

AN INTELLIGENT MENTAL HEALTH SUPPORT PLATFORM USING ARTIFICIAL INTELLIGENCE AND GEO LOCATION- BASED RESOURCES

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ABSTRACT

This research presents an AI-driven mental health platform designed to provide personalized emotional support, journaling, and geolocation-based resource navigation [1]. The app integrates an empathetic chatbot, customizable journaling tools, and a resource locator to bridge gaps in mental health accessibility [2]. User surveys with 10 participants revealed high satisfaction with the chatbot's emotional support and the journaling feature's guided prompts, while the resource locator faced occasional accuracy issues. Key challenges, including NLP accuracy, geolocation reliability, and advanced customization, were identified as areas for improvement. By leveraging user feedback and iterative updates, this app has the potential to revolutionize accessible mental health support.

KEYWORDS

Mental Health, AI-Driven Chatbot, Personalized Journaling, Geolocation Resources, User-Centered Design

1. INTRODUCTION

The mental health crisis is a global challenge that affects individuals of all ages, with significant impacts on both personal well-being and societal productivity [3]. Recent studies indicate that 1 in 8 people globally live with mental health disorders, such as anxiety and depression, yet only a fraction receive adequate care. Barriers to access include stigma, lack of awareness, and insufficient resources. Technology has the potential to bridge these gaps by offering accessible, personalized, and scalable mental health support.

This paper addresses the lack of integrated platforms that combine personalized mental health content, journaling tools, and peer support with artificial intelligence (AI)-driven guidance. Despite existing mental health apps, many lack the depth to offer comprehensive emotional support while fostering community engagement. The absence of personalized learning resources and seamless interactivity in existing solutions further highlights the need for innovation.

This gap significantly affects vulnerable populations, including adolescents, working professionals, and individuals in remote areas, leading to untreated symptoms, social isolation, and decreased quality of life. For example, studies suggest that up to 70% of young people with mental health conditions receive no intervention. This underscores the urgency of developing

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inclusive and effective tools that cater to diverse needs, enabling proactive mental health management.

Balcombe and Leo (2022) highlighted the role of human-computer interaction (HCI) in improving accessibility and usability in AI-driven mental health platforms, though they faced challenges in socio-cultural adaptability (Balcombe & Leo, 2022) [4]. Van der Schyff et al. (2023) explored the Leora chatbot, emphasizing accessibility and privacy for mild mental health symptoms, but identified biases and ethical concerns in AI deployment (van der Schyff et al., 2023). Sadeh-Sharvit et al. (2023) demonstrated that AI-assisted platforms improved therapy outcomes and retention, though their reliance on clinical settings limited scalability (Sadeh-Sharvit et al., 2023). Our project builds on these methodologies by integrating modular components such as NLP-powered chatbots, personalized journaling, and geolocation-based resources, creating a scalable and inclusive solution.

Our proposed solution is an AI-driven mental health platform that integrates personalized journaling, chatbot interactions, learning modules, and community engagement. The platform fosters emotional well-being by providing tailored resources and peer connections while leveraging state-of-the-art AI to offer empathetic, real-time support.

This approach addresses key challenges, including stigma and accessibility, by offering a private and judgment-free environment for users to explore their feelings and track their mental health journeys. The app's chatbot, powered by AI, acts as a virtual companion, guiding users through introspective exercises and offering real-time advice based on their needs. Journaling features allow users to document their emotions, while integrated learning modules provide curated articles and videos to deepen their understanding of mental health.

Compared to existing solutions, this platform is uniquely positioned to deliver a holistic and engaging experience. By incorporating geolocation-based resources, it bridges the gap between digital and in-person support, enabling users to find nearby services [5]. Its modular design also ensures adaptability to future technological advancements, making it a scalable and sustainable solution.

The experiments aimed to evaluate the app's usability, emotional support capabilities, and feature-specific satisfaction. In the first experiment, 10 participants used the app for one week and provided feedback through a survey focusing on overall user experience. High satisfaction scores for the chatbot and journaling features confirmed the app's effectiveness in promoting mental well-being. Suggestions for improved customization and enhanced geolocation accuracy were highlighted.

In the second experiment, feature-specific feedback was collected to identify the strongest components and areas needing improvement. The chatbot emerged as the most reliable and engaging feature, while the journaling tool was praised for its prompts but required additional customization options. The resource locator, though useful, faced challenges with data accuracy and engagement.

These insights validate the app's potential as a mental health tool while emphasizing the need for iterative updates based on user feedback to enhance functionality and user satisfaction.

