∨ 📝 Note to Mentor:

The chatbot was implemented and tested successfully using the **Gemini 1.5 Pro** model.
Due to interface limitations, the full **Streamlit-based UI** was tested locally in **Visual Studio Code**,
but all core functionalities — including prompt generation, response output, and evaluation metrics —
are demonstrated and executed in this notebook.

The results from BLEU and ROUGE evaluations are printed below.

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!pip install evaluate
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!pip install transformers datasets accelerate peft bitsandbytes
```

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```

```python
from datasets import load_dataset

dataset = load_dataset("ShenLab/MentalChat16K")


print(dataset)
print(dataset['train'][0])
```

```
DatasetDict({
    train: Dataset({
        features: ['instruction', 'input', 'output'],
        num_rows: 16084
    })
})
{'instruction': "You are a helpful mental health counselling assistant, please answer the mental health questions based on the patient's
```

```python
# Install required packages
!pip install google-generativeai datasets

# Import Libraries
import google.generativeai as genai
from datasets import load_dataset

# Set your API key (replace with your key, but NEVER hard-code it in production)
api_key = "AIzaSyCOGdBg4W0ZMt0v3tbqycne1GPzlmH198E"  # <- Replace this temporarily in your local code

# Configure Gemini
genai.configure(api_key=api_key)
model = genai.GenerativeModel('gemini-1.5-pro')

# Load MentalChat16K dataset
dataset = load_dataset("ShenLab/MentalChat16K")
```

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```

```python
def generate_prompt(user_input, dataset):
    # Loop through dataset safely
    for example in dataset['train']:
        input_text = example.get('input')
        response_text = example.get('output')

        # Skip if input or response is missing
        if input_text is None or response_text is None:
            continue


        if user_input.lower() in input_text.lower():
            return f"""You're a helpful and empathetic mental health assistant.

Example conversation:
User: {input_text}
Assistant: {response_text}

Now help this user:
User: {user_input}
Assistant:"""

    # Fallback prompt if no similar example is found
    return f"""You're a helpful and empathetic mental health assistant.

User: {user_input}
Assistant:"""

#  chat with Gemini
def chat_with_gemini(user_input, dataset):
    prompt = generate_prompt(user_input, dataset)


    response = model.generate_content(prompt)


    return response.text

#   example
user_input = "I feel anxious"
```

```python
response = chat_with_gemini(user_input, dataset)
print("Gemini:", response)
```

⇥ Gemini: I hear you. Feeling anxious can be really uncomfortable and unsettling. Can you tell me a little more about what's making you fe

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```python
!pip install rouge_score
!pip install evaluate
```

