Health AI – Intelligent Healthcare Assistant

1.Introduction

Project Title: Health AI – Intelligent Healthcare Assistant
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Team Members:
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2. E. Vishalachi – vvisa088@gmail.com
3. R. Pooja – baburamesh490490@gmail.com

2. Project Overview

Purpose: Health AI offers intelligent and easy-to-understand healthcare assistance by leveraging the IBM Granite model. It enables features such as Patient Chat, Disease Prediction, and Treatment Plans for better medical guidance.
Features:
– Patient Chat Interface
– Disease Prediction System
– Treatment Plan Recommendations
– Integration with IBM Granite Model
– Secure Deployment in Google Colab

3. Architecture

Frontend: Gradio for interactive UI
Backend: Python (Transformers and Torch Libraries)
Model: IBM Granite Model from Hugging Face
Deployment: Google Colab with T4 GPU

4. Setup Instructions

Prerequisites:
- Python (3.x)
- Git
- Gradio Framework
- IBM Granite Model (via Hugging Face)
- Google Colab Access

Installation Steps:
1. Clone the repository (if applicable):
git clone [Repository URL]
2. Install required libraries:
pip install transformers torch gradio -q
3. Open Google Colab, change Runtime Type to T4 GPU.

5. Folder Structure

HealthAI/ |-- colab_notebook.ipynb # Main Google Colab Notebook |-- model_integration.py #

Code for model interaction |-- utils.py # Helper functions |-- requirements.txt # Required Python packages

6. Running the Application

1. Open Google Colab: https://colab.research.google.com/
2. Set Runtime to T4 GPU
3. Run the initial cell to install dependencies:
!pip install transformers torch gradio -q
4. Upload and run the project code cells sequentially.

7. API Documentation

The project runs entirely in Google Colab without separate REST APIs. Interaction occurs through the Gradio web interface.

8. Authentication

No explicit authentication mechanism. The model runs locally in Google Colab and is accessed through Gradio's interface.

9. User Interface

- Landing Page with Gradio Interface
- Chat Window for Patient Interaction
- Prediction Output Section
- Treatment Plan Recommendations

10. Testing

- Manual Testing through the Gradio Interface
- Sample Inputs:
– Symptoms for disease prediction
– Query for treatment plans

11. Known Issues

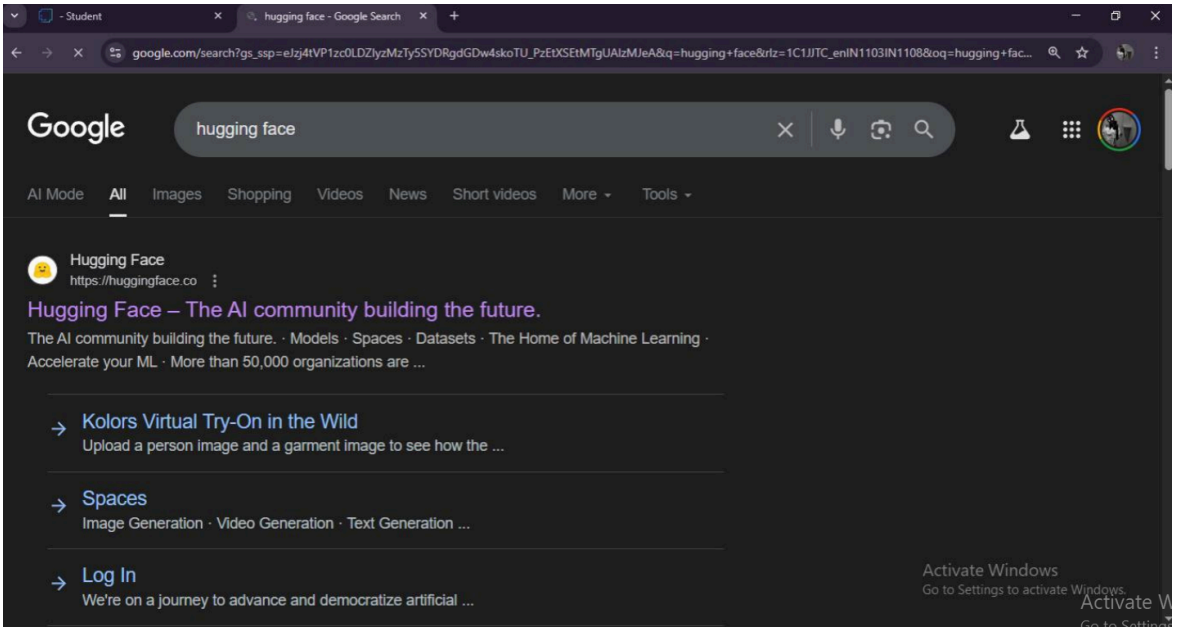
- Performance depends on Google Colab session time limits
- Occasional loading delays when model is first initialized

12. Future Enhancements

- Add Authentication System for User Tracking
- Build a Dedicated Web Interface
- Expand Database for Disease & Treatment Knowledge
- Deploy on Cloud Infrastructure for Scalability