2. CHALLENGES

In order to build the project, a few challenges have been identified as follows.

2.1. Empathetic and Accurate

The integration of an AI-driven chatbot posed significant challenges, particularly in maintaining empathetic and accurate responses. Natural Language Processing (NLP) models require extensive training on diverse datasets to ensure contextually appropriate and emotionally supportive interactions [6]. A potential issue is the misinterpretation of user inputs, leading to ineffective or harmful suggestions. To address this, robust testing with feedback loops is essential, alongside incorporating sentiment analysis to fine-tune responses. Additional measures, such as regular model updates with user data (while ensuring privacy), would further improve the chatbot's reliability and relevance.

2.2. Ensuring Secure Storage

Developing personalized journaling features required balancing user customization with a user-friendly interface. Ensuring secure storage of sensitive mental health data was a top priority, as any breach could harm user trust. The challenge was to implement a seamless, encrypted database integration while maintaining performance and accessibility. A proposed solution involves utilizing end-to-end encryption and secure APIs for data transfer, combined with a user authentication system. Additionally, designing an intuitive interface with guided prompts and emotional tags enhances user engagement while preserving simplicity.

2.3. Ensuring Accurate and Updated Data

The geolocation-based resource finder faced hurdles in ensuring accurate and updated data. Dependencies on external APIs for geocoding and service listings introduced potential latency and reliability issues. Additionally, ensuring inclusivity in resource recommendations, such as considering cultural sensitivities and diverse demographics, was critical. To overcome these challenges, caching frequently accessed data and implementing fallback mechanisms in case of API failures could enhance reliability. Collaborating with local organizations for verified resource data would further ensure accuracy and relevance. Regular audits and user feedback loops can also help refine the recommendations over time.

3. SOLUTION

The AI-driven mental health platform is structured around three core components: the chatbot, journaling feature, and resource locator. These components work together to provide users with a holistic mental health support system.

The flow begins with the chatbot, powered by advanced Natural Language Processing (NLP), which serves as the user's virtual companion [7]. It interprets user inputs, provides empathetic responses, and guides users through reflective exercises. The chatbot is integrated with sentiment analysis and conversational memory, ensuring personalized and contextually relevant interactions.

Next, the journaling feature allows users to record their thoughts and track their emotional progress. This component includes customizable prompts, mood tagging, and visual data summaries. Journals are securely stored using end-to-end encryption, ensuring user privacy. The interface is intuitive, encouraging engagement and sustained usage.

The third component is the resource locator, which uses geolocation to provide users with nearby mental health resources, such as therapists, support groups, and hotlines. This feature leverages

external APIs for geocoding and integrates verified local data sources to enhance reliability. Recommendations are tailored based on user preferences and demographic considerations.

The system's backbone includes a Flutter-based frontend, Firebase for database and authentication, and Flask for backend processing [8]. Together, these technologies ensure seamless interaction between components, high performance, and scalability. The modular design enables adaptability to future advancements, making it a sustainable solution for diverse mental health needs.

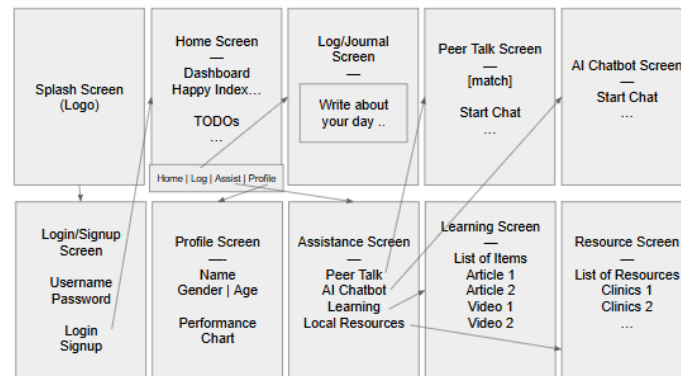


Figure 1. Overview of the solution

The chatbot serves as a virtual mental health companion, offering empathetic responses and personalized guidance. Powered by the ChatGPT SDK, it uses Natural Language Processing (NLP) to analyze user inputs and provide relevant advice. Integrated with sentiment analysis, it enhances conversational depth, ensuring users receive appropriate emotional support during their interactions.