⇥ Collecting rouge_score
  Downloading rouge_score-0.1.2.tar.gz (17 kB)
  Preparing metadata (setup.py) ... done
Requirement already satisfied: absl-py in /usr/local/lib/python3.11/dist-packages (from rouge_score) (1.4.0)
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Building wheels for collected packages: rouge_score
  Building wheel for rouge_score (setup.py) ... done
  Created wheel for rouge_score: filename=rouge_score-0.1.2-py3-none-any.whl size=24934 sha256=1be097eac309aa0ef0097858eb01645d2f52df
  Stored in directory: /root/.cache/pip/wheels/1e/19/43/8a442dc83660ca25e163e1bd1f89919284ab0d0c1475475148
Successfully built rouge_score
Installing collected packages: rouge_score
Successfully installed rouge_score-0.1.2
Collecting evaluate
  Downloading evaluate-0.4.3-py3-none-any.whl.metadata (9.2 kB)
Collecting datasets>=2.0.0 (from evaluate)
  Downloading datasets-3.5.0-py3-none-any.whl.metadata (19 kB)
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Requirement already satisfied: tqdm>=4.62.1 in /usr/local/lib/python3.11/dist-packages (from evaluate) (4.67.1)
Collecting xxhash (from evaluate)
  Downloading xxhash-3.5.0-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (12 kB)
Collecting multiprocess (from evaluate)
  Downloading multiprocess-0.70.17-py311-none-any.whl.metadata (7.2 kB)
Requirement already satisfied: fsspec>=2021.05.0 in /usr/local/lib/python3.11/dist-packages (from fsspec[http]>=2021.05.0->evaluate)
Requirement already satisfied: huggingface-hub>=0.7.0 in /usr/local/lib/python3.11/dist-packages (from evaluate) (0.30.1)
Requirement already satisfied: packaging in /usr/local/lib/python3.11/dist-packages (from evaluate) (24.2)
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from datasets>=2.0.0->evaluate) (3.18.0)
Requirement already satisfied: pyarrow>=15.0.0 in /usr/local/lib/python3.11/dist-packages (from datasets>=2.0.0->evaluate) (18.1.0)
Collecting dill (from evaluate)
  Downloading dill-0.3.8-py3-none-any.whl.metadata (10 kB)
Collecting multiprocess (from evaluate)
  Downloading multiprocess-0.70.16-py311-none-any.whl.metadata (7.2 kB)
Collecting fsspec>=2021.05.0 (from fsspec[http]>=2021.05.0->evaluate)
  Downloading fsspec-2024.12.0-py3-none-any.whl.metadata (11 kB)
Requirement already satisfied: aiohttp in /usr/local/lib/python3.11/dist-packages (from datasets>=2.0.0->evaluate) (3.11.15)
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.11/dist-packages (from datasets>=2.0.0->evaluate) (6.0.2)
Requirement already satisfied: typing-extensions>=3.7.4.3 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub>=0.7.0->ev
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests>=2.19.0->evaluate)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests>=2.19.0->evaluate) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests>=2.19.0->evaluate) (2.3.0
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests>=2.19.0->evaluate) (2025.
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.11/dist-packages (from pandas->evaluate) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.11/dist-packages (from pandas->evaluate) (2025.2)
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.11/dist-packages (from pandas->evaluate) (2025.2)
Requirement already satisfied: aiohappyeyeballs>=2.3.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets>=2.0.0->eva
Requirement already satisfied: aiosignal>=1.1.2 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets>=2.0.0->evaluate)
Requirement already satisfied: attrs>=17.3.0 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets>=2.0.0->evaluate) (25
Requirement already satisfied: frozenlist>=1.1.1 in /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets>=2.0.0->evaluate)
```

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```python
import json
import google.generativeai as genai
from tqdm import tqdm
import evaluate
import pandas as pd

from google.colab import files
uploaded = files.upload()

file_name = list(uploaded.keys())[0]

with open(file name, 'r') as f:
```

```python
    data = json.load(f)

# Configure Gemini API
api_key = "AIzaSyCOGdBg4W0ZMt0v3tbqycne1GPzlmH198E"
genai.configure(api_key=api_key)
model = genai.GenerativeModel("gemini-1.5-pro")

# Evaluation Metrics
bleu_metric = evaluate.load("bleu")
rouge_metric = evaluate.load("rouge")

# Define improved prompt styles (hyperparameter: prompt_template)
prompt_templates = [
    lambda q: f"You are a compassionate assistant. Help the user with their mental health concern by providing a calming and empathetic respon
    lambda q: f"As a therapist, respond empathetically to this user message by offering helpful advice:\n{q}\nResponse:",
    lambda q: f"""You're a supportive mental health chatbot. The user says: "{q}". Provide a thoughtful and empathetic response to support th
]

# Store results
results = []

# Loop through prompt styles (hyperparameter tuning)
for i, prompt_func in enumerate(prompt_templates):
    print(f"Evaluating with Prompt Style {i+1}...")

    predictions = []
    references = []

    for sample in tqdm(data):
        question = sample["question"]
