HEALTH AI-ASSITANT

Project Documentation

1.Introduction

- Project title : HEALTH AI ASSISTANT
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- Team member : NIVETHA A
- Team member :NAVEENA L

2. Project Overview

Purpose:
The Health AI Assistant is designed to provide users with quick, AI-driven medical insights for symptoms, conditions, and general wellness recommendations. It is not a replacement for doctors, but an **informational tool** that promotes awareness, encourages early consultation, and provides users with personalized guidance.

By leveraging AI and natural language models, the assistant can:

- Predict possible medical conditions based on symptoms
- Suggest general treatment and home remedies
- Provide personalized treatment plan drafts based on patient details

Important: All outputs emphasize the need for professional medical consultation.

Features:

- **Conversational Symptom Analysis**
  - Accepts symptoms in plain text and returns possible conditions.
- **Treatment Plan Generator**

    - Creates a customized treatment plan with home remedies and lifestyle tips based on user info (age, gender, history).
- **Disclaimer Integration**
    - Ensures every response reminds users to consult a healthcare professional.
- **Gradio-based UI**
    - Clean, accessible web interface for disease prediction and treatment planning.
- **LLM Integration**
    - Uses IBM Watsonx Granite (granite-3.2-2b-instruct) for high-quality medical text generation.

3. Architecture

Frontend (Gradio):

- Built with **Gradio Blocks & Tabs**.
- Provides two main modules:
    - *Disease Prediction* (symptom input → conditions & recommendations)
    - *Treatment Plans* (condition + patient details → personalized plan).
- Simple, user-friendly interface with disclaimers.

Backend (Python + Transformers):

- Uses Hugging Face Transformers with IBM Watsonx Granite model.
- Handles:
    - Symptom → prompt → AI response
    - Condition + patient details → prompt → AI-generated treatment plan

LLM Integration (IBM Watsonx Granite):

- Provides natural language understanding and generation.
- Prompts carefully structured to:
    - Return medical insights
    - Enforce safety disclaimers

4. Setup Instruction

Prerequisites:

- Python 3.9+
- pip and venv
- GPU (optional, for faster inference)
- Internet access (to fetch models)

5.Folder Structure:

app Core application code (Gradio interface, model handling, prompt functions).

- main.py Entry point – The script you shared (loads model, defines functions, launches Gradio UI).
- model_utils.py Helper functions for model loading&text generation (to keep main.py clean).
- prompts.py Stores reusable prompt templates (e.g., disease prediction, treatment plan).
- model Local model cache if you want to save/download IBM Granite weights instead of pulling every run.

README.md Info on downloading or linking Hugging Face model.

- Requirements Dependency management.

requirements.txt Python libraries: transformers, torch, gradio, etc.

environment.yml Conda environment file if using Conda.

- static CSS, images, or custom frontend assets if you style Gradio.
- Notebooks Jupyter Colab notebooks for experimentation or data analysis
- tests Unit tests for generate_response, disease_prediction, etc.
- docs Documentation for setup, usage, and API details.

README.md Main project documentation (installation, running instructions).

- .env Environment variables (API keys, secrets if needed).

README.md Top-level project description and quick start guide.

LICENSE Project license (MIT, Apache, etc.).

- .gitignore Ignore cache files, model weights, and virtual environments.

6. Running the Application

python health_ai.py

1. Launch the Gradio interface (python health_ai.py).
2. Open the given localhost/Share link.
3. Navigate between **Disease Prediction** and **Treatment Plan** tabs.
4. Enter symptoms or patient details.
5. Receive AI-generated suggestions with medical disclaimer.

7. API Documentation

If integrated with FastAPI, the following APIs could be exposed:

- **POST /predict-symptoms** – Returns conditions & recommendations
- **POST /generate-plan** – Returns personalized treatment plan.