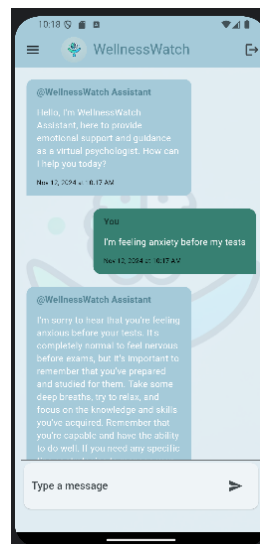


Figure 2. Screenshot of the chatbot

```

Future<void> _handleSubmit(String text) async {
  setState(() {
    _isLoading = true;
  });
  _textController.clear();

  // Add the user-sent message to the thread
  ChatMessage prompt = ChatMessage(
    text: text,
    isSentByMe: true,
    timestamp: DateTime.now(),
  );

  setState(() {
    _messages.insert(0, prompt);
  });
  _history.add(text);

  // Handle ChatGPT request and response
  final request = ChatCompletionText(
    messages: [
      Map.of({"role": "assistant", "content": _history.toString()})
    ],
    maxToken: 500,
    model: GptTurboChatModel(),
  );

  final response = await _openAI.onChatCompletion(request: request);
  String result = response.choices.first.message!.content.trim().replaceAll("'", "");

  // Add the AI-generated message to the thread
  ChatMessage message = ChatMessage(
    text: result,
    isSentByMe: false,
    timestamp: DateTime.now(),
  );

  setState(() {
    _messages.insert(0, message);
    _isLoading = false;
    _history.add(result);
  });
}

```

Figure 3. Screenshot of code 1

This code handles user input in the chatbot interface. When the user submits a message, the `_handleSubmit` function is triggered. First, it updates the state to reflect that the system is processing, and clears the text input field.

The user's message is converted into a `ChatMessage` object and added to the chat thread. The input history is updated with the message for context.

Next, a request is made to the ChatGPT model via the `onChatCompletion` method [9]. The model processes the conversation history and returns a generated response. The returned text is then parsed and formatted into a `ChatMessage` object.

Finally, the chatbot's state is updated to display the AI's response. The loading state is reset, and the response is appended to the conversation history for continuity.

The journal feature enables users to document their thoughts, emotions, and experiences. This component integrates Firebase Firestore for secure data storage and retrieval, providing users with access to their entries anytime. The interface supports creating, viewing, and organizing journal entries, promoting introspection and mental well-being through a seamless experience.

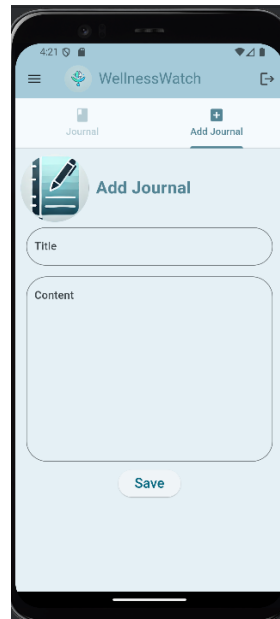


Figure 4. Screenshot of the add journal page

```
void saveJournal() {  
    // Save to Firestore  
    FirebaseFirestore.instance.collection(journalCollection).add({  
        'title': titleController.text,  
        'content': contentController.text,  
        'created_at': DateTime.now(),  
    });  
  
    // Show snackbar notification  
    ScaffoldMessenger.of(context).showSnackBar(const SnackBar(  
        content: Text('Journal saved successfully'),  
        duration: Duration(seconds: 2),  
    ));  
}
```

Figure 5. Screenshot of code 2

The `saveJournal` function handles the saving of journal entries to Firebase Firestore. It captures user inputs from `TextEditingController` instances (`titleController` and `contentController`) and stores them as a document in a predefined Firestore collection (`journalCollection`).

Each journal entry includes a title, content, and a timestamp (`created_at`) to track when it was created. Upon successfully saving the entry, a confirmation message is displayed to the user using a `SnackBar`. This feedback loop improves user interaction and confirms the action's success.

The use of Firestore ensures scalability and secure data management. Timestamp conversion facilitates chronological sorting and retrieval of journal entries. This modular function simplifies the addition of entries while maintaining a clean and intuitive interface.

