HEALTH AI INTELLIGENT HEALTH CARE ASSISTANT
PROJECT DOCUMENTATION

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1. Introduction

Project Title: Health AI Intelligent Health Care Assistant

Team member : MUTHU GANAPATHI R P
Team member : HAJA MOHAIDEEN B
Team member : AAKASH M
Team member : MOHAMED MUFEETH J
Team member : DONY A

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2. Project Overview
Purpose: The Medical AI Assistant is designed to provide informational support on possil

Features:

Disease Prediction: Users can enter symptoms and receive suggestions for possible medi

Treatment Plan Generation: The assistant can generate personalized treatment plans bas

User Interface: The application uses a Gradio interface with separate tabs for each funct

LLM Integration: It uses the ibm-granite/granite-3.2-2b-instruct model for generating res

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3. Solution Components

AI Model: The project uses ibm-granite/granite-3.2-2b-instruct for natural language unde

Frontend: The frontend is a web interface built with the Gradio library. It includes textbo

Backend: The logic is handled by a Python script that uses the Hugging Face Transforme

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4. Technology Stack

Frameworks: Gradio

Libraries: torch and transformers are used for loading and running the AI model.

API Endpoints: The code itself does not define explicit API endpoints, but the Gradio inte

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5. Prompt Engineering

Purpose: Prompts are carefully crafted to guide the AI model to provide medical information. The disease_prediction and treatment_plan functions use specific prompts that include the user's input and a clear disclaimer about consulting a healthcare professional.

6. Deployment

The application can be launched and shared via a public URL using the app.launch(share=True) command. The provided document also shows that the deployment was in a Colab notebook.

7. API Endpoints

The application's functionality is handled by two main Python functions: disease_prediction and treatment_plan. These functions take user inputs and return AI-generated responses.

8. Authentication

The provided code does not include authentication. A warning is noted that the Hugging Face Hub token does not exist, but authentication is optional to access public models.

