AI Consultant Application with Referral System

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Abstract

Mental health is a significant concern in the modern world, with many individuals hesitant to seek help from therapists or psychiatrists, potentially exacerbating their issues. This application leverages a combination of Natural Language Processing (NLP) and Artificial Intelligence (AI) to assess users' emotions and past experiences. By analysing key aspects such as emotional stability, behaviour, and state of mind, the AI generates a Mental Stability Score (MSS). If the score exceeds a certain threshold, the application prompts the user to seek professional consultation, recommending qualified therapists and psychiatrists in their vicinity.

1. Problem Statement

According to the National Crime Records Bureau (NCRB), the suicide rate in India has surged to 12.4 per 100,000 people. Furthermore, a report by Swachh India (NDTV) indicates that 80% of individuals with mental health challenges are reluctant to seek professional assistance.

Mental health is steadily deteriorating due to various factors such as academic pressure, financial instability, and strained relationships. These stressors often lead to prolonged emotional distress, which, if not addressed, can develop into more serious mental health issues. While such issues can sometimes be mitigated through conversations, physical activities, or therapy, prolonged exposure to stress may require professional intervention.

To address this, the proposed application integrates a chatbot designed to engage users in meaningful conversations. The chatbot will be responsive and provide solutions to the user’s concerns, simultaneously generating a Mental Stability Score (MSS) based on factors such as emotional stability, state of mind, and the severity of the issue. If the score exceeds a certain threshold, the chatbot will encourage the user to seek professional help.

The application will collaborate with renowned therapists globally, recommending the nearest available professionals based on the user’s location. With access to reviews of nearby therapists, users will also have the option to book appointments directly through the platform. This system aims to be a self-sufficient solution capable of addressing various mental health challenges and guiding users toward appropriate professional care when necessary.

2. Market and Customer Needs Assessment

2.1 Market Analysis:

The global mental health app market is experiencing rapid growth. In 2021, it was valued at approximately $4.2 billion and is projected to expand at a compound annual growth rate (CAGR) of 15-20% through 2028. This growth can be attributed to several factors, including heightened awareness of mental health issues, increased accessibility to smartphones, and rising rates of anxiety and depression.

Key players in this market include Calm, Headspace, Woebot, Wysa, and BetterHelp. These applications offer a diverse range of services, such as guided meditation, Cognitive Behavioural Therapy (CBT), mindfulness practices, and virtual therapy sessions. Analysing their features, subscription models, and user feedback will be essential for distinguishing our chatbot from existing solutions and identifying opportunities for improvement.

2.2 Customer Segmentation:

The customers are segmented within different demography, such as age, gender, income level and more. The potential customer for the application can be classified and elaborated into:

- **Based on Age:**
  - Teens (13-17): Seeking support for school-related stress, peer pressure, and identity issues.
  - Young Adults (18-24): Navigating relationships, academic pressures, and early career stress.
  - Adults (25-34): Facing career development challenges, work-life balance, and family planning issues.
  - Middle-aged Adults (35-54): Dealing with mid-life crises, parenting challenges, and aging concerns.
  - Older Adults (55+): Coping with retirement, health issues, and loss of loved ones.
- **Based on Gender:**
  - Men: May have specific concerns around stigma and societal expectations regarding mental health.
  - Women: Often more open to discussing emotional issues; may seek support for anxiety, depression, or postpartum concerns.
  - Non-binary and LGBTQ+: Specific needs related to identity, discrimination, and social support.
- **Based on Income Level:**
  - Low-Income: Likely seeking affordable or free mental health services due to financial constraints.
  - Middle-Income: May look for cost-effective solutions or premium features if they can afford them.

- High-Income: Often willing to pay for premium services, including personalized or specialized mental health support.

3. Target Specification

3.1 Core Functionality and Design:

1. Login System: The system will facilitate account creation and allow users to log in with valid credentials. It will support registration and password recovery options, as well as sign-up through social media platforms such as Facebook and Google. Additionally, the login system will manage automatic logouts in the event of session expiry to enhance security.

