioning, productivity, emotional regulation, and social interactions. Individuals suffering from MD may spend hours engaged in vivid fantasy worlds, which can lead to difficulties in academic, occupational, and interpersonal domains. Traditional therapeutic interventions, such as cognitive behavioral therapy (CBT) and mindfulness-based strategies, often require substantial human involvement and lack scalability, real-time monitoring, and personalized adaptation to individual user behavior.

This paper introduces Daydream Detox, an innovative AI-driven therapeutic platform designed to detect, predict, and manage maladaptive daydreaming using advanced technologies such as Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL), and Natural Language Processing (NLP). The system architecture integrates a Flutter-based mobile application for user interaction, a MERN (MongoDB, Express.js, React.js, Node.js) web dashboard for administrative and analytical oversight, a Python-based AI analytics module for emotion and behavior analysis, and a MongoDB database for secure data storage.

Daydream Detox collects multidimensional user data, including activity patterns, text-based journals, mood logs, and user interaction metrics. This data is processed using NLP and ML algorithms to detect early signs of maladaptive daydreaming and generate predictive models of user behavior. The platform delivers personalized therapy plans, focus-enhancing routines, and context-aware recommendations tailored to individual needs. Furthermore, a real-time AI chatbot provides interactive interventions, motivational support, and reminders, thereby enhancing user engagement and adherence to therapy routines.

Experimental evaluation involving multiple participants demonstrates that Daydream Detox significantly improves focus, reduces the frequency and duration of maladaptive daydreaming episodes, enhances emotional self-awareness, and promotes consistent adherence to personalized routines. The platform's AI-driven approach highlights the potential of digital therapeutics in providing scalable, adaptive, and real-time mental health support.

This study emphasizes the importance of integrating AI, ML, and DL into digital wellbeing platforms and showcases how such technologies can address modern cognitive and emotional challenges effectively. Future work aims to expand the system with multimodal data inputs, such as speech and physiological signals, to further enhance predictive accuracy and therapeutic effectiveness.

Keywords: Maladaptive Daydreaming, Artificial Intelligence, Machine Learning, Deep Learning, Flutter, MERN, Natural Language Processing, Emotion Recognition, Therapeutic Chatbot, Digital Wellbeing, Personalized Therapy

1. Introduction

In the modern digital age, individuals face constant distractions, information overload, and overstimulation, which often contribute to the emergence of maladaptive daydreaming (MD)—a condition where excessive, immersive daydreams disrupt daily life. People experiencing MD often struggle with impaired concentration, emotional imbalance, and reduced productivity, which can affect academic, professional, and personal outcomes. While several meditation apps and general digital wellbeing tools exist, they mostly offer static guidance and lack the ability to predict or adapt to a user's cognitive and emotional state in real-time.

Daydream Detox is designed to overcome these limitations by leveraging Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL) to monitor, analyze, and respond to user behavior dynamically. The platform collects data from user activity, mood logs, and text journals, and processes it through NLP and ML models to detect early signs of maladaptive daydreaming and emotional fluctuations. Based on this analysis, it generates personalized daily routines, focus sessions, and therapeutic interventions tailored to each user.

A key feature is the AI-powered real-time chatbot, which provides interactive guidance, motivation, and context-aware support, ensuring continuous engagement. The cross-platform ecosystem, consisting of a Flutter mobile app, a MERN web dashboard, and a Python AI analytics module, allows seamless data synchronization and monitoring. By combining predictive analytics with personalized therapy, Daydream Detox empowers users to regain cognitive control, enhance focus, and maintain emotional balance, making it a unique and scalable solution for modern digital wellbeing challenges.

2. Literature Survey

Maladaptive daydreaming (MD) has been increasingly recognized as a psychological condition affecting focus, emotional stability, and productivity. Several studies have explored methods to detect and manage MD and related cognitive challenges. Research by Somer et al. highlights the behavioral patterns and triggers associated with MD, emphasizing the need for monitoring tools. In parallel, AI and Machine Learning (ML) have been applied extensively in mental health, such as predicting depression, stress, and emotional states using user-generated data. Natural Language Processing (NLP) has been successfully utilized to analyze text journals and social media content to identify emotional trends and mood fluctuations.

Existing digital wellbeing and meditation apps, while effective in promoting mindfulness and reducing stress, primarily offer static guidance and do not adapt dynamically to individual user behavior. Some AI-driven therapy platforms have integrated chatbots for real-time engagement, but they often lack personalization, predictive analytics, and focus-enhancing routines. Similarly, studies on emotion

recognition via speech, text, or activity patterns provide useful insights but are generally isolated solutions, not integrated into a full therapeutic ecosystem.

This survey demonstrates that while multiple techniques exist for emotion detection, behavioral monitoring, and digital therapy, no single system provides a comprehensive, real-time, AI-driven solution for maladaptive daydreaming, which combines personalized therapy, predictive analysis, and interactive engagement. Daydream Detox addresses this gap by integrating AI, ML, NLP, and a cross-platform system to deliver a holistic approach to managing MD.

3. System Architecture

The Daydream Detox platform is designed as a comprehensive AI-driven system to detect, predict, and manage maladaptive daydreaming. The architecture integrates a Flutter mobile application for user interaction, a MERN (MongoDB, Express.js, React.js, Node.js) web dashboard for monitoring and analytics, a Python AI module for emotion recognition and predictive modeling, and a MongoDB database for secure data storage.