13. Screenshots or Demo

[Provide screenshots of the Gradio interface and sample outputs]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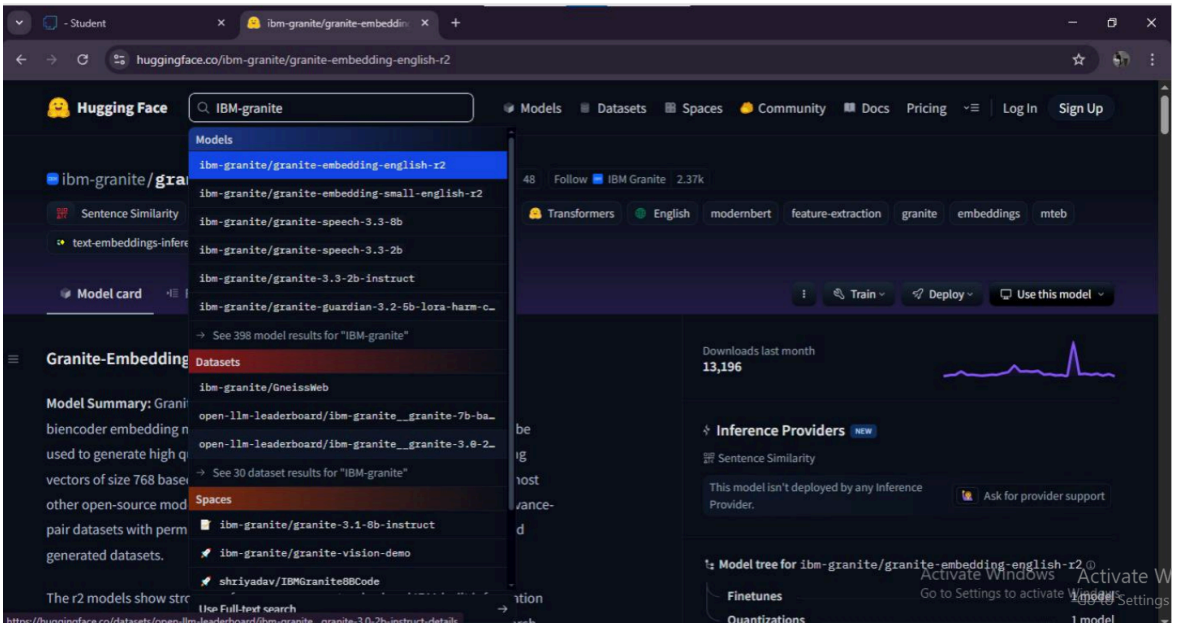
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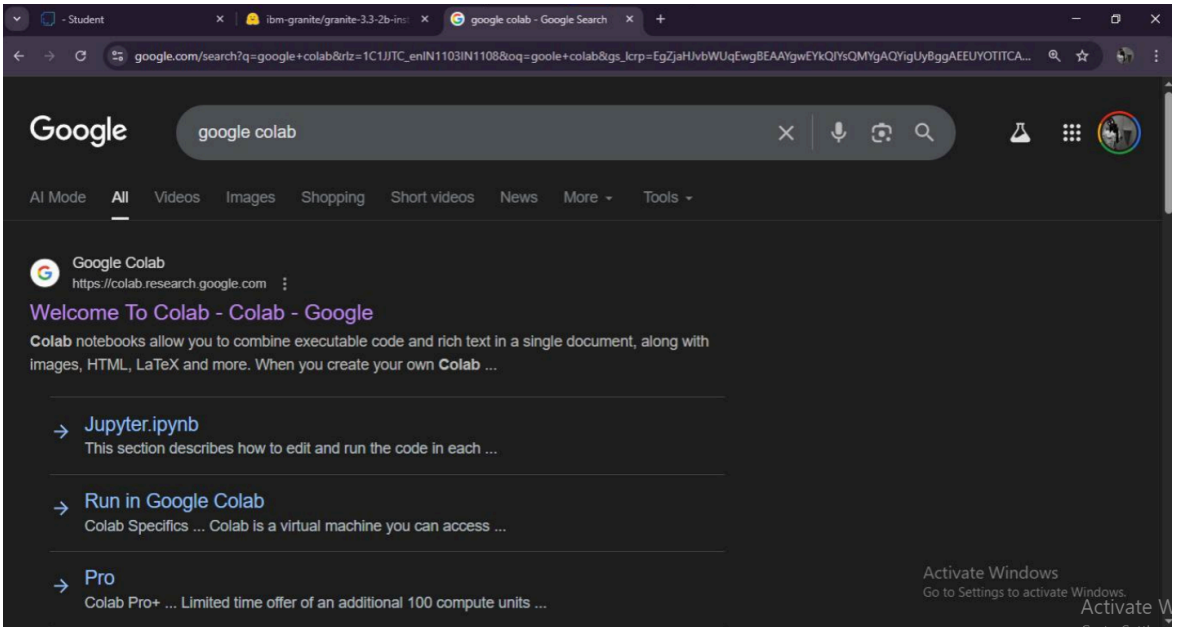
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Welcome To Colab - Colab - Google
Colab notebooks allow you to combine executable code and rich text in a single document, along with images, HTML, LaTeX and more. When you create your own Colab ...
Jupyter.ipynb
This section describes how to edit and run the code in each ...
Run in Google Colab
Colab Specifics ... Colab is a virtual machine you can access ...
Pro
Colab Pro+ ... Limited time offer of an additional 100 compute units ...
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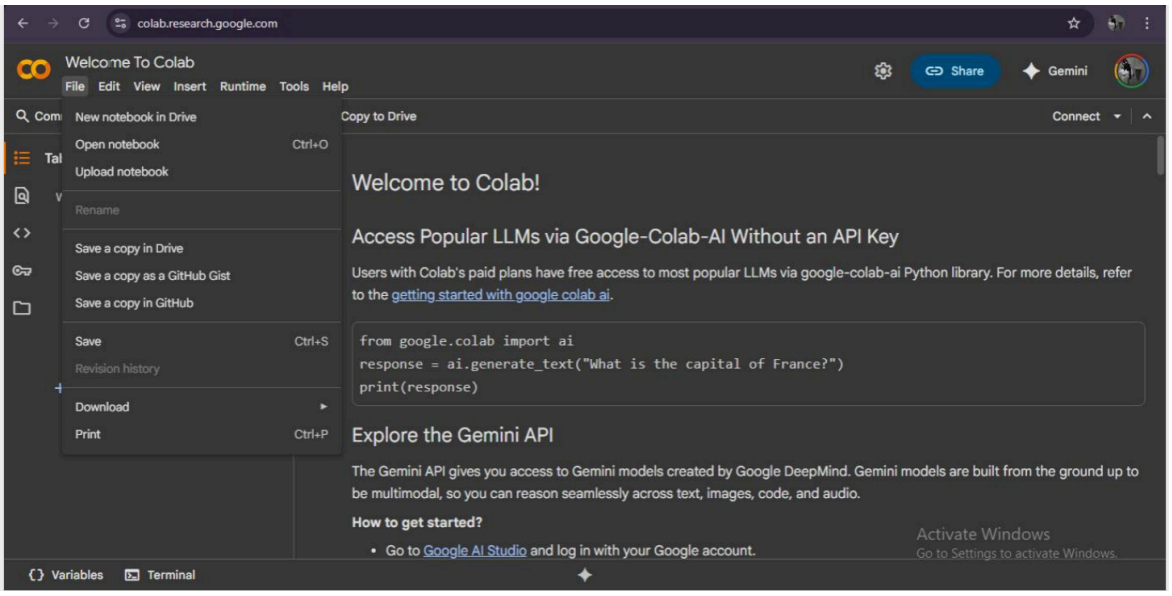
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Upload notebook
Rename
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Save a copy as a GitHub Gist
Save a copy in GitHub
Save Ctrl+S
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Access Popular LLMs via Google-Colab-AI Without an API Key