8. Authentication

Currently runs in **open mode** for demo. Future secure deployments can add:

- API key-based access
- Role-based usage (doctor vs. patient mode)

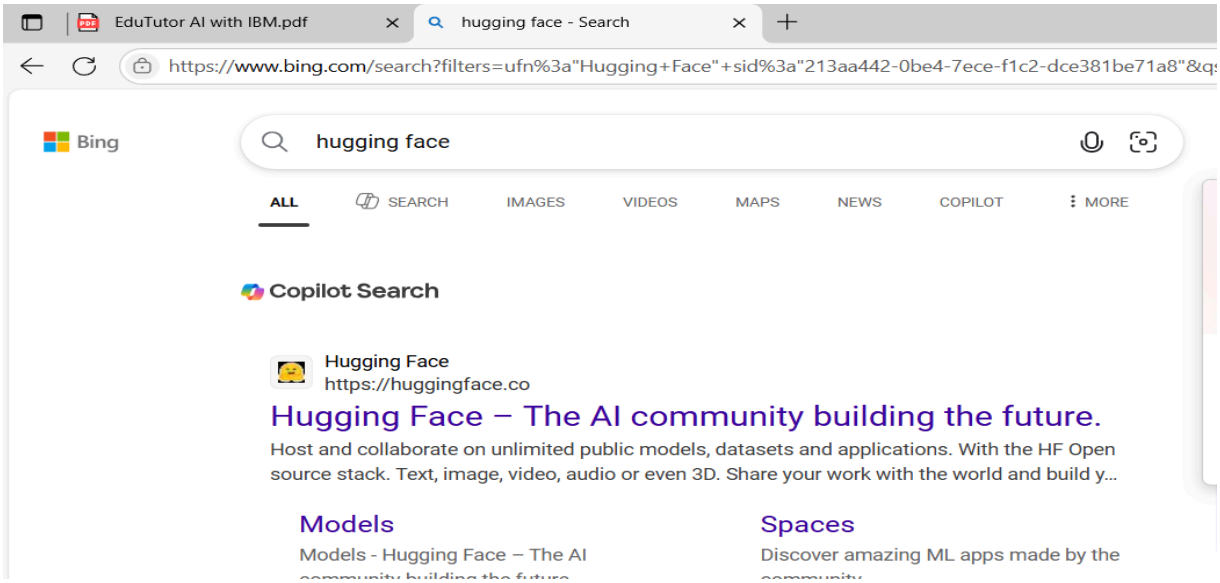
9. User Interface

- **Tabs:** Disease Prediction | Treatment Plans
- **Inputs:** Textboxes, dropdowns, number inputs
- **Outputs:** Multi-line text with AI response
- **Design Priority:** Minimalist, clarity-first, with disclaimers at every step

10. Testing

- **Unit Testing:** Prompt functions tested for valid AI responses
- **Manual Testing:** UI tested for different symptoms and conditions
- **Edge Cases:** Empty input, long symptom lists, invalid formats
- **Safety Validation:** Ensured disclaimer appears in every output