2. Personalized Chatbot: The application will feature a sophisticated chatbot that employs advanced machine learning techniques to engage users in calm, precise, and solution-oriented conversations. The chatbot will leverage previous interactions, user surveys, historical data, and identified patterns to guide users effectively and generate a Mental Stability Score (MSS).

3. Meditative Sounds and Sleep Schedule: Users will have access to calming music designed to alleviate stress and anxiety. The Sleep Schedule feature will enable users to monitor their sleep patterns, allowing them to record daily sleep entries and track their anxiety levels in relation to sleep quality.

4. Referral System with Appointment Booking Facility: In instances where users are identified as being in a non-positive state of mind, the application will recommend therapists. The system will provide a curated list of qualified therapists in the user's vicinity, highlighting various discounts and deals available through the referral system. Furthermore, an integrated appointment booking facility will enable users to schedule sessions on available dates. Both the user and therapist will receive confirmation of appointments, which will include relevant information such as anxiety levels and past survey data.

5. Review System: After a successful appointment, users will have the opportunity to provide feedback regarding their experience with the therapist or healthcare facility. This review system will allow all users to assess and rate therapists, contributing to a community-based resource for future clients.

3.2 Performance Requirement

1. **Statement Generation:** The basic requirement of the chat bot is to generate calm, non-aggressive, precise and solution oriented statements. The model should utilizes the previous conversations, patterns, anxiety level, surveys and more to assist in

statement generation. The goal of the chat bot is to increase the positive state of mind and thus is prohibited to generate any statement that brings confusion to the user.

2. **Faster Response Time:** The process of statement generation must be quick, thus the cloud service provider should be able to attain a fair amount of users at a time. Along with it, the model needs to optimize for lower response time.

3. **Optimal Score Generation:** The Mental Stability Score depends on various factors and thus model must be able to generate an overall score after each interaction. The parameters affecting the score must be handled properly.

4. **Scalability:** The platform must be able to handle multiple users simultaneously without performance degradation. It should have a scalable infrastructure to support a growing user base and increased usage.

4. External Search

The application needs a responsive chat bot which can be built up from scratch but it will require a lot of hardware and extensive research. With proper data collection required for the product such as daily conversations, therapy sessions, solutions to anxiety problems, and more we need to tweak the pre-existing models to accomplish the task.

We can use the LSTM based models such as Bi-LSTM with attention mechanism, ElMo, Hierarchical LSTM or we can use Transformer based models like GPT3, BERT, ROBERT, ALBERT. Transformers in general will be the better solution to form such a personalized chat bot, with proper storage of model over cloud and accessing it to effectively generate chats will combinely make the product robust in nature.

4.1 Benchmarking

Criteria	Headspace	Calm	Wysa	My Solution
Daily Streak	Yes	Yes	Yes	No
Meditating Sounds	Yes	Yes	No	Yes
Chat Bot	Text with Coach	No	Yes (Rule Based)	Yes
Referral System	No	No	Yes	Yes
Suggested remedies	Yoga exercises, Light hearted podcast	Motivating stories and podcasts	Exercises, goal setting	Personalized solutions generated by bot
Revenue Model	Subscription Plans	Subscription Plans	Subscription Plan , Virtual Therapist	Commission based referral system

1. **Headspace**: Headspace is an application that claims to improve mental health by managing sleep schedules, talking to a mental health coach, providing meditating sounds, and more. The app mainly focuses on everyday wellbeing and stress relief by providing above mentioned solutions.
   The limitations of Headspace is its ability to not able to provide customised care. The application claims to improve mental health by giving subscription plans which majorly includes paid podcasts and sounds. The uniqueness within our solution is its ability to listen to customer's problem, either providing meaningful solutions or referring to a therapist.

2. **Calm:** Calm is also a mobile application that majorly focuses on meditating sounds, improving sleep schedules, maintaining streaks and more. The application offers some mood uplifting sounds, focus mode, sleep management and more but the maximum features are included in the premium account.
   Similar to Headspace, Calm also does not provide any customised solutions for the user, and mainly focuses on building a healthy state of mind.