Users with Colab's paid plans have free access to most popular LLMs via google-colab-ai Python library. For more details, refer to the getting started with google colab ai.
from google.colab import ai
response = ai.generate_text("What is the capital of France?")
print(response)
Explore the Gemini API
The Gemini API gives you access to Gemini models created by Google DeepMind. Gemini models are built from the ground up to be multimodal, so you can reason seamlessly across text, images, code, and audio.
How to get started?
Go to Google AI Studio and log in with your Google account.
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Variables
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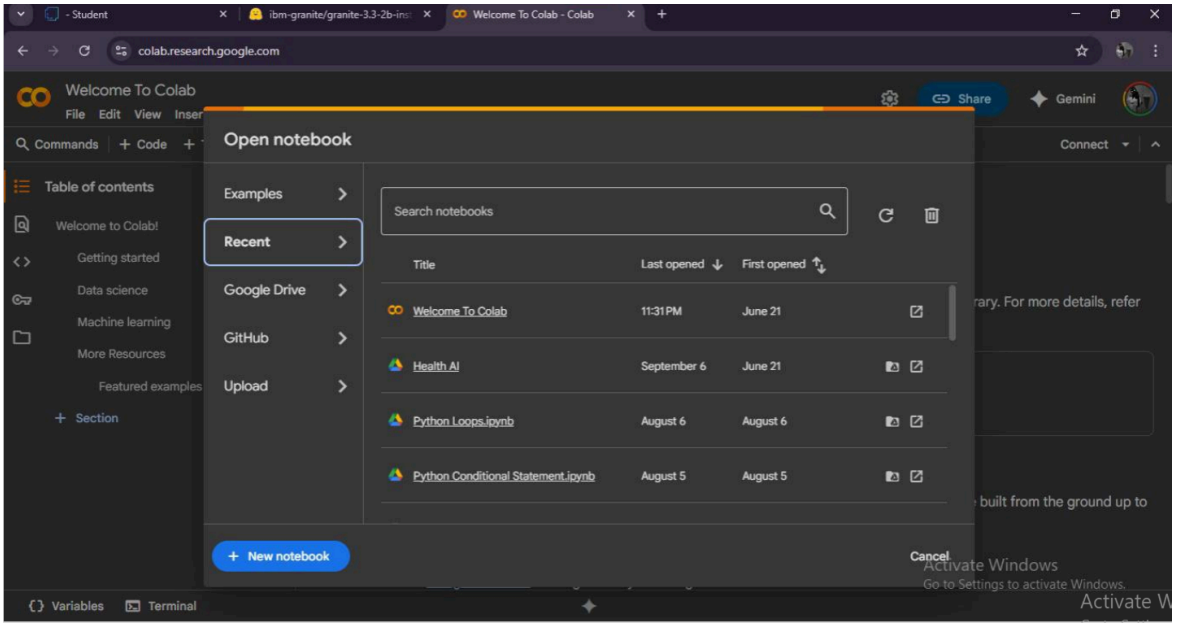
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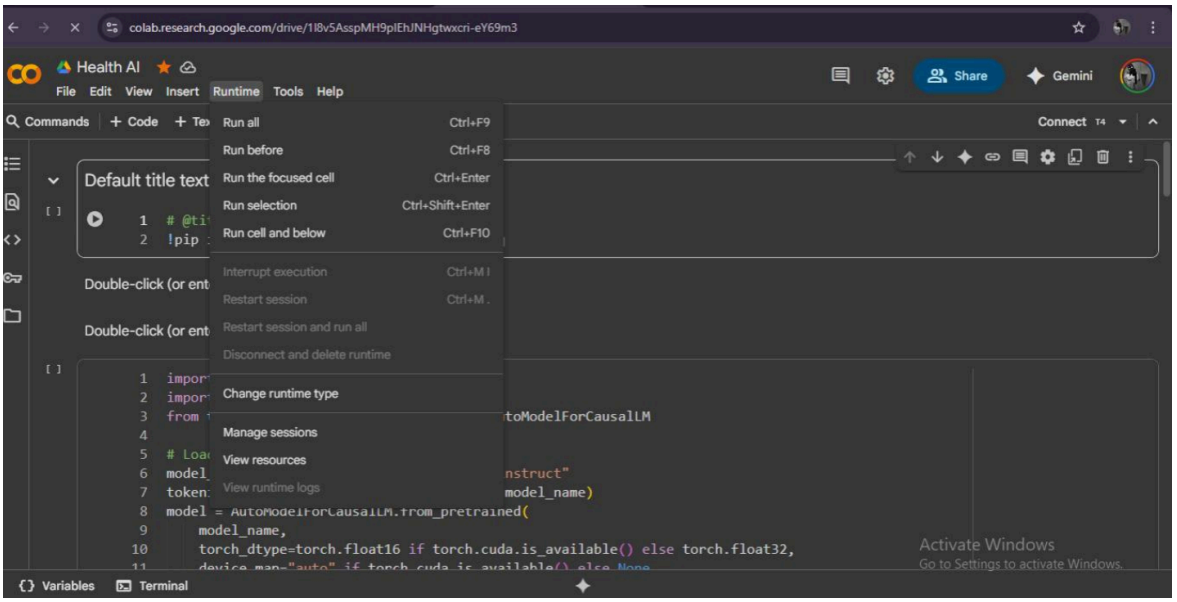
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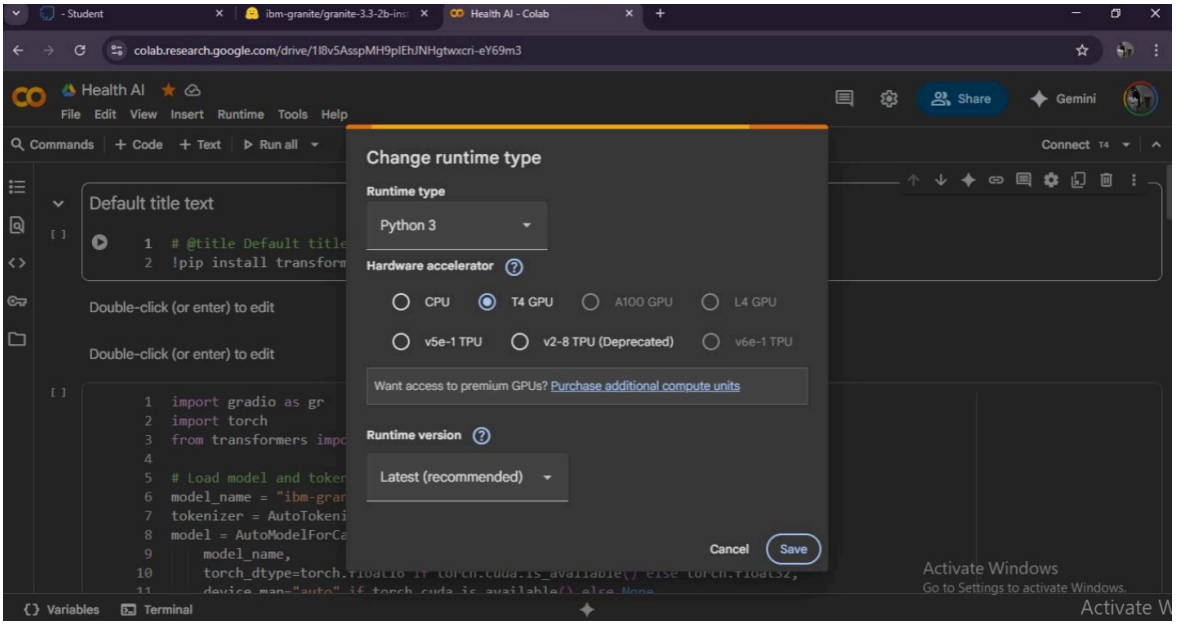
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A100 GPU
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v2-8 TPU (Deprecated)
v6e-1 TPU
Want access to premium GPUs? Purchase additional compute units