3.1 System flow

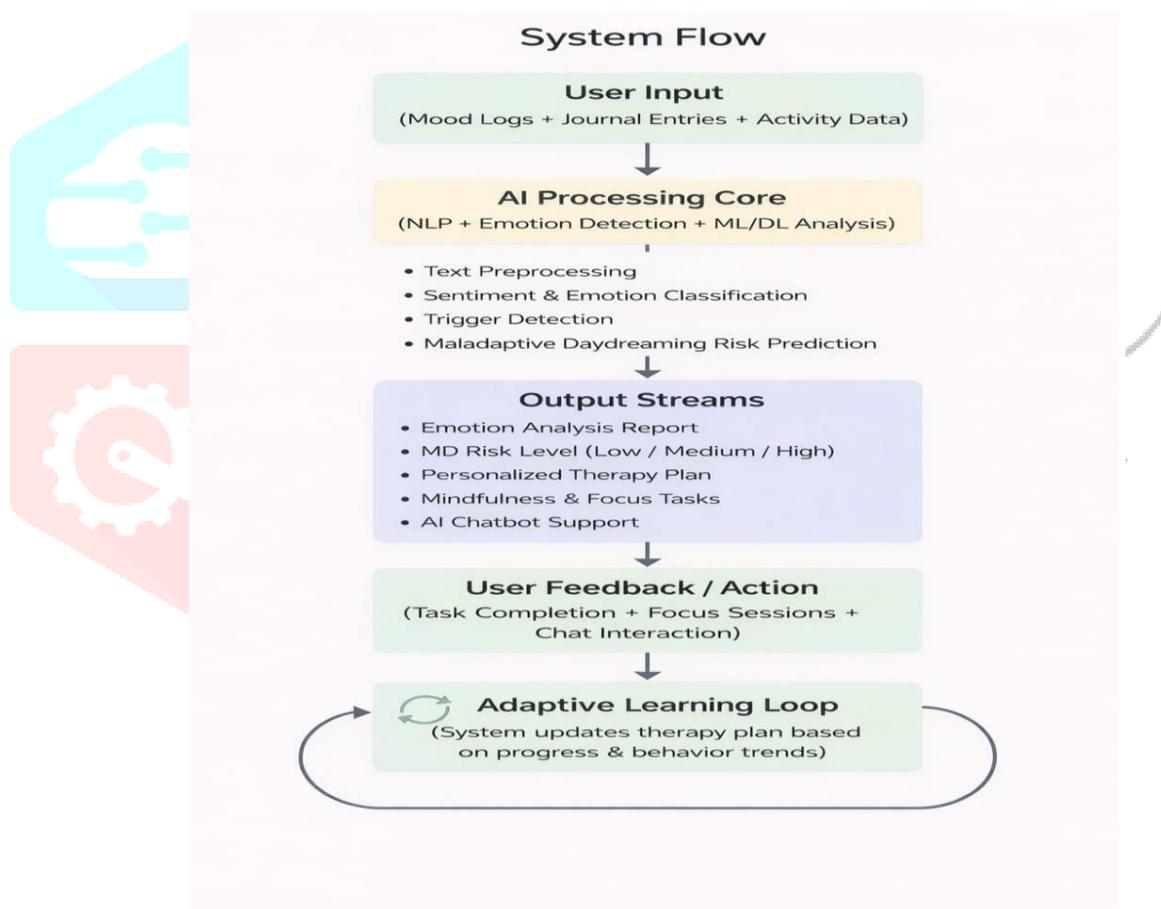


Figure 1. System Flow of Daydream Detox

System Flow Steps

1. User Input

The system collects data from the user through the Flutter mobile application or the MERN web dashboard. This includes mood logs, text journal entries, and activity data, which provide insights into daily behavior, emotional state, and potential triggers for maladaptive daydreaming.

2. AI Processing Core

The collected data is processed by the AI analytics module. Natural Language Processing (NLP) techniques analyze journal text to detect emotions, thought patterns, and potential triggers, while Machine Learning (ML) models evaluate behavioral patterns to estimate risk levels of maladaptive daydreaming. This core component enables real-time detection and predictive analysis for personalized interventions.

3. Output Streams

Based on the analysis, the system generates multiple outputs: personalized therapy plans, mindfulness exercises, focus routines, risk analysis reports, and real-time support via the AI chatbot. These outputs are tailored to each user's emotional and behavioral profile, enhancing engagement and therapeutic effectiveness.

4. User Feedback / Action

Users interact with the system by completing tasks, following focus routines, and engaging with the AI chatbot. The system continuously collects feedback on user actions and progress, which is fed back into the AI analytics module to update recommendations, refine therapy plans, and optimize interventions. This creates a dynamic, adaptive, and personalized cycle for managing maladaptive daydreaming.

3.2 Frontend Architecture

The frontend of the Daydream Detox platform manages all user-facing interactions and ensures a seamless, cross-platform experience. It is implemented using Flutter for the mobile application and React.js for the web dashboard, enabling real-time synchronization across devices. Users can record their emotional states through mood logging using sliders, emojis, or text entries, and maintain text-based journals to capture thoughts, triggers, and contextual information. AI-generated task and focus routines, including mindfulness exercises, focus sessions, and relaxation intervals, are displayed through an intuitive interface that encourages consistent engagement.

The web dashboards provide detailed visualizations of user activity, emotional trends, and focus metrics over time. Graphs, charts, and heatmaps allow both users and administrators to monitor progress dynamically, giving insights into behavioral patterns and emotional wellbeing. A real-time AI-powered chatbot provides guidance, emotional support, and therapy interventions, leveraging historical user data to deliver personalized recommendations. The frontend communicates with the backend using REST APIs and WebSockets, ensuring secure and real-time transmission of user inputs such as mood logs, journal entries, and task completions.