11. Screenshots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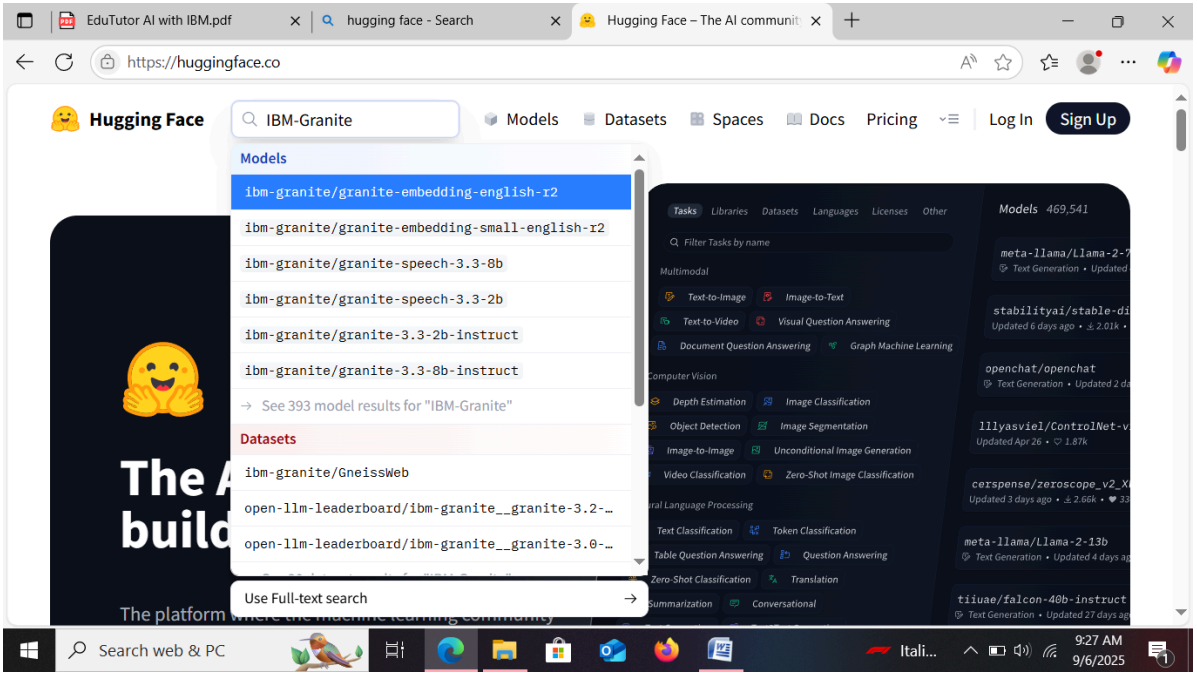
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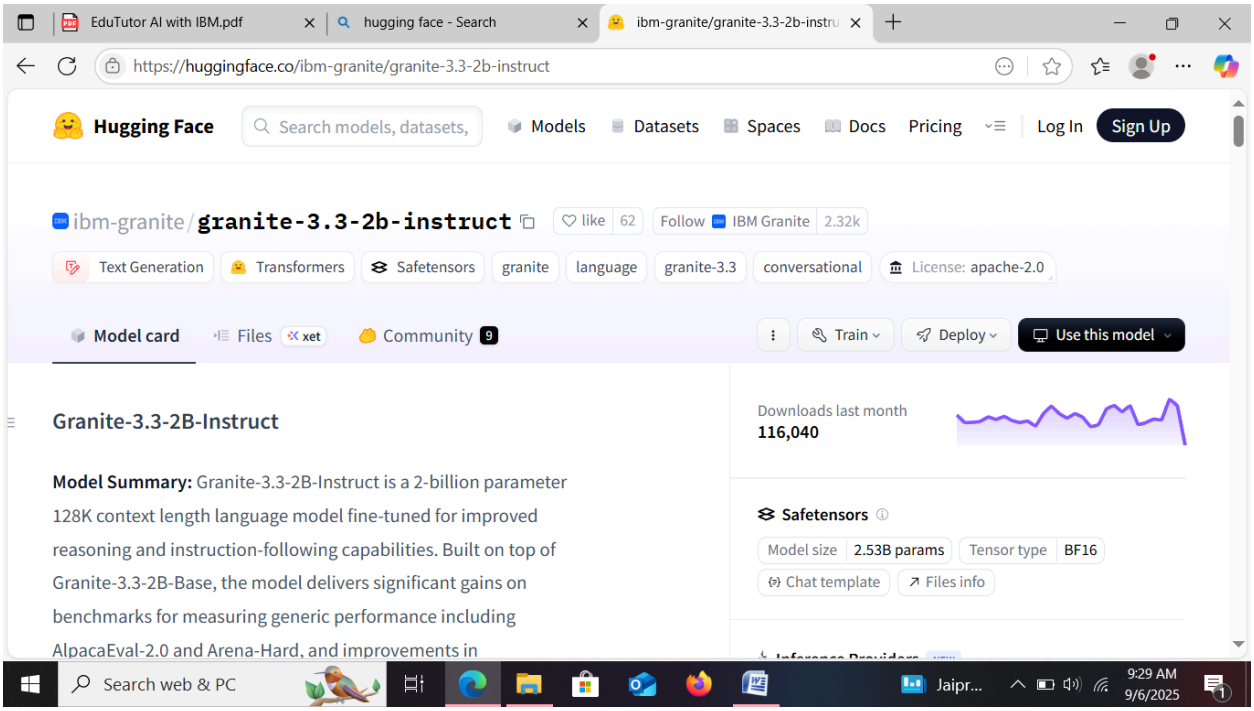
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Deploy
Use this model
Granite-3.3-2B-Instruct
Model Summary: Granite-3.3-2B-Instruct is a 2-billion parameter 128K context length language model fine-tuned for improved reasoning and instruction-following capabilities. Built on top of Granite-3.3-2B-Base, the model delivers significant gains on benchmarks for measuring generic performance including AlpacaEval-2.0 and Arena-Hard, and improvements in