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import gradio as gr
import torch
from transformers impo
# Load model and toker
model_name = "ibm-gran
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model = AutoModelForCa
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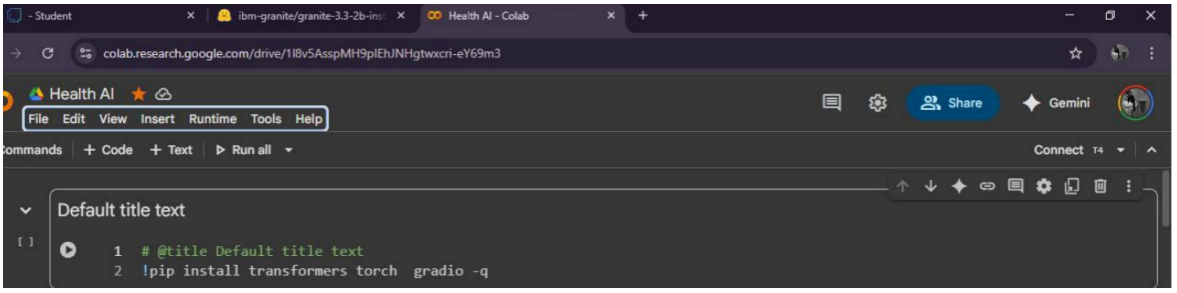
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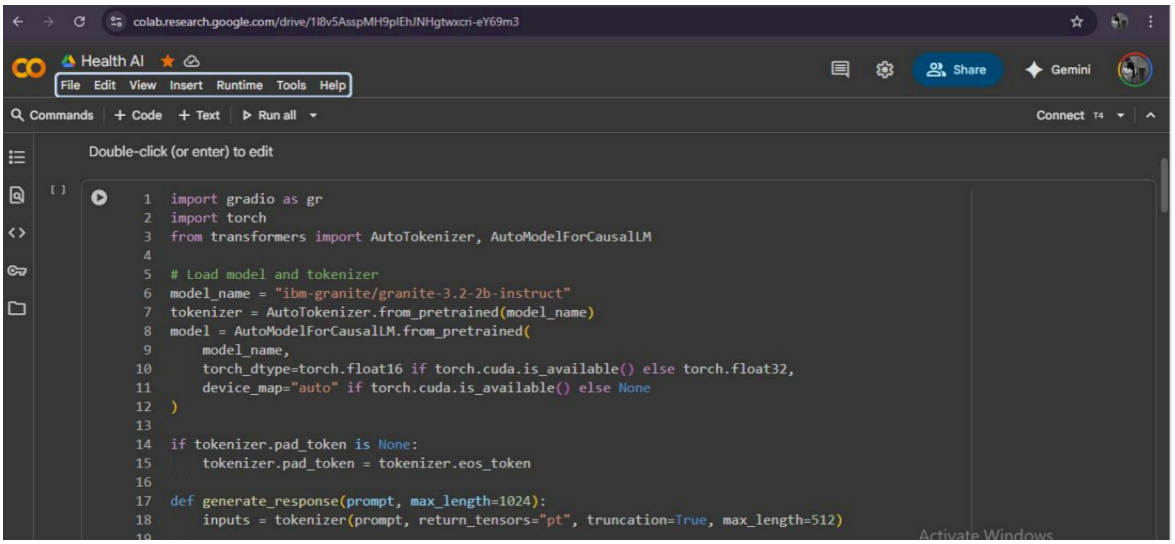
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Double-click (or enter) to edit
import gradio as gr
import torch
from transformers import AutoTokenizer, AutoModelForCausalLM
# Load model and tokenizer
model_name = "ibm-granite/granite-3.2-2b-instruct"
tokenizer = AutoTokenizer.from_pretrained(model_name)
model = AutoModelForCausalLM.from_pretrained(
model_name,
torch_dtype=torch.float16 if torch.cuda.is_available() else torch.float32,
device_map="auto" if torch.cuda.is_available() else None
)
if tokenizer.pad_token is None:
tokenizer.pad_token = tokenizer.eos_token
def generate_response(prompt, max_length=1024):
inputs = tokenizer(prompt, return_tensors="pt", truncation=True, max_length=512)
Activate Windows