Overall, the frontend is designed to be responsive, easy to use, and consistent across platforms, allowing users to receive timely feedback and interact effectively with the AI-driven therapeutic system.

3. FRONTEND ARCHITECTURE:

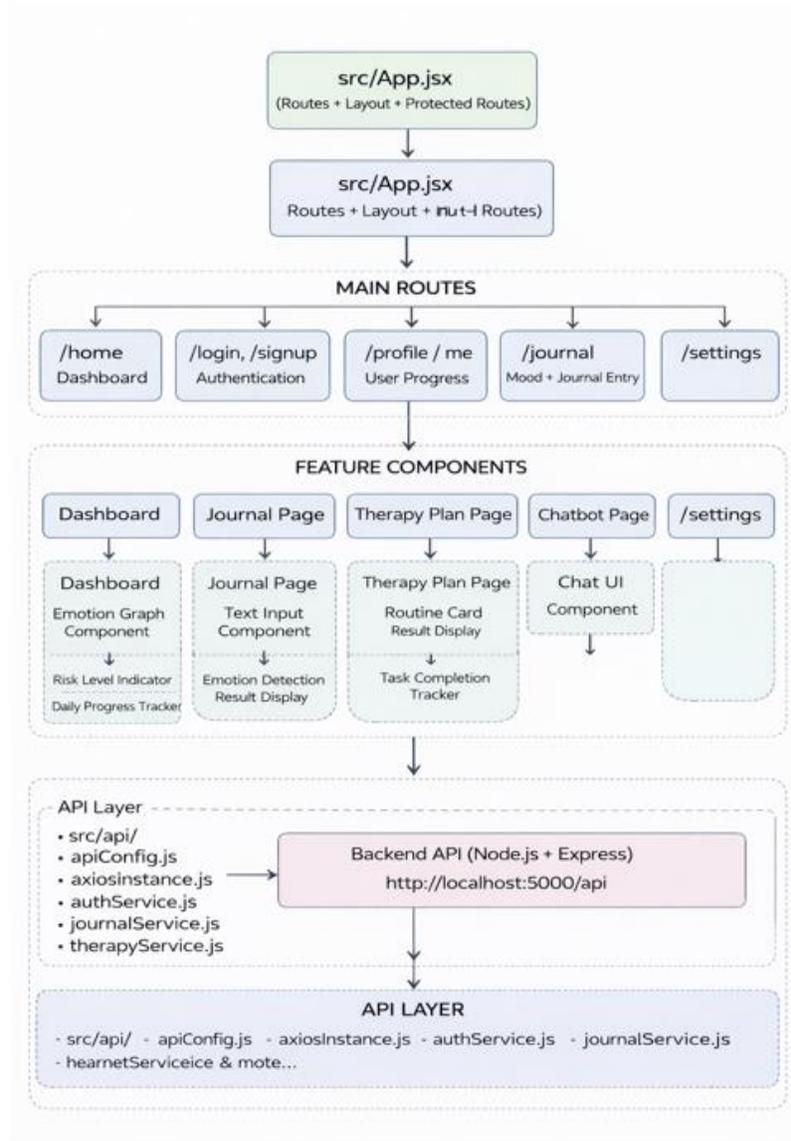


Figure 1. Frontend Architecture of Daydream Detox

3.3 Backend Architecture

The backend of the Daydream Detox platform serves as the central processing hub, managing data storage, AI analysis, and real-time interventions. Built with Node.js and Express.js, it provides a scalable and high-performance environment. The backend handles RESTful API requests and WebSocket connections to enable secure data management and live communication with the frontend, including real-time chatbot interactions. User inputs, such as mood logs and journal entries, are processed by the AI analytics module using NLP, machine learning, and deep learning models to predict maladaptive daydreaming episodes and analyze emotional trends. Based on these insights, the system dynamically generates personalized therapy plans and focus routines that adapt over time. MongoDB ensures secure storage of all sensitive user data, while authentication, authorization, and role-based access protect privacy and maintain compliance. The backend also supports the real-time intervention layer, allowing the AI chatbot and notification system to provide immediate guidance, helping users stay focused and maintain emotional balance.