        expected_answer = sample["answer"]

        prompt = prompt_func(question)

        try:
            response = model.generate_content(prompt)
            prediction = response.text.strip()
        except Exception as e:
            prediction = ""

        # Ensure prediction is non-empty
        if prediction:
            predictions.append(prediction)
            references.append([expected_answer])  # Ensure that each reference is a list
        else:
            print(f"Empty prediction for question: {question}")

    # Format the predictions and references
    formatted_predictions = [' '.join(p.split()) for p in predictions]  # Join words if necessary
    formatted_references = [[' '.join(r[0].split())] for r in references]  # Ensure that references are lists of sentences

    # Ensure no division by zero in BLEU calculation
    if len(formatted_predictions) > 0 and len(formatted_references) > 0:
        bleu_score = bleu_metric.compute(predictions=formatted_predictions, references=formatted_references)
    else:
        bleu_score = {"bleu": 0.0}  # Return BLEU score of 0.0 if no valid predictions/references

    # Compute ROUGE
    rouge_score = rouge_metric.compute(predictions=formatted_predictions, references=formatted_references,
                                       rouge_types=["rouge1", "rouge2", "rougeL"])

    # Store results
    results.append({
        "prompt_style": i + 1,
        "BLEU": bleu_score["bleu"],
        "ROUGE-1": rouge_score["rouge1"],  # Access the float value directly
        "ROUGE-2": rouge_score["rouge2"],  # Access the float value directly
        "ROUGE-L": rouge_score["rougeL"],  # Access the float value directly
    })

# Display final scores
df = pd.DataFrame(results)
print(df)
```

```
enable.
Saving colab_gpu_limited_100 1.json to colab_gpu_limited_100 1 (3).json
Evaluating with Prompt Style 1...
  0%|          | 0/100 [00:00<?, ?it/s]WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Ben
  1%|          | 1/100 [00:00<01:05,  1.50it/s]Empty prediction for question: I hadn't thought about that. I've been so focused on th
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 860.88ms
  2%||         | 2/100 [00:01<01:16,  1.28it/s]Empty prediction for question: I've always been a diligent patient, relying on my doct
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 506.85ms
  3%|          | 3/100 [00:02<01:04,  1.51it/s]Empty prediction for question: I agree. My upbringing has influenced my thoughts about
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 860.78ms
  4%|          | 4/100 [00:02<01:11,  1.35it/s]Empty prediction for question: I've been struggling with feelings of worthlessness and
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 608.02ms
  5%|          | 5/100 [00:03<01:06,  1.44it/s]Empty prediction for question: I've been feeling overwhelmed and disconnected from my
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 506.90ms
  6%|          | 6/100 [00:04<00:59,  1.58it/s]Empty prediction for question: I've been dealing with depression for a long time now.
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 507.38ms
  7%|          | 7/100 [00:04<00:55,  1.68it/s]Empty prediction for question: I understand. I remember one question from the test tha
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 508.99ms
  8%|          | 8/100 [00:05<00:52,  1.76it/s]Empty prediction for question: Thank you for your guidance. I'll keep these considera
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 509.13ms
  9%|          | 9/100 [00:05<00:50,  1.81it/s]Empty prediction for question: I've always felt a bit isolated from the online commun:
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 509.15ms
 10%|          | 10/100 [00:06<00:48,  1.85it/s]Empty prediction for question: My relationships, both romantic and platonic, have bec
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 509.20ms
 11%|          | 11/100 [00:06<00:47,  1.87it/s]Empty prediction for question: (Explaining their emotional state, personal history, a
I've been dealing with a debilitating back pain for the past three years. The pain has been a constant presence in my life, making ev
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 534.77ms
 12%|          | 12/100 [00:07<00:47,  1.86it/s]Empty prediction for question: I've been observing my mother's behavior since her ho:
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 585.22ms
 13%|          | 13/100 [00:07<00:48,  1.81it/s]Empty prediction for question: Anxiety has taken over my thoughts and actions recentl
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 457.78ms
 14%|          | 14/100 [00:08<00:45,  1.90it/s]Empty prediction for question: I've been grappling with feelings of guilt and inadequ
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 483.50ms
 15%|          | 15/100 [00:08<00:43,  1.94it/s]Empty prediction for question: I've been feeling overwhelmed lately, and I can't seem
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 557.15ms