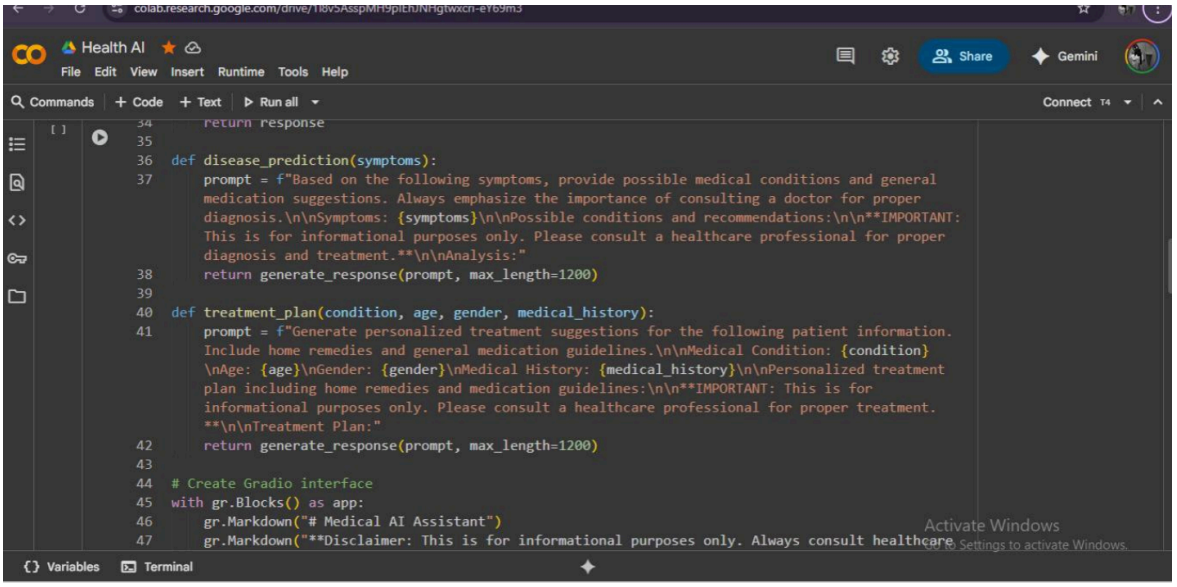
```
def generate_response(prompt, max_length=1024):
    inputs = tokenizer(prompt, return_tensors="pt", truncation=True, max_length=512)

    if torch.cuda.is_available():
        inputs = {k: v.to(model.device) for k, v in inputs.items()}

    with torch.no_grad():
        outputs = model.generate(
            **inputs,
            max_length=max_length,
            temperature=0.7,
            do_sample=True,
            pad_token_id=tokenizer.eos_token_id
        )

    response = tokenizer.decode(outputs[0], skip_special_tokens=True)
    response = response.replace(prompt, "").strip()
    return response

def disease_prediction(symptoms):
    prompt = f"Based on the following symptoms, provide possible medical conditions and general
    medication suggestions. Always emphasize the importance of consulting a doctor for proper
```