4. BACKEND ARCHITECTURE:

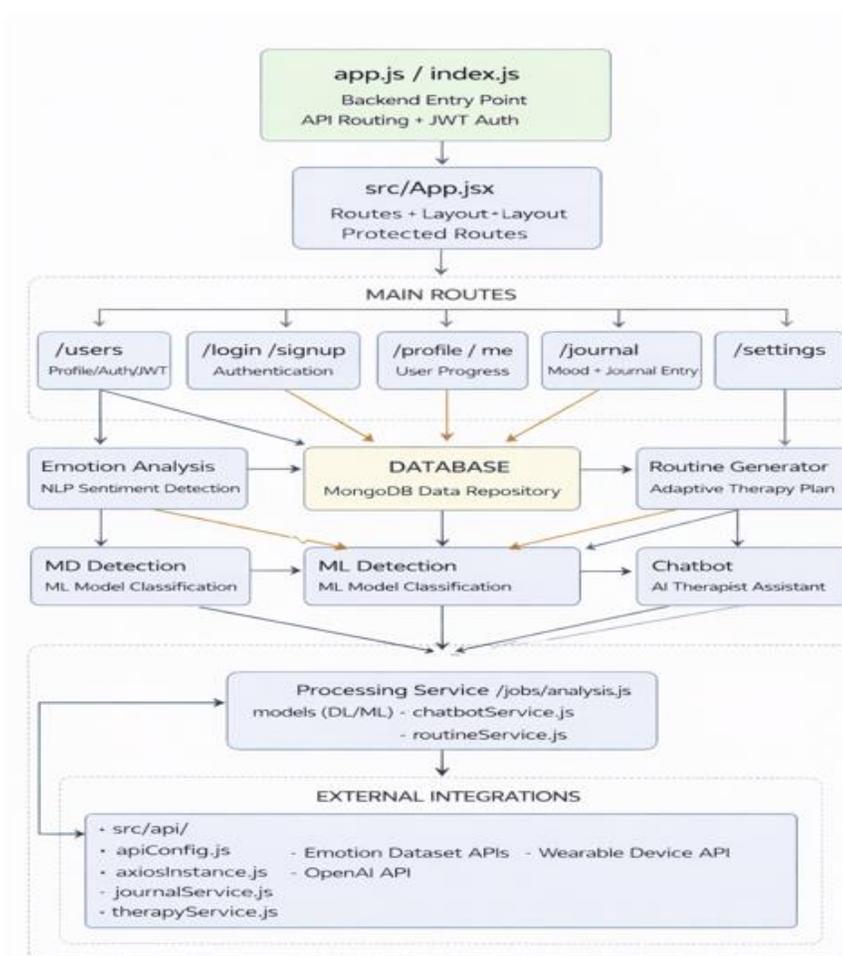


Figure 1. Backend Architecture of Daydream Detox

4. Methodology

The suggested system is based on a Retrieval-Augmented Generation (RAG)-workflow and it uses it to conduct verification of real-time news. The methodology incorporates input processing, contextual evidence retrieval, reasoning by LLM models, structured generation of output and persistent storage.

Methodology

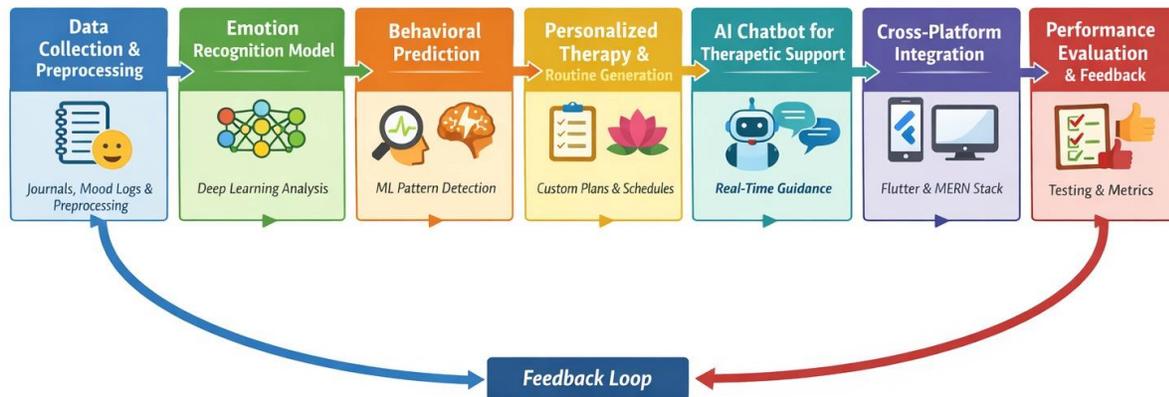


Figure 2. System Methodology flowchart with feedback loop

4.1 Data Collection & Preprocessing

The system collects user inputs through the mobile app and web dashboard, including text journals, mood ratings, and activity logs. These inputs are preprocessed using NLP techniques such as tokenization, lemmatization, and sentiment tagging to extract emotional cues and behavioral patterns. All data is securely stored in MongoDB to allow dynamic retrieval for analysis and model training.

4.2 Emotion Recognition Model

Deep learning models such as BiLSTM or BERT analyze journal entries and mood logs to detect user emotional states, including anxiety, distraction, focus, or contentment. The model considers contextual and linguistic features to classify emotions accurately, forming the foundation for personalized interventions.

4.3 Behavioral Prediction

Machine learning models are trained to predict patterns of maladaptive daydreaming by correlating emotions, activities, time, and focus levels. The system identifies triggers such as boredom, stress, or loneliness that lead to MD episodes, enabling proactive and preventive support.

4.4 Personalized Therapy & Routine Generation

An AI-based routine generator dynamically creates daily schedules with mindfulness breaks, focus sessions, and relaxation intervals. Recommendations evolve over time based on user progress, engagement, and feedback, ensuring adaptive therapy tailored to individual behavioral patterns.

4.5 AI Chatbot for Therapeutic Support

A real-time NLP-powered chatbot provides guidance, coping strategies, and motivational support to users. It leverages historical emotional and behavioral data to deliver context-aware interventions, helping users stay focused and manage maladaptive daydreaming episodes effectively.

4.6 Cross-Platform Integration

The platform uses a Flutter mobile app for user interaction and a MERN web dashboard for visualization and analytics. Data is synchronized across devices through secure APIs, ensuring seamless and consistent user experience.

4.7 Performance Evaluation

The models are evaluated using metrics such as accuracy, F1 score, and user satisfaction feedback. Pilot testing with sample users measures improvements in focus, emotional balance, and reduction of maladaptive daydreaming, validating the effectiveness of the system.