The resource locator helps users find nearby mental health services using geolocation and the Google Places API [10]. It integrates geocoding to convert addresses into coordinates and leverages external APIs to provide real-time data on psychiatrists and clinics within a user-defined radius, ensuring accessibility and relevance.

```

Future<void> getNearbyPsychiatrists(String lat, String lng) async {
  try {
    setState(() {
      _isSearching = true;
    });
    final String url =
      'https://maps.googleapis.com/maps/api/place/nearbysearch/json?'
      'location=$lat,$lng&radius=5000'
      '&keyword=mental health center OR clinic OR therapy OR counseling OR '
      'psychiatrist&key=$googleApiKey';

    final response = await http.get(Uri.parse(url));

    if (response.statusCode == 200) {
      final jsonResponse = json.decode(response.body);
      setState(() {
        _psychiatrists = jsonResponse['results'];
        _isSearching = false;
      });
    } else {
      throw Exception('Failed to load nearby psychiatrists.');
```

Figure 6. Screenshot of code 3

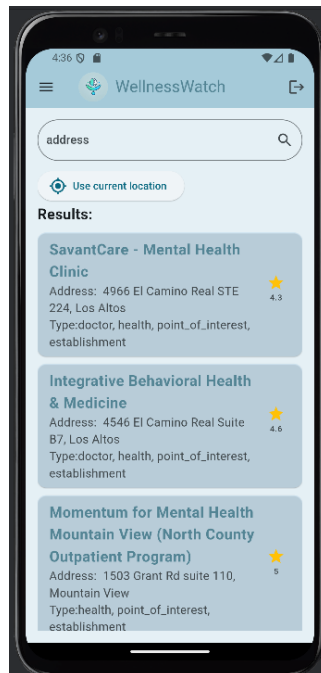


Figure 7. Screenshot of the results

The `getNearbyPsychiatrists` function queries the Google Places API to find mental health services within a 5 km radius of the given latitude and longitude. It constructs a URL containing the API endpoint, location coordinates, search radius, and relevant keywords (e.g., clinics, psychiatrists).

The API response is fetched asynchronously using an HTTP GET request. If successful, the JSON response is parsed, and the results are stored in the `_psychiatrists` list for display. In case of failure, an exception is thrown, and errors are logged to help identify issues.

This function ensures real-time access to resource information and updates the state to reflect whether a search is in progress (`_isSearching`). By combining geolocation, API integration, and

robust error handling, the component ensures users can easily find relevant services, even when navigating technical challenges like API latency or limited permissions.

4. EXPERIMENT

4.1. Experiment 1

A survey was conducted to evaluate user experience, satisfaction, and emotional support provided by the app. Insights from participants helped assess its usability and effectiveness in fostering mental well-being.

The survey involved 10 participants, including mental health professionals and general users, who tested the app for one week. The survey consisted of 10 questions: 6 on a 5-point Likert scale (e.g., ease of use, emotional support), 2 open-ended prompts (e.g., suggestions for improvement), and 2 multiple-choice questions (e.g., preferred features).

Participants evaluated key components, including the chatbot, journaling, and resource locator. Responses were collected anonymously using an online survey form to ensure privacy. This experiment aimed to identify strengths and weaknesses of the app, focusing on its design, usability, and emotional impact.

Metric	Average Score (out of 5)	Comments Summary
Ease of Use	4.6	Interface intuitive, minor tweaks needed
Chatbot Effectiveness	4.8	Highly empathetic and responsive
Journaling Engagement	4.2	Liked prompts, suggested better organization
Resource Locator Accuracy	4.0	Effective but occasional location mismatches

Figure 8. Figure of experiment 1

The survey revealed high satisfaction with the chatbot (average 4.8/5), highlighting its empathetic and context-aware responses. Participants noted that it felt like an effective virtual companion. The journaling feature scored an average of 4.2/5, with users appreciating its prompts but suggesting enhanced categorization for better usability.

The resource locator scored 4.0/5, with users praising its utility but encountering occasional inaccuracies in location-based recommendations. The overall ease of use scored 4.6/5, affirming that the app's interface is intuitive and user-friendly.

Open-ended feedback emphasized the importance of maintaining privacy and enhancing customization options. For instance, users requested the ability to add multimedia to journal entries and suggested real-time notifications for mental health resources.

This data confirms the app's effectiveness in supporting mental well-being while identifying actionable improvements. Iterative design updates based on user feedback will further enhance its impact and usability.

4.2. Experiment 2

A survey was conducted to assess user satisfaction with specific features, including the chatbot, journaling, and resource locator. This experiment focused on evaluating their individual contribution to user experience.

The survey was administered to the same 10 participants after a second week of using the app, with an emphasis on feature-specific feedback. Participants rated each feature on a 5-point Likert scale for parameters such as reliability, usefulness, and engagement. Additionally, open-ended questions solicited suggestions for improvements.

