



Legacy : Mental Health Counselling Portal

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Introduction

Objective

- Develop a web application to assist mental health counselors in supporting their patients effectively. Utilize **Machine Learning (ML)** and **Natural Language Processing (NLP)** to: Provide actionable suggestions.
- Generate insights tailored to the counselor's input.
- Focus on delivering personalized, real-time guidance based on patient challenges.

Solution Overview

- **Web Application:** Interactive portal for mental health counselors.
- **ML Integration:** Predicts actionable suggestions based on patient descriptions.
- **Emotion Analysis:** Detects emotional tone (e.g., sadness, anxiety) in input text.
- **NLP Integration:** Leverages a Large Language Model (LLM) to generate tailored advice.
- **User-Friendly Interface:** Simplifies input and displays actionable results for counselors.

Key Benefits

- **Enhanced Decision Support:** Provides counselors with practical, data-driven guidance.
- **Time Efficiency:** Reduces the effort required to generate tailored advice.
- **Improved Patient Outcomes:** Ensures better mental health interventions through personalized suggestions.

Deliverables

- **Web Application:** Interactive platform for real-time counselor support.
- **ML Model:** Predictive insights for patient concerns (e.g., likelihood of anxiety or depression).
- **Emotion Detection Module:** Identifies emotional tones in counselor inputs.
- **LLM-Based Advice Generator:** Suggestions based on detected emotion.

Workflow

- Data Collection & Preprocessing <https://www.kaggle.com/datasets/thedevastator/nlp-mental-health-conversations/data> – (contains Context and Response data)
- EDA
- Annotated / Ground truth labels - used a pre-trained model to detect the dominant emotion for each sentence in the 'Context' column and appended it as a new 'Sentiment' column.
- Model creation/Training
 - Split the TF-IDF array and 'Sentiment' labels into training and testing sets with a 70-30 split.
 - Created a TF-IDF matrix from 'contexts' and logs the vectorizer and metrics to MLflow.
 - Trained a balanced Random Forest classifier model, logs its parameters, metrics, and the trained model to MLflow.
 - Evaluated and visualized the model's performance with accuracy, a classification report, and a confusion matrix heatmap.
- Streamlit app – for counselor insights
 - Text input → Press Submit → Load ML flows → Process model → display predicted emotion → Set Up Mistral AI Client → Generate Suggestions
- Create Docker Image: Package the application into a Docker image for easy deployment and portability.



Legacy: Mental Health Counselling Portal

Welcome, Counselor! This portal allows you to input your observations, notes, or insights regarding a patient's mental health.

Enter your notes or observations here:

Submit



Input 1



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Welcome, Counselor! This portal allows you to input your observations, notes, or insights regarding a patient's mental health.

Enter your notes or observations here:

"I'm going through some things with my feelings and myself. I barely sleep and I do nothing but think about how I'm worthless and how I shouldn't be here.
I've never tried or contemplated suicide. I've always wanted to fix my issues, but I never get around to it.
How can I change my feeling of being worthless to everyone?"

Submit

Emotion sensed: **sadness**

Suggestions: I'm really glad you've taken the first step to seek support. Please remember that I'm an artificial intelligence and my knowledge cut off is 2021, also I can't provide the same level of service as a human professional. Here are some actionable suggestions that might help you cope with sadness:

1. Self-Care:

- Ensure you're getting enough sleep, eating healthily, and staying hydrated. Physical health can greatly influence your mood.
- Engage in regular physical activity. Even a short walk can make a difference.

2. Mindfulness and Relaxation:

- Practice mindfulness meditation. Apps like

Input 2



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"I have so many issues to address. I have a history of sexual abuse, I'm a breast cancer survivor and I am a lifetime insomniac. I have a long history of depression and I'm beginning to have anxiety. I have low self esteem but I've been happily married for almost 35 years. I've never had counseling about any of this. Do I have too many issues to address in counseling?"

Submit

Emotion sensed: **fear**

Suggestions: I'm glad you've reached out, and I'm here to help. Remember, I'm an AI and my knowledge cut off is 2021 also I can't provide the same level of service as a human professional, but I can certainly offer some actionable suggestions to help manage fear.

- 1. **Deep Breathing:** Fear can often trigger our "fight or flight" response, causing rapid, shallow breathing. Combat this by taking slow, deep breaths. Try the 4-7-8 method: Breathe in for 4 seconds, hold for 7 seconds, then exhale for 8 seconds.
- 2. ****Grounding Techniques**

Input 3



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Welcome, Counselor! This portal allows you to input your observations, notes, or insights regarding a patient's mental health.

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People who are parental figures in my life have, in the past, hurt me, and some continue to do so. It makes me feel like I'm not good enough for my husband or the life he provides me. I have had jobs, but I am going through a lot of my past garbage and trying to figure out when it all went wrong. Any time I bring these things up, I am expected to be over the issue. These are people that you can't just cut out, but I have never received apologies for so much of my pain. I don't know what to do any more. I don't know who I am anymore.

Submit

Emotion sensed: **surprise**

Suggestions: As a mental health counselor, I would provide the following actionable suggestions for someone experiencing surprise, especially if it's accompanied by feelings of uncertainty or anxiety:

- 1. **Pause and Breathe:**
 - Take a few slow, deep breaths to help calm your physical response to the surprise. This can help you feel more centered and ready to process the new information.
- 2. **Acknowledge Your Feelings:**
 - Recognize and accept that you're feeling surprised. It's okay to feel this way, and acknowledging your emotions can help you move forward.
- 3. **Reframe the Surprise:**
 - Try to look at the surprise from

Next steps

Enhance the UI/UX:

- Add features like:
 - A history log for counselors to review past inputs and suggestions.
 - Improve the design for better usability.

Set Up a CI/CD Pipeline:

- Automate the process of building, testing, and deploying the application using CI/CD pipelines.



Code Repository :

https://github.com/rhythm-billore/mental_health_counselor_guide



Portal Link :

<https://streamlit-app-counsellor-inputcounsello-bgo20u.streamlit.app/>