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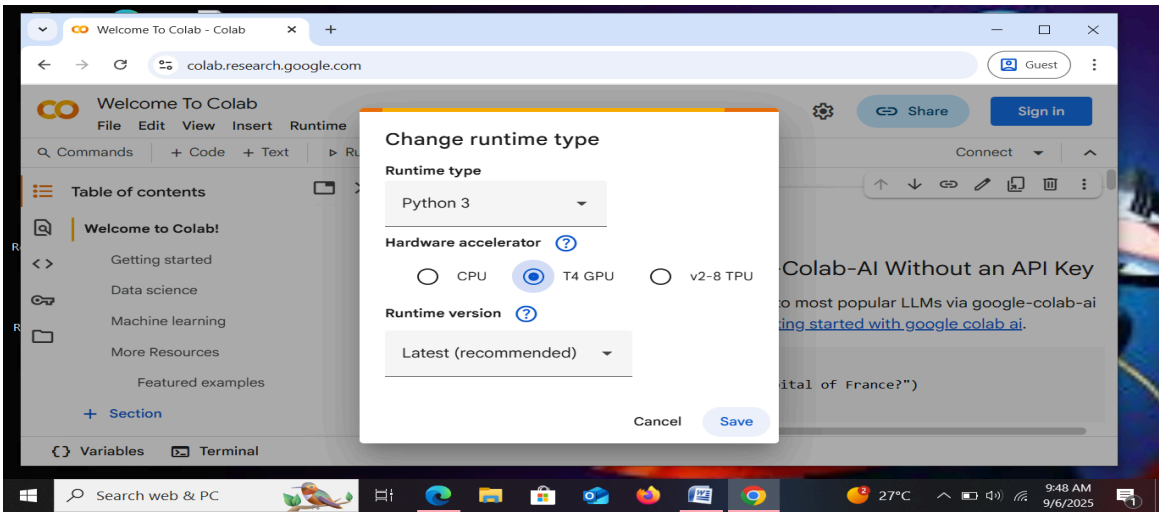
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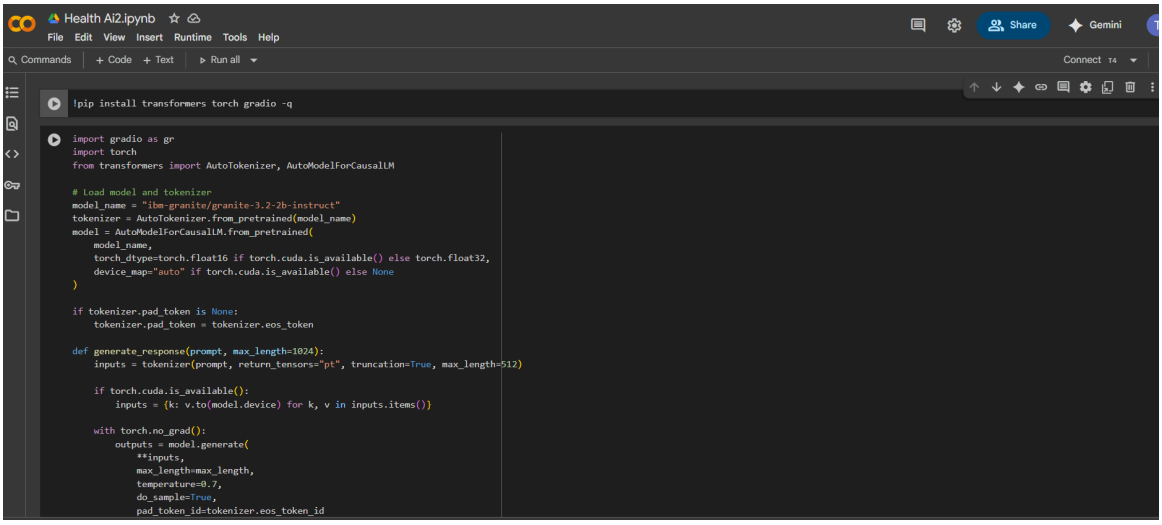
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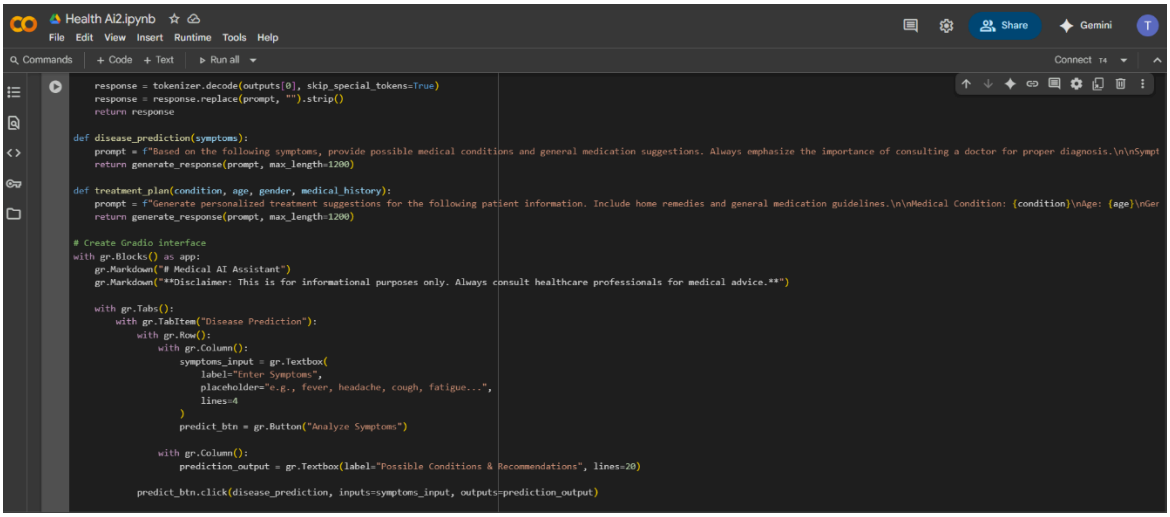
!pip install transformers torch gradio -q
import gradio as gr
import torch
from transformers import AutoTokenizer, AutoModelForCausalLM
# Load model and tokenizer
model_name = "ibm-granite/granite-3.2-2b-instruct"
tokenizer = AutoTokenizer.from_pretrained(model_name)