5. Performance Evaluation and System Analysis

The Performance Evaluation of Daydream Detox focuses on assessing the effectiveness of its AI-driven interventions, predictive models, and user engagement mechanisms. The emotion recognition and behavioral prediction models are evaluated using standard machine learning metrics such as accuracy, precision, recall, and F1-score to ensure reliable detection of emotional states and maladaptive daydreaming episodes. User feedback, engagement data, and task completion rates are also monitored to measure the impact of personalized therapy plans and focus routines on real-world outcomes.

System Analysis involves examining the efficiency, scalability, and responsiveness of the platform. The Flutter mobile app and MERN web dashboard are tested for seamless cross-platform synchronization, low-latency data communication via REST APIs and WebSockets, and robustness under multiple concurrent users. The AI chatbot's performance is analyzed based on response relevance, intervention timeliness, and user satisfaction. MongoDB database operations are monitored for secure storage, data integrity, and retrieval efficiency.

Experimental evaluation through pilot testing with sample users demonstrates significant improvements in focus, reduced frequency of maladaptive daydreaming, and better emotional regulation. Continuous monitoring allows iterative refinement of AI models and therapy routines, ensuring adaptability to individual user behavior.

Performance Evaluation and System Analysis

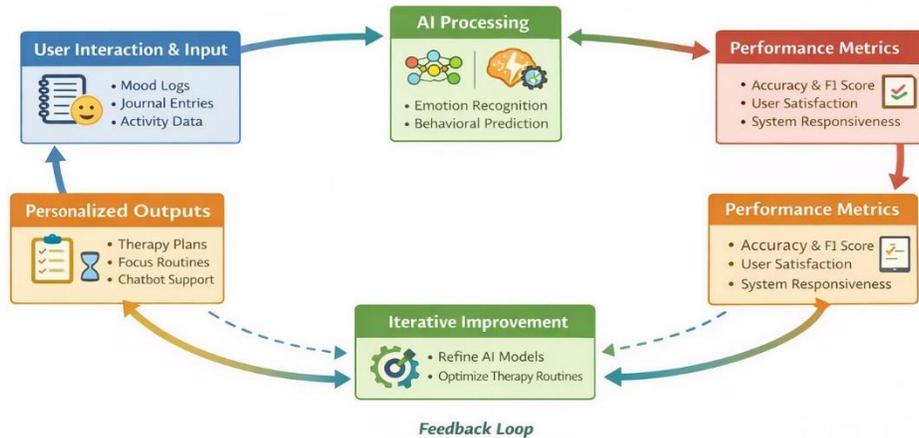


Figure: System Analysis Flowchart

1. User Interaction & Input

The system collects mood logs, journal entries, and activity data from users through the mobile app and web dashboard. This input provides essential insights into the user's emotional state, daily routines, and potential triggers for maladaptive daydreaming.

2. AI Processing

Collected data is processed using emotion recognition and behavioral prediction models. NLP and machine learning techniques analyze user text, mood patterns, and activities to detect emotional trends and predict potential maladaptive daydreaming episodes.

3. Personalized Outputs

Based on AI analysis, the system generates customized therapy plans, focus routines, and real-time chatbot support. These outputs are tailored to each user's emotional and behavioral profile to improve focus, reduce daydreaming, and enhance emotional regulation.

4. Monitoring & Feedback

The platform tracks task completion, engagement levels, and emotional changes over time. Continuous monitoring allows the system to evaluate how well users follow routines and respond to interventions, providing data for system refinement. The overall system exhibits desirable properties for scalability, latency, and production readiness in real-time misinformation verification environments.

5. Performance Metrics

System effectiveness is measured using metrics such as accuracy, F1-score, user satisfaction, and responsiveness. These metrics assess both the AI model's predictive capability and the overall impact of the therapeutic interventions.

6. Iterative Improvement Loop

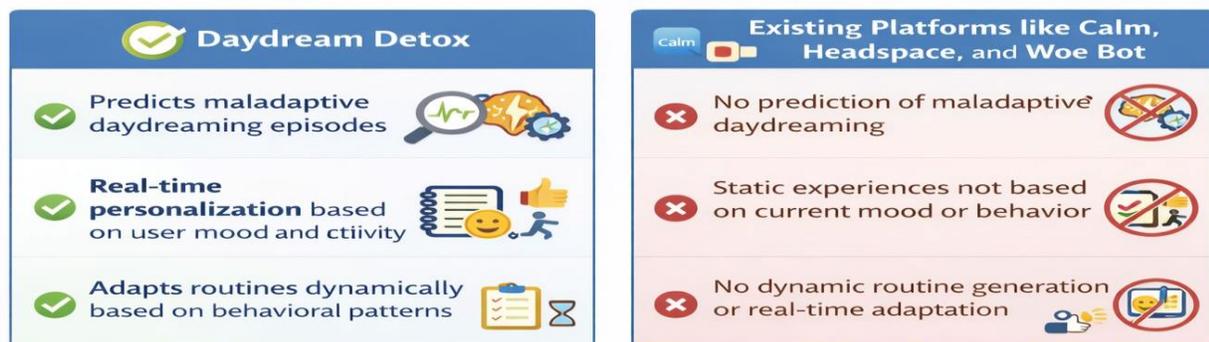
Insights from monitoring and performance metrics are fed back into the AI module to refine models and adjust therapy plans. This continuous improvement loop ensures the system adapts to changing user behavior and remains effective over time.