3. **Wysa:** Wysa offers some unique features that separates it from other two. Wysa includes a Rule based chat bot which can help user up to some limits. The provided chat bot is a rule based chat bot, thus providing predefined solutions and conversation.
   Wysa also gives functionality namely "Add a Therapist". This feature gives an accessibility to user for certain number of sessions, with fare discounts. Though Wysa differentiates itself from a majority of application it still have some limitations, from chat bot to referral system (high prices, no pre-reviews, and more).

4. **A large group of similar Applications:** Other than the 3 mentioned, there are numerous applications present in the market such as 7 cups, Talklife, Daylio Journal, BetterMe, and more. Some of the application offers community support to talk to different person and share their experiences (TalkLife) and some focuses on improving physical health.
   The mental health market is very big, and the current service providers are often majorly dependent on motivation sounds, podcasts, sleep schedule and more. Our solution may outstand in majority of their limitations, with personalized communication, on point solutions, referral system and more.

5. Constraints and Regulation:

5.1 Data privacy and Security

I. **Compliance with Indian Regulations:** Ensuring compliance with the Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules, 2011, under the IT Act, 2000. Also, be mindful of the upcoming Digital Personal Data Protection Act, 2023, which outlines how personal

data should be processed and stored, giving users the right to access, correct, and erase their data.

II. **Encryption and Secure Data Storage:** Following the IT Act's guidelines for ensuring encryption and secure handling of sensitive personal data, especially health information. Use industry-standard encryption protocols for data both in transit and at rest.

III. **User Consent:** Explicit consent must be obtained from users before collecting, storing, and processing any data, especially sensitive data related to mental health. Ensure that the consent is informed, meaning users are aware of the data collected and its intended use.

5.2 Age Consideration

I. **Age Restrictions**: In India, the legal age of majority is 18 years. Considering limited access to users above 18 or obtaining parental consent for users under 18, in accordance with Personal Data Protection (PDP) laws for children.

5.3 Deals regarding referral system

I. **Transparency in Referrals:** The Consumer Protection Act, 2019 emphasizes transparency in business practices, which applies to referral commissions and collaborations. Clearly disclose any referral fees or commissions received from professional mental health services.

II. **Quality Assurance:** Partner with licensed mental health professionals, ensuring they are certified by the Rehabilitation Council of India (RCI) or other accredited bodies. Conduct regular checks to ensure they meet Indian regulatory standards.

III. **Ethical Referrals:** Adhere to ethical guidelines laid out by mental health authorities, ensuring that recommendations are based on user needs and not solely on financial incentives. Avoid conflicts of interest.

5.4 User Policy

I. **Terms of Service and Privacy Policy:** Draft comprehensive terms and conditions in compliance with Indian laws like the IT Act and Consumer Protection Act, 2019, detailing user rights, data use, and the scope of the chatbot’s services. Include how personal and sensitive data will be handled, stored, and shared.

II. **Data Retention and Deletion:** Follow the Digital Personal Data Protection Act, 2023 regarding the right to data erasure and specify in your policy how long user data will be stored. Offer users the option to have their data permanently deleted upon request.

III. **Mental Health Disclaimer**: Include disclaimers stating that the chatbot is not a substitute for professional psychological counselling or medical diagnosis. This is important to clarify the service's limitations and to comply with the Mental Healthcare Act, 2017.

5.5 Licensing and Regulatory Compliance

I. **Mental Healthcare Compliance**: The chatbot must comply with the Mental Healthcare Act, 2017, which mandates that any service offering mental health support must adhere to certain standards, including protecting the rights of individuals seeking care.

6. Monetization Strategies

6.1 Commission-Based Referral System:

- This will serve as the primary revenue source for the application. The system will generate income through a fixed commission for each customer referred to a therapist or organization, taking into account the number of sessions conducted.

- It is essential to manage this arrangement effectively when engaging with individual practitioners or organizations. Additionally, the system should include pre-established clauses to address any potential legal disputes that may arise.