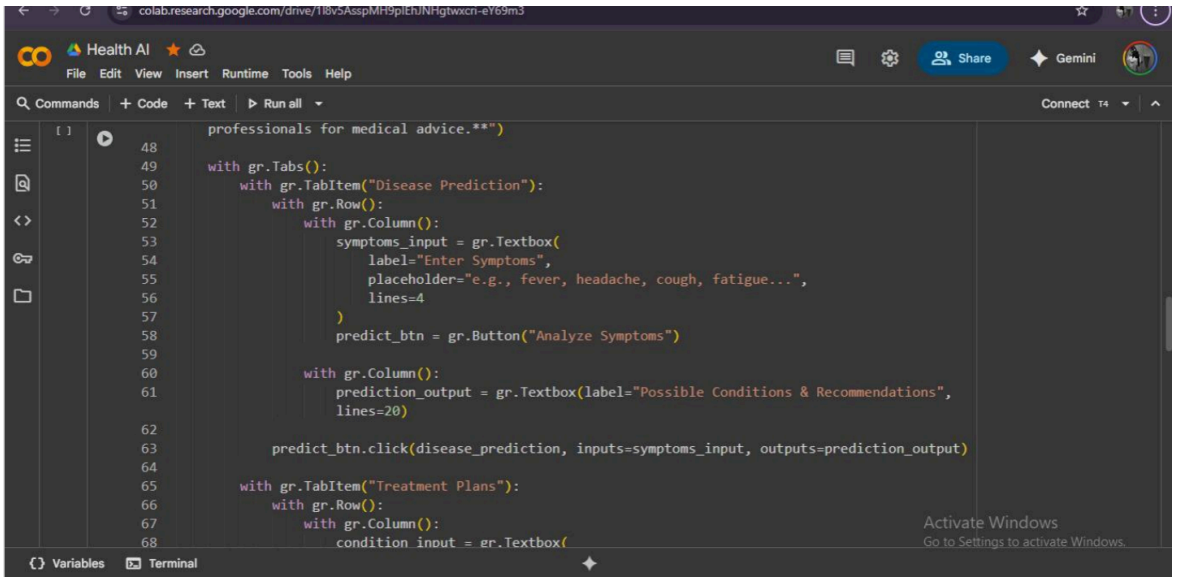



```
    return response

def disease_prediction(symptoms):
    prompt = f"Based on the following symptoms, provide possible medical conditions and general
    medication suggestions. Always emphasize the importance of consulting a doctor for proper
    diagnosis.\n\nSymptoms: {symptoms}\n\nPossible conditions and recommendations:\n\n**IMPORTANT:
    This is for informational purposes only. Please consult a healthcare professional for proper
    diagnosis and treatment.**\n\nAnalysis:"
    return generate_response(prompt, max_length=1200)

def treatment_plan(condition, age, gender, medical_history):
    prompt = f"Generate personalized treatment suggestions for the following patient information.
    Include home remedies and general medication guidelines.\n\nMedical Condition: {condition}
    \nAge: {age}\nGender: {gender}\nMedical History: {medical_history}\n\nPersonalized treatment
    plan including home remedies and medication guidelines:\n\n**IMPORTANT: This is for
    informational purposes only. Please consult a healthcare professional for proper treatment.
    **\n\nTreatment Plan:"
    return generate_response(prompt, max_length=1200)

# Create Gradio interface
with gr.Blocks() as app:
    gr.Markdown("# Medical AI Assistant")
    gr.Markdown("**Disclaimer: This is for informational purposes only. Always consult healthcare
```