model = AutoModelForCausalLM.from_pretrained(
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)
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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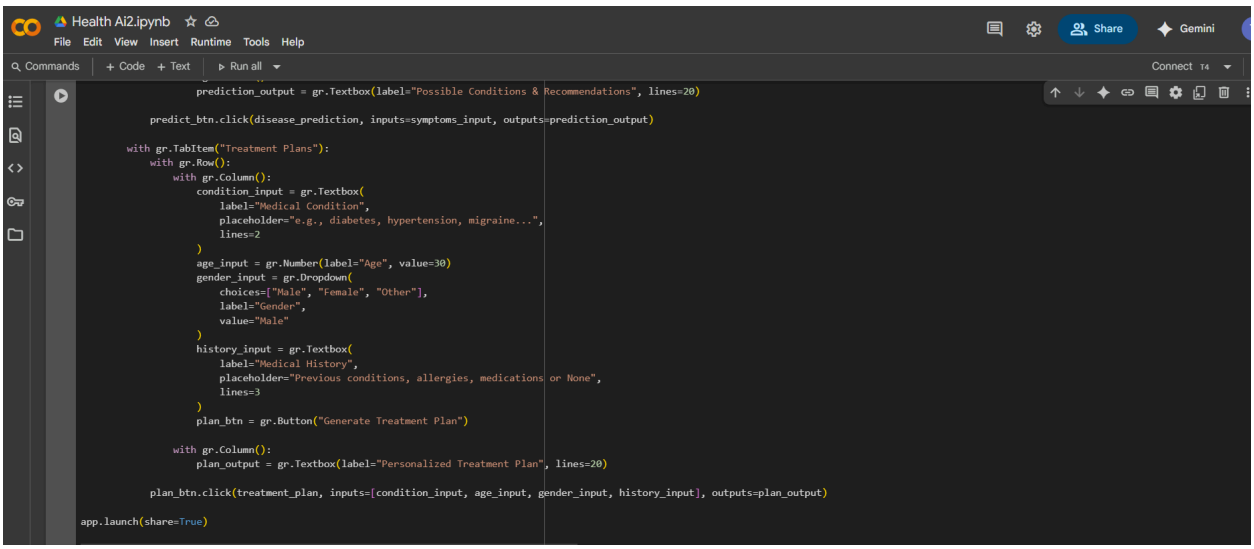
response = tokenizer.decode(outputs[0], skip_special_tokens=True)
response = response.replace(prompt, "").strip()
return response
def disease_prediction(symptoms):
prompt = f"Based on the following symptoms, provide possible medical conditions and general medication suggestions. Always emphasize the importance of consulting a doctor for proper diagnosis.\n\nSympt