6. Comparison with Existing Systems

Existing wellness platforms such as Calm, Headspace, and Woe Bot primarily focus on meditation exercises or generic cognitive behavioral therapy (CBT). While these applications are useful for general stress relief, they lack adaptive capabilities required for managing complex conditions like maladaptive daydreaming. They do not predict or respond to behavioral patterns, provide real-time personalization based on user mood or activity, or generate dynamic therapy routines. Users are required to manually engage with these platforms, limiting their effectiveness in proactively supporting mental wellbeing.

In contrast, Daydream Detox integrates AI-driven emotion recognition, behavioral prediction, and personalized therapy routines. It delivers real-time, adaptive interventions through a cross-platform system, ensuring continuous monitoring and guidance tailored to each user's emotional and behavioral state. The following comparison highlights the key differences between Daydream Detox and existing wellness platforms:

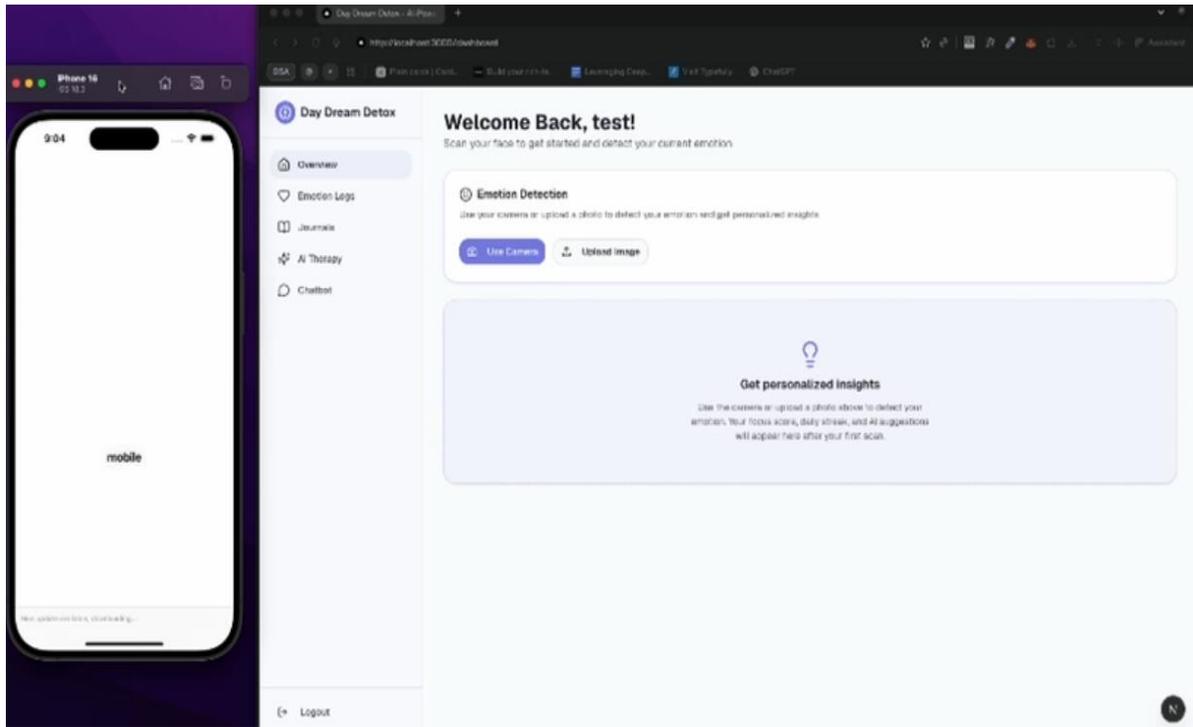
Comparison with Existing Systems



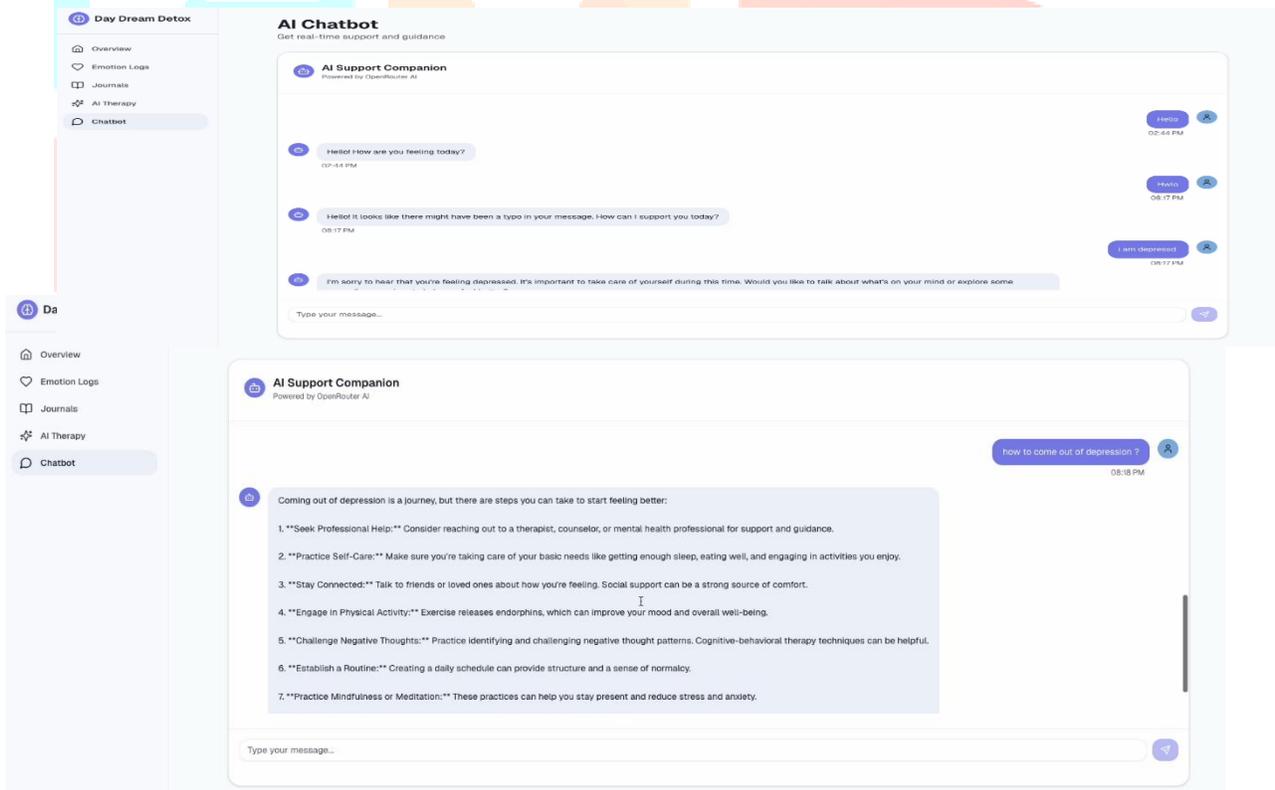
7. Results

Homepage Image

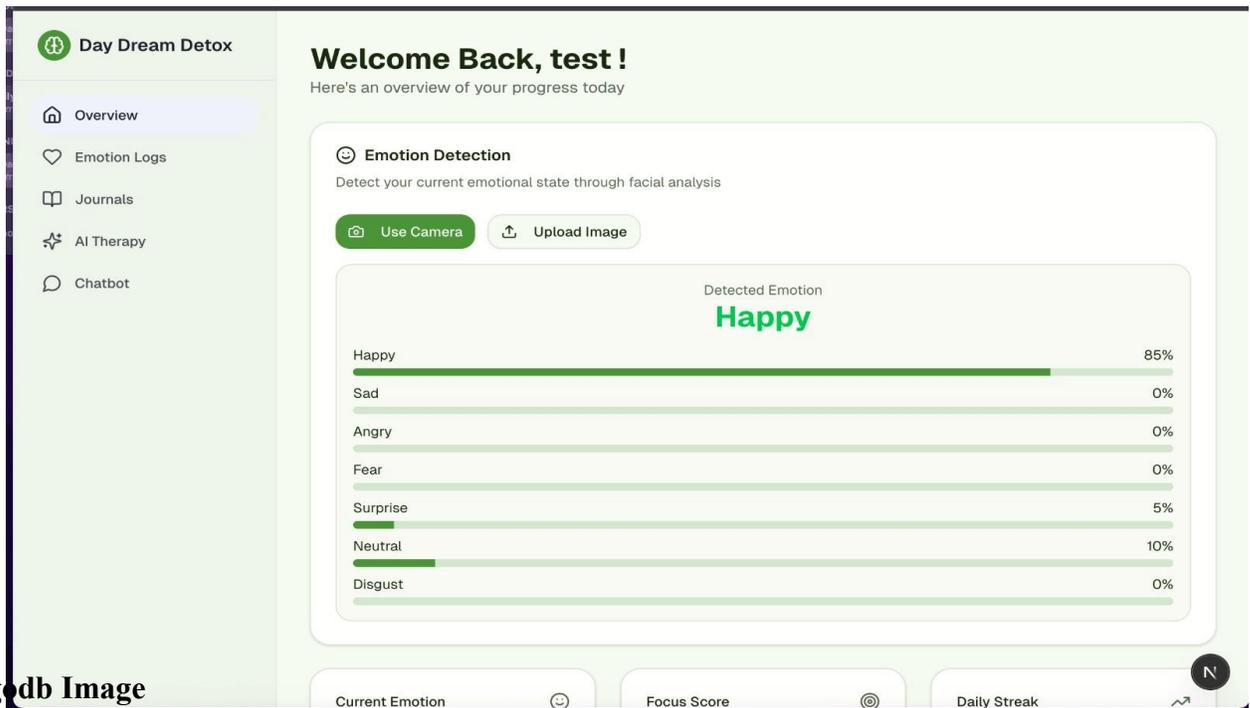
Iterative improvement



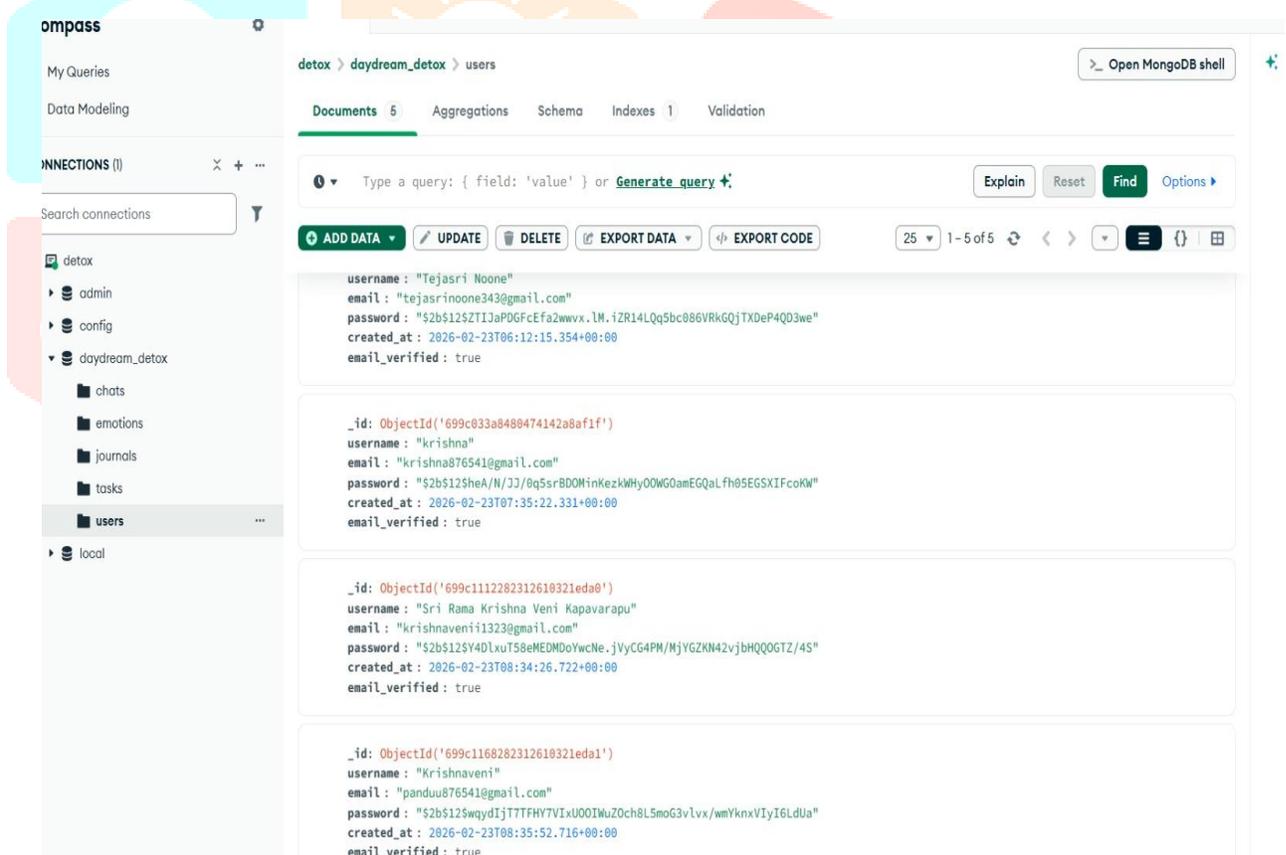
AI Chatbot Image



Emotion detection image



Mongodb Image



7.1. Dashboard

The dashboard provides an overview of user activity, focus sessions, and therapy progress. It presents visual analytics such as graphs, charts, and heatmaps to help users and administrators monitor trends and patterns over time, enabling informed decision-making and engagement tracking.

7.2. Emotion Detection