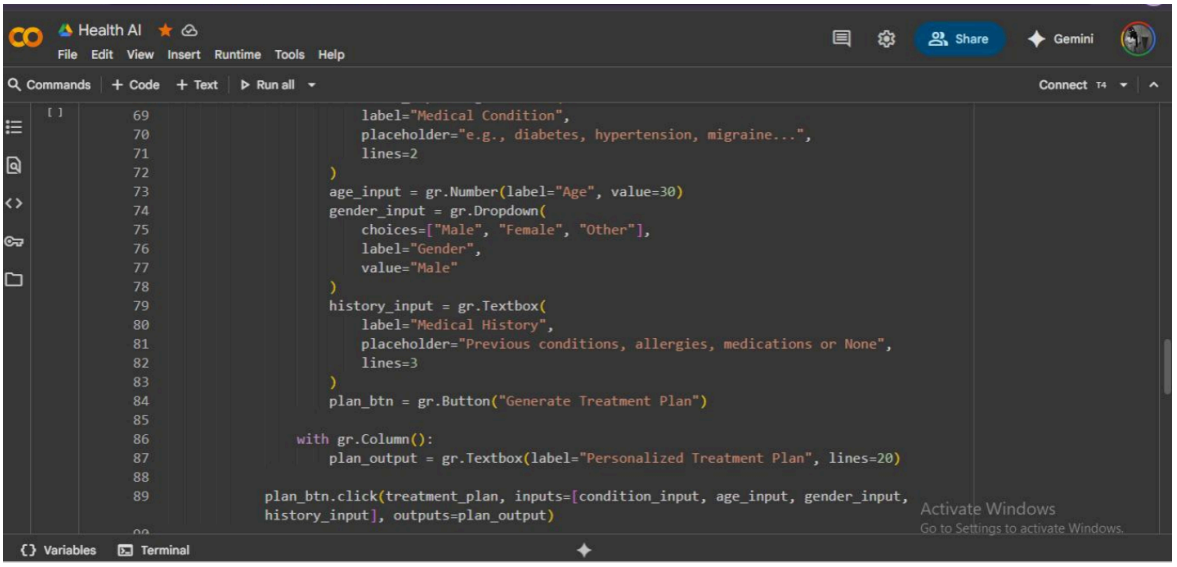
```
    professionals for medical advice.**")

    with gr.Tabs():
        with gr.TabItem("Disease Prediction"):
            with gr.Row():
                with gr.Column():
                    symptoms_input = gr.Textbox(
                        label="Enter Symptoms",
                        placeholder="e.g., fever, headache, cough, fatigue...",
                        lines=4
                    )
                    predict_btn = gr.Button("Analyze Symptoms")

                with gr.Column():
                    prediction_output = gr.Textbox(label="Possible Conditions & Recommendations",
                    lines=20)

            predict_btn.click(disease_prediction, inputs=symptoms_input, outputs=prediction_output)

        with gr.TabItem("Treatment Plans"):
            with gr.Row():
                with gr.Column():
                    condition_input = gr.Textbox(
```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label="Medical Condition",
placeholder="e.g., diabetes, hypertension, migraine...",
lines=2
)
age_input = gr.Number(label="Age", value=30)
gender_input = gr.Dropdown(
choices=["Male", "Female", "Other"],
label="Gender",
value="Male"
)
history_input = gr.Textbox(
label="Medical History",
placeholder="Previous conditions, allergies, medications or None",
lines=3
)
plan_btn = gr.Button("Generate Treatment Plan")
with gr.Column():
plan_output = gr.Textbox(label="Personalized Treatment Plan", lines=20)
plan_btn.click(treatment_plan, inputs=[condition_input, age_input, gender_input,
history_input], outputs=plan_output)
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Variables
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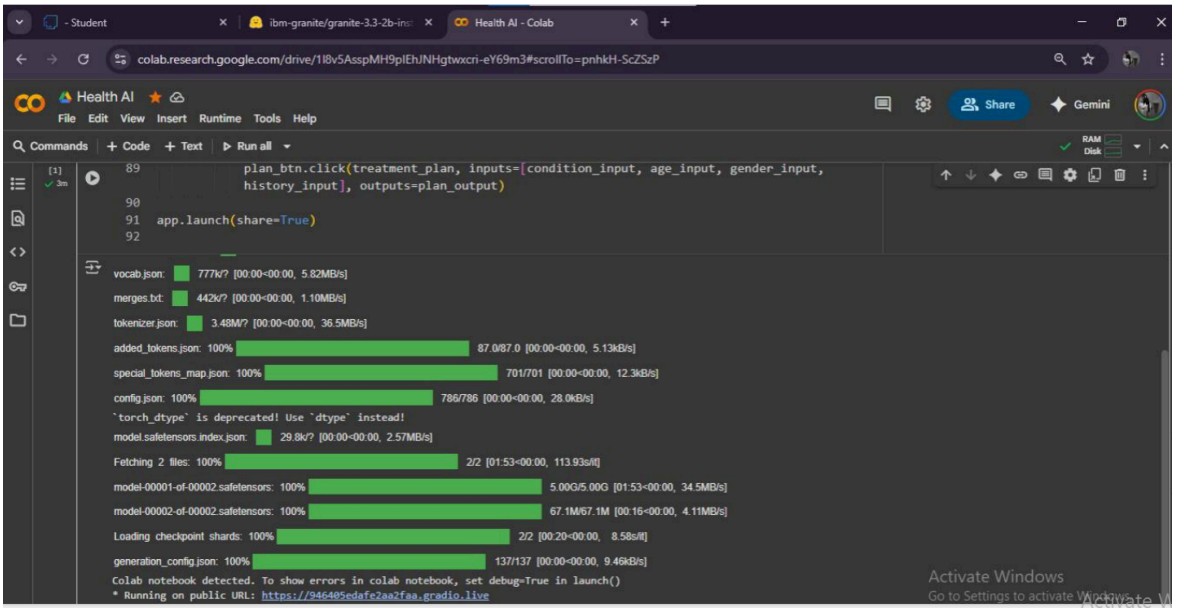
- Student
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Health AI - Colab
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Health AI
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Run all
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plan_btn.click(treatment_plan, inputs=[condition_input, age_input, gender_input,