6.2 Advertisements and Sponsorships:

- **In-App Advertisements:** This secondary revenue stream will be generated through in-app advertisements. It is crucial to clearly outline this strategy within the user policy and licensing agreements. Revenue will be accrued based on metrics such as click-through rates and conversion rates.

- **Sponsorships:** Organizations and individual practitioners may choose to sponsor their services to reach their target audience effectively. This sponsorship will aim to enhance marketing efforts and increase customer engagement. Charges for sponsorships will be determined based on the specifics of the sponsorship deals.

7. Final Product Prototype

AI Consultant application is aimed to decrease anxiety, depression and improves the state of mind of the user's by providing meaningful and solution driven conversations. The application is also offers an appointment booking system that can help user to reach out to the therapists and doctor across the region.

7.1 Key Features

1. **User Profile Creation:**

- Users will be able to create their profiles by submitting relevant details. The application will also include a health survey, which will assist in tailoring conversations and generating the Mental Stability Score (MSS) effectively.

2. **Personalized Chat bot:**

- The application will utilize advanced deep learning structures and techniques to develop a personalized chatbot for mental health conversations. The chat bot will be responsive and capable of generating non-aggressive, calm, and solution-oriented statements.
- Mental Stability Score (MSS): The MSS will be critical for assessing the user's mental state. It will be generated based on various factors, including:
    - Sentiment analysis of conversations
    - Emotion detection
    - Surveys and questionnaires
    - Historical patterns
    - Sleep quality, anxiety levels, and other relevant metrics
- Achieving an accurate Mental Stability Score is complex and requires consideration of multiple factors; however, common techniques can be employed using pre-trained models such as BERT or GPT, which can then be fine-tuned for mental health applications.

3. **Review System:**

- Users will have access to reviews of therapists available in their region. After successfully booking an appointment, users will be able to provide their own feedback.
- The system will be designed to be sensitive to language, ensuring that aggressive or abusive feedback is promptly identified and removed.

4. **Referral and Appointment Booking:**

- Upon reaching a predetermined threshold value in their mental stability score, users will receive recommendations to consult with a therapist.
- The application will display available therapists along with their reviews, ensuring that the system is rule-based and free from bias.

7.2 User Flow:

1. **User Registration:**

- Upon launching the application, users will be directed to either the login or registration page. This process will be triggered only if the user is new, has logged out, or if the session has expired.
- During the registration process, users will be prompted to complete a simple survey designed to gather essential information that will aid in understanding their needs.

2. **Chatbot Interaction:**

- After successful login, users will have access to the chatbot.
- Once engaged in a conversation, users should be able to communicate freely with the bot. The chatbot must adapt to the conversation's length and complexity, ensuring a natural flow.
- The chatbot is strictly prohibited from using inappropriate or aggressive language and must consistently generate non-aggressive statements.

3. **Reviews and Therapist Information:**

- Users will be able to locate therapists in their specified region.
- Reviews will be accessible to all users, but feedback can only be submitted after booking an appointment with a specific therapist.
- In addition to reviews, users can inquire about appointment bookings directly within the application.

4. **Booking an Appointment:**

- Users will have the ability to book appointments on mutually available dates with therapists.
- Following a successful booking, users will receive a confirmation email detailing the appointment.
- Both the confirmation email and in-app booking will serve as verification of the appointment with the therapist or clinic.

5. **Explore Features:**

- Users can interact with the chatbot, complete various surveys, and explore additional features of the application.
- Once the designated time for each session has concluded, users will be redirected back to the login page.