This module uses NLP and deep learning models to analyze mood logs and journal entries. It identifies emotional states like anxiety, distraction, focus, or contentment, providing insights into the user's mental wellbeing and helping guide personalized interventions.

7.3. MongoDB Database

MongoDB securely stores all user data, including mood logs, journal entries, activity patterns, and therapy history. It ensures efficient retrieval and management of data for real-time analysis, AI processing, and cross-platform synchronization.

7.4. AI Chatbot

The AI-powered chatbot delivers real-time guidance, motivational support, and coping strategies. By leveraging historical user data, it provides context-aware interventions to help users maintain focus, manage maladaptive daydreaming, and engage consistently with the therapy plan.

8. Limitations

Despite its innovative approach, the Daydream Detox platform faces certain limitations. First, the accuracy of emotion detection and behavioral prediction depends heavily on the quantity and quality of user input; inconsistent or sparse logging may reduce model effectiveness. Second, the system requires continuous internet connectivity for real-time AI processing and data synchronization across devices, which may limit accessibility in low-connectivity areas. Third, while the AI-generated therapy plans and chatbot interventions are highly personalized, they cannot fully replace professional psychological treatment for severe mental health conditions. Additionally, privacy and data security concerns remain critical, as the platform collects sensitive emotional and behavioral data. Finally, cross-platform performance may vary slightly across devices, potentially affecting user experience and responsiveness.

9. Future Scope