history_input], outputs=plan_output)
app.launch(share=True)
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added_tokens.json: 100% 87.0/87.0 [00:00<00:00, 5.13kB/s]
special_tokens_map.json: 100% 701/701 [00:00<00:00, 12.3kB/s]
config.json: 100% 786/786 [00:00<00:00, 28.0kB/s]
`torch_dtype` is deprecated! Use `dtype` instead!
model.safetensors.index.json: 29.8k/? [00:00<00:00, 2.57MB/s]
Fetching 2 files: 100% 2/2 [01:53<00:00, 113.93s/it]
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Loading checkpoint shards: 100% 2/2 [00:20<00:00, 8.58s/it]
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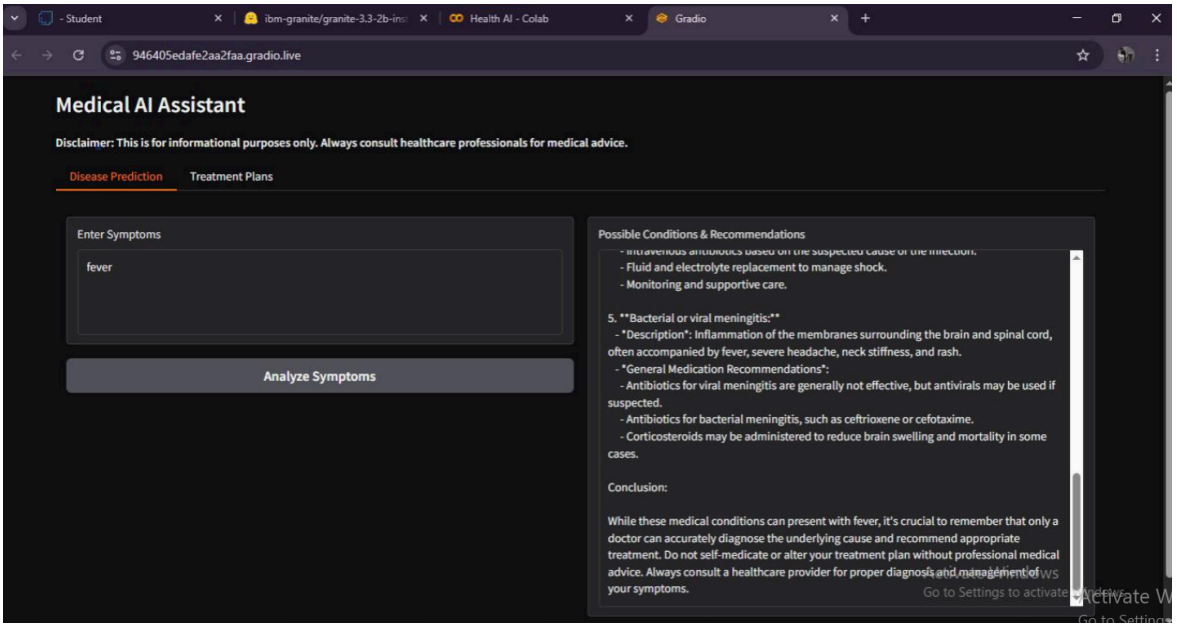
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Health AI - Colab
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Medical AI Assistant
Disclaimer: This is for informational purposes only. Always consult healthcare professionals for medical advice.
Disease Prediction
Treatment Plans
Enter Symptoms
fever
Analyze Symptoms
Possible Conditions & Recommendations
- Fluid and electrolyte replacement to manage shock.
- Monitoring and supportive care.
5. **Bacterial or viral meningitis:**
- *Description*: Inflammation of the membranes surrounding the brain and spinal cord, often accompanied by fever, severe headache, neck stiffness, and rash.
- *General Medication Recommendations*:
- Antibiotics for viral meningitis are generally not effective, but antivirals may be used if suspected.
- Antibiotics for bacterial meningitis, such as ceftrioxene or cefotaxime.
- Corticosteroids may be administered to reduce brain swelling and mortality in some cases.
Conclusion:
While these medical conditions can present with fever, it's crucial to remember that only a doctor can accurately diagnose the underlying cause and recommend appropriate treatment. Do not self-medicate or alter your treatment plan without professional medical advice. Always consult a healthcare provider for proper diagnosis and management of your symptoms.
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