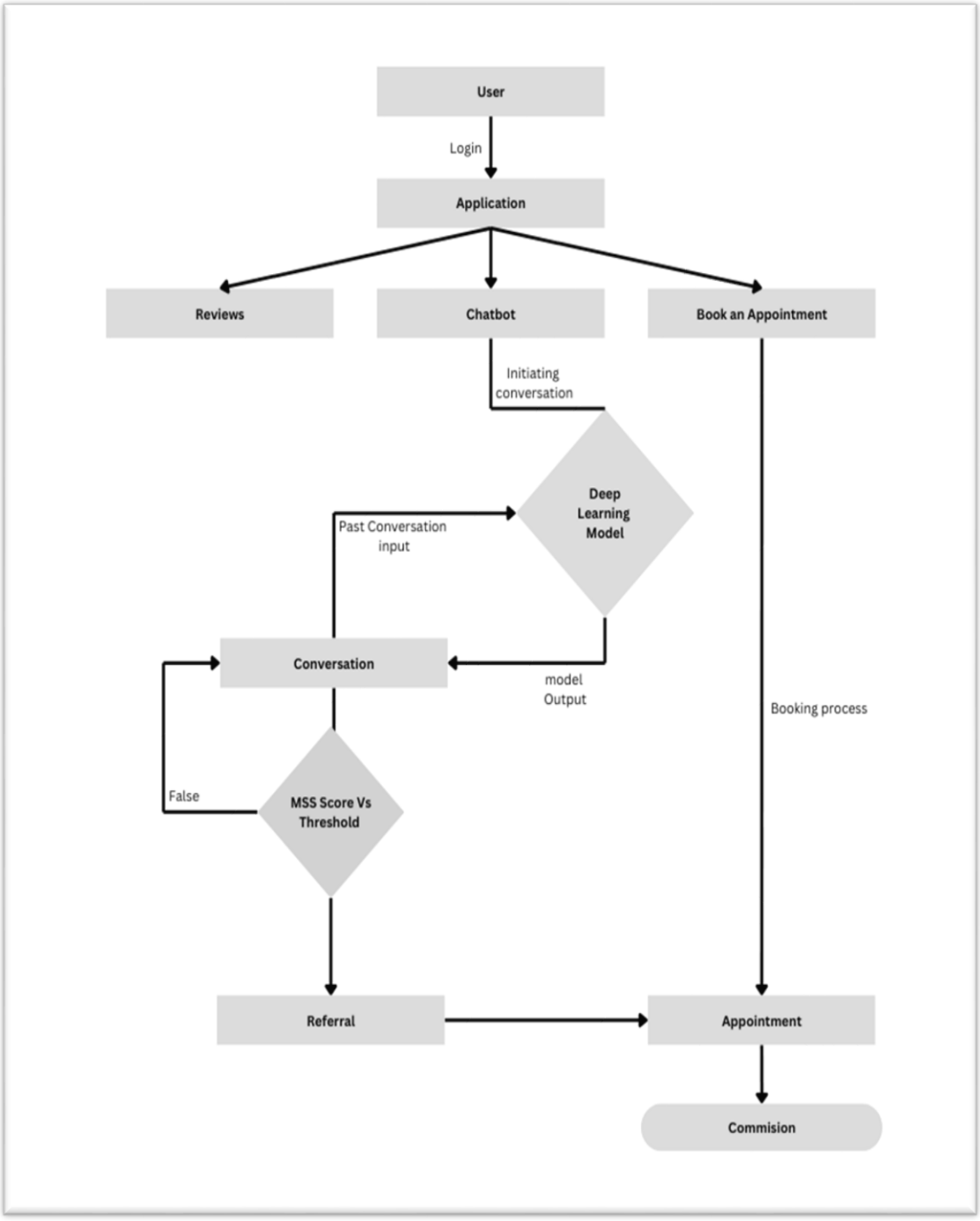

Fig. 7.1 Business and Revenue Model

8. Conclusion

The proposed application directly addresses the reluctance many individuals have in seeking professional mental health support. By using Natural Language Processing (NLP) and Artificial Intelligence (AI), the app engages users in personalized conversations to understand their emotional stability, behaviour, and state of mind. Based on this data, it generates a Mental Stability Score (MSS). If the score exceeds a predefined threshold, the app recommends professional consultation, connecting users with nearby therapists or psychiatrists, complete with reviews and booking options.

Through this approach, the app offers a convenient and discreet way for individuals to monitor their mental health and seek help when needed, bridging the gap between users and mental health professionals. By promoting early intervention, it aims to prevent further deterioration of mental well-being, ultimately contributing to better mental health outcomes.

9. References

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