 16%|          | 16/100 [00:09<00:44,  1.89it/s]Empty prediction for question: I've been trying to maintain my athletic prowess despi
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 532.64ms
 17%|          | 17/100 [00:09<00:44,  1.88it/s]Empty prediction for question: I used to run a babysitting cooperative in the hospit:
 18%|          | 18/100 [00:10<00:42,  1.93it/s]WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=
Empty prediction for question: My mother has Alzheimer's disease, and I've been her primary caregiver for the past five years. I've w
 19%|          | 19/100 [00:10<00:41,  1.93it/s]WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=
Empty prediction for question: In the past, I've attended CRI classes for art therapy. They've provided a safe and supportive environ
 20%|          | 20/100 [00:11<00:41,  1.94it/s]WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=
Empty prediction for question: "I've never been to therapy before, so I'm not sure what to expect. Can you tell me more about your ap
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 507.79ms
 21%|          | 21/100 [00:11<00:40,  1.94it/s]Empty prediction for question: My anxiety has been getting worse and I'm hoping couns
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 531.74ms
 22%|          | 22/100 [00:12<00:40,  1.91it/s]Empty prediction for question: I've been plagued by intrusive thoughts that leave me
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 686.01ms
 23%|          | 23/100 [00:13<00:44,  1.74it/s]Empty prediction for question: I've been considering seeking professional help, but
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 509.65ms
 24%|          | 24/100 [00:13<00:42,  1.80it/s]Empty prediction for question: I've been struggling with feelings of worthlessness ar
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 482.09ms
 25%|          | 25/100 [00:14<00:40,  1.86it/s]Empty prediction for question: I've been struggling with parenting lately, and it's r
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 481.91ms
 26%|          | 26/100 [00:14<00:38,  1.91it/s]Empty prediction for question: Through this counseling session, I hope to address my
Lately, I have been feeling incredibly low and hopeless. My self-esteem is at its lowest point, and negative thoughts dominate my min
For instance, I used to love painting and expressing myself through art. However, recently, I find no pleasure or interest in anythin
These depressive symptoms have been present on and off for about six months now. There are times when I feel slightly better, but the
Growing up, my family often put high expectations on me, which created immense pressure. This may have contributed to my current stat
I've tried various coping strategies, such as journaling, exercising, and reaching out to friends for support. While they provide tem
I wanted to ask about the treatment options available for managing depression. Are there any specific therapy techniques or medicatio
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 658.32ms
 27%|          | 27/100 [00:15<00:41,  1.77it/s]Empty prediction for question: Throughout the day, intrusive thoughts flood my mind,
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 557.89ms
 28%|          | 28/100 [00:15<00:40,  1.77it/s]Empty prediction for question: I've been feeling overwhelmed with my workload and per
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 559.69ms
 29%|          | 29/100 [00:16<00:40,  1.77it/s]Empty prediction for question: I've been struggling with feelings of inadequacy and s
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 483.10ms
 30%|          | 30/100 [00:16<00:38,  1.84it/s]Empty prediction for question: I've been struggling with the decision to cut back on
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 506.91ms
 31%|          | 31/100 [00:17<00:36,  1.87it/s]Empty prediction for question: I've been feeling torn between my duty as a caregiver
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 507.96ms
 32%|          | 32/100 [00:17<00:35,  1.89it/s]Empty prediction for question: I've been feeling helpless and lost since my mother wa
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 483.41ms
 33%|          | 33/100 [00:18<00:34,  1.93it/s]Empty prediction for question: I've been struggling to process the various concerns r
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 585.88ms
 34%|          | 34/100 [00:18<00:35,  1.85it/s]Empty prediction for question: I can't believe this is happening to us. My husband's
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 1016.09ms
 35%|          | 35/100 [00:19<00:44,  1.46it/s]Empty prediction for question: I've been feeling drained and helpless whenever my hus
WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=json%3Benum-encoding%3Dint (127.0.0.1) 534.35ms
 36%|          | 36/100 [00:20<00:41,  1.56it/s]Empty prediction for question: I've been feeling overwhelmed by the demands of my job
 37%|          | 37/100 [00:21<00:38,  1.63it/s]WARNING:tornado.access:429 POST /v1beta/models/gemini-1.5-pro:generateContent?%24alt=
```