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}\nGer
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)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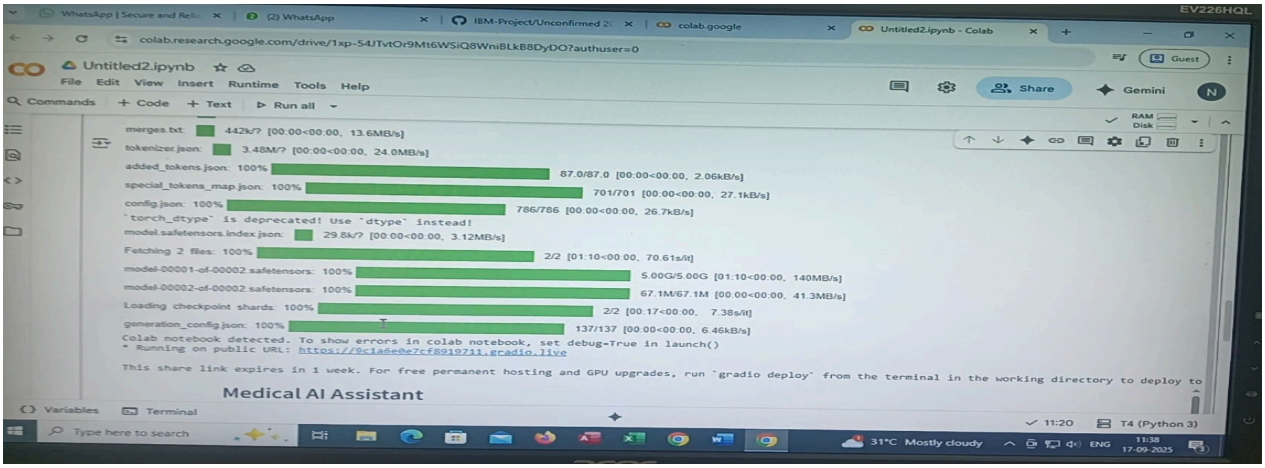
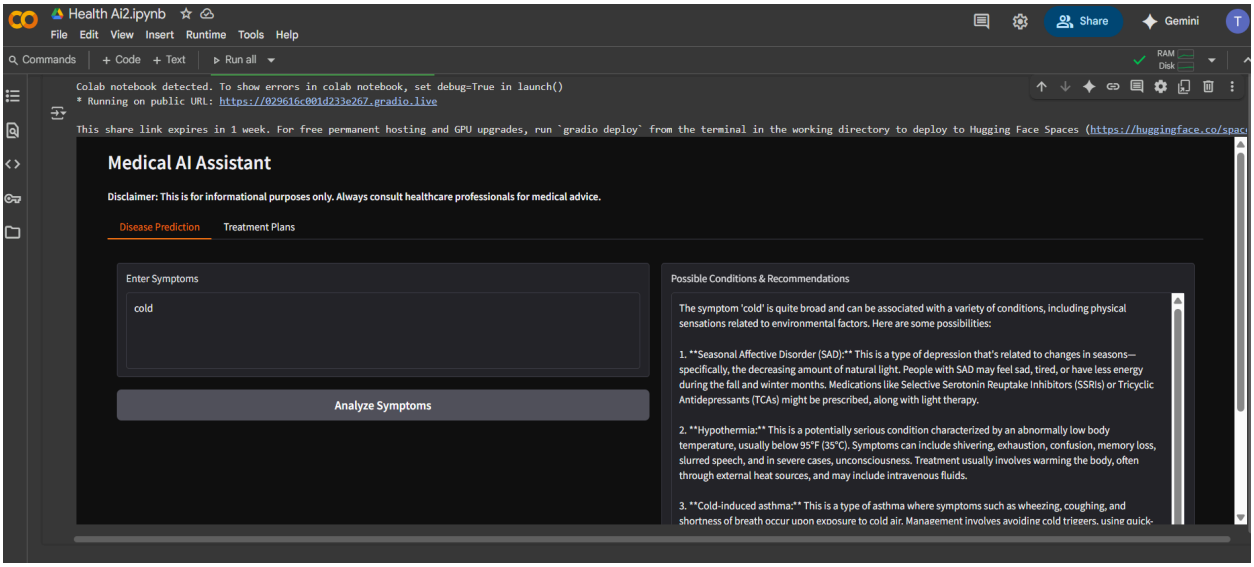
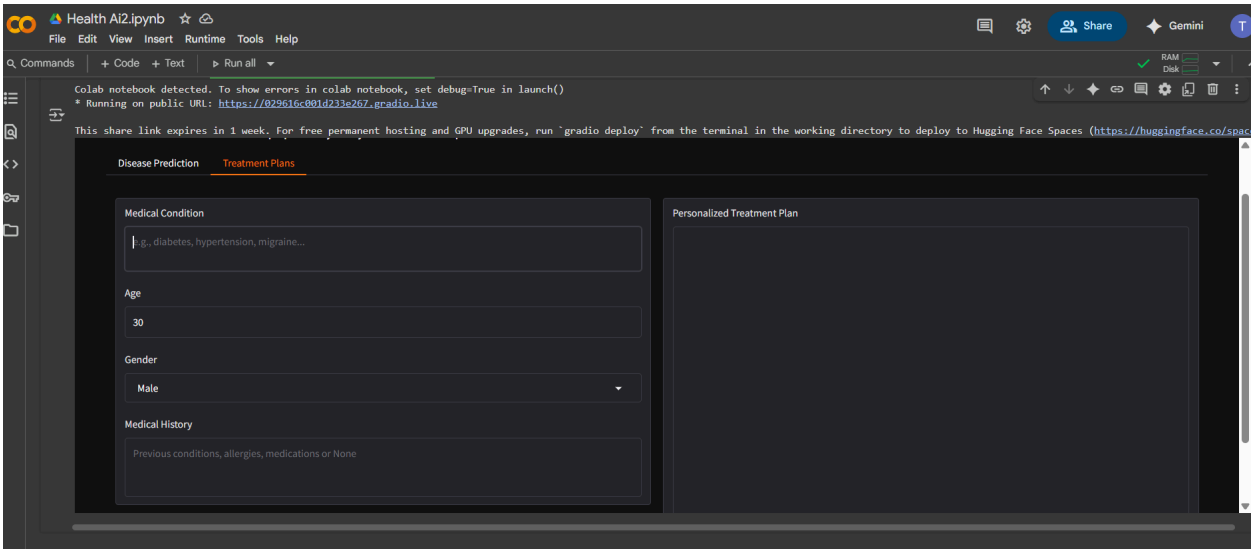
prediction_output = gr.Textbox(label="Possible Conditions & Recommendations", lines=20)
predict_btn.click(disease_prediction, inputs=symptoms_input, outputs=prediction_output)
with gr.TabItem("Treatment Plans"):
with gr.Row():
with gr.Column():
condition_input = gr.Textbox(
label="Medical Condition",
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)
app.launch(share=True)







12. Known Issues

- Responses may vary in accuracy since model is not a certified medical system.
- No real-time medical data integration yet.
- Limited medical terminology handling for rare conditions.

13. Future Enhancements

- Integration with **FastAPI** for API-based deployment
- **Medical knowledge base integration** (PubMed, WHO, etc.)
- **Speech-to-text support** for accessibility
- **Secure authentication** for patient data privacy
- **Multilingual support** for non-English speakers