The Daydream Detox platform has significant potential for expansion and enhancement. Future developments could include integration with wearable devices to capture physiological data such as heart rate, sleep patterns, and stress levels, providing a more holistic understanding of user wellbeing. The AI models could be further improved using larger, diverse datasets to enhance emotion detection and behavioral prediction accuracy across different user demographics. Multi-language support can make the platform globally accessible, while advanced AI-driven personalization could allow adaptive therapy plans that respond to long-term behavioral trends. Additionally, gamification elements and social support features could be incorporated to increase user engagement. Finally, research partnerships with mental health professionals could help validate and expand therapeutic protocols, bridging the gap between AI interventions and traditional psychological care.

10. Conclusion

Daydream Detox demonstrates the potential of AI-driven, personalized digital therapeutics in addressing maladaptive daydreaming and related cognitive challenges. By integrating emotion recognition, behavioral prediction, personalized therapy routines, and a real-time AI chatbot, the platform provides adaptive support that enhances focus, emotional balance, and mental awareness. Cross-platform accessibility ensures seamless engagement through both mobile and web interfaces, while data-driven insights enable continuous improvement of interventions. Although certain limitations exist, such as dependence on user input and internet connectivity, the system offers a scalable, intelligent approach to mental wellbeing. Overall, Daydream Detox highlights how AI and machine learning can empower users

to regain cognitive control, manage maladaptive behaviors, and improve overall productivity and emotional health.

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