The goal was to identify which features contributed most significantly to user satisfaction and which required enhancement. For example, participants were asked to evaluate the chatbot's emotional support accuracy, the journaling tool's customization, and the resource locator's relevance. Responses were collected via an online form to ensure a structured and anonymous data-gathering process.

The survey confirmed that the chatbot is the app's standout feature, receiving the highest scores for reliability (4.7), usefulness (4.8), and engagement (4.9). Participants praised its empathetic nature and real-time responsiveness, affirming its role in fostering emotional support.

The journaling feature also performed well, scoring an average of 4.6 for usefulness. Users appreciated the guided prompts but suggested incorporating thematic templates and multimedia capabilities to enhance customization and engagement.

The resource locator received positive feedback for its utility (4.3) but lower scores for engagement (4.0), largely due to occasional inaccuracies in geolocation data. Suggestions included refining the search algorithm and expanding the database of local resources.

Overall, this experiment validated the app's core features while highlighting specific areas for improvement. By prioritizing user suggestions, iterative updates can further enhance the app's reliability, usefulness, and engagement.

Feature	Reliability (Avg. Score)	Usefulness (Avg. Score)	Engagement (Avg. Score)	Comments Summary
Chatbot	4.7	4.8	4.9	Highly empathetic, responsive
Journaling	4.4	4.6	4.3	Liked prompts, requested more themes
Resource Locator	4.1	4.3	4.0	Useful but occasional inaccuracies

Figure 9. Figure of experiment 2

5. RELATED WORK

Balcombe and Leo (2022) explored the potential of human-computer interaction (HCI) in enhancing digital mental health platforms by addressing accessibility, reliability, and ethical challenges [11]. Their research highlights AI-driven approaches for prediction, treatment, and suicide prevention through digital platforms and smartphone apps. These solutions focus on guided cognitive behavioral therapy (CBT) for anxiety and depression while incorporating tools

like real-time machine learning algorithms and digital phenotyping. Despite its promise, the methodology faces limitations such as socio-cultural adaptability and usability concerns, which hinder broader implementation. Compared to this, our project integrates HCI principles with advanced NLP-powered chatbots and personalized journaling features, providing a more comprehensive and user-friendly mental health platform.

Van der Schyff et al. (2023) evaluated the Leora chatbot, an AI-powered platform designed to provide discreet, personalized mental health support for minimal-to-mild anxiety and depression symptoms [12]. The platform offers round-the-clock availability and emphasizes accessibility and stigma reduction by acting as a virtual self-care coach. However, challenges such as bias, health inequity, and ethical concerns in AI deployment were identified, highlighting the need for rigorous validation and stakeholder engagement. In comparison, our project addresses similar challenges by incorporating a geolocation-based resource locator and advanced AI features to ensure both ethical compliance and diverse user inclusivity.

Sadeh-Sharvit et al. (2023) conducted a randomized clinical trial to evaluate the impact of an AI platform on reducing depression and anxiety symptoms during outpatient therapy [13]. The platform supported therapists by transcribing sessions, providing feedback on evidence-based practices, and summarizing progress notes, leading to improved patient outcomes and retention rates compared to traditional therapy. However, the study highlighted limitations in scalability and the potential over-reliance on AI in clinical settings. In contrast, our project addresses scalability and adaptability challenges by integrating modular components like NLP-powered chatbots, personalized journaling, and geolocation-based resource locators to provide a holistic mental health solution.

6. CONCLUSIONS

While the app demonstrates significant potential in providing mental health support, some limitations remain. The chatbot, despite its high satisfaction scores, occasionally misinterprets user inputs, leading to responses that lack contextual accuracy [14]. Enhancing the Natural Language Processing (NLP) model with diverse and inclusive training datasets can address this issue.

The journaling feature, while appreciated for its guided prompts, lacks advanced customization options such as multimedia integration and thematic templates. Introducing these enhancements would increase user engagement and satisfaction.

The resource locator, though effective, relies heavily on external APIs, leading to occasional inaccuracies and latency issues [15]. Building a localized database and improving caching mechanisms could improve reliability and performance.

Data privacy and security remain critical challenges, particularly given the sensitivity of mental health information. Regular audits and stronger encryption protocols are essential to maintain user trust.

With additional time and resources, these improvements could significantly enhance the app's functionality and user experience.

This app is a promising solution to bridge gaps in mental health support by combining AI-driven chatbots, personalized journaling, and resource location services. By addressing limitations and implementing iterative enhancements, the app has the potential to become an indispensable tool for promoting mental well-being in diverse communities.

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