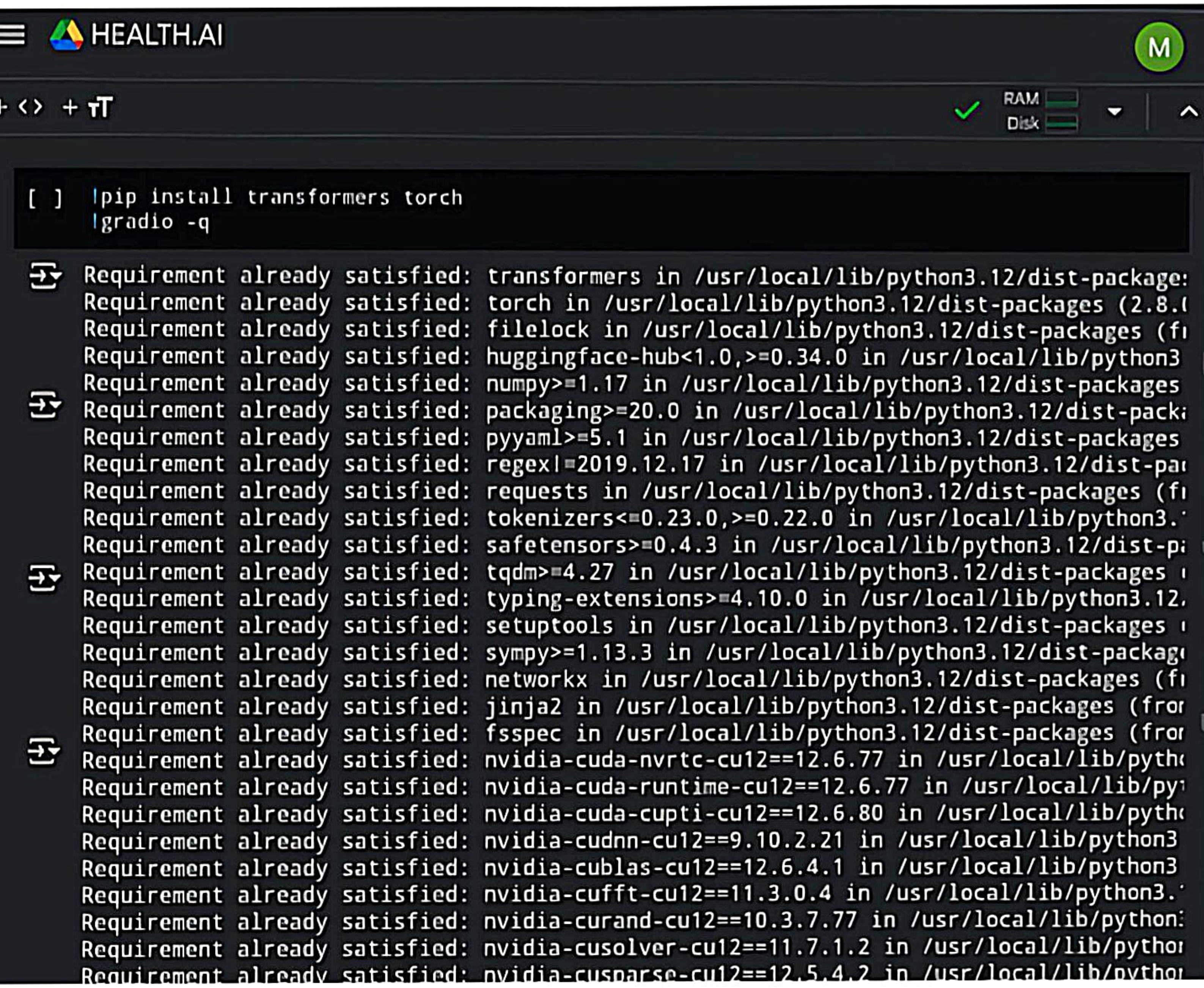
9. User Interface

The interface is created using gr.Blocks(). It features a main title and a disclaimer using gr.Markdown and is organized into two tabs with gr.Tabs and gr.TabItem for different functionalities. The layout uses gr.Row and gr.Column to arrange input and output components.

10.Testing

- UnitTesting– Prompt responsesandMLmodels.
- APITesting– Swagger&Postman.
- ManualTesting– File uploads, summarization, anomalydetection.
- EdgeCases– Invalidinputs, emptyPDFs,missingAPI keys.

11.Screenshot



```
[ ]  !pip install transformers torch
     !gradio -q

Requirement already satisfied: transformers in /usr/local/lib/python3.12/dist-package:
Requirement already satisfied: torch in /usr/local/lib/python3.12/dist-packages (2.8.(
Requirement already satisfied: filelock in /usr/local/lib/python3.12/dist-packages (fr
Requirement already satisfied: huggingface-hub<1.0,>=0.34.0 in /usr/local/lib/python3
Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.12/dist-packages
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.12/dist-packa
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.12/dist-packages
Requirement already satisfied: regex!=2019.12.17 in /usr/local/lib/python3.12/dist-pa
Requirement already satisfied: requests in /usr/local/lib/python3.12/dist-packages (fr
Requirement already satisfied: tokenizers<=0.23.0,>=0.22.0 in /usr/local/lib/python3.
Requirement already satisfied: safetensors>=0.4.3 in /usr/local/lib/python3.12/dist-pa
Requirement already satisfied: tqdm>=4.27 in /usr/local/lib/python3.12/dist-packages (
Requirement already satisfied: typing-extensions>=4.10.0 in /usr/local/lib/python3.12,
Requirement already satisfied: setuptools in /usr/local/lib/python3.12/dist-packages (
Requirement already satisfied: sympy>=1.13.3 in /usr/local/lib/python3.12/dist-packag
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Requirement already satisfied: nvidia-cuda-runtime-cu12==12.6.77 in /usr/local/lib/py
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.6.80 in /usr/local/lib/pytho
Requirement already satisfied: nvidia-cudnn-cu12==9.10.2.21 in /usr/local/lib/python3
Requirement already satisfied: nvidia-cublas-cu12==12.6.4.1 in /usr/local/lib/python3
Requirement already satisfied: nvidia-cufft-cu12==11.3.0.4 in /usr/local/lib/python3.
Requirement already satisfied: nvidia-curand-cu12==10.3.7.77 in /usr/local/lib/python3
Requirement already satisfied: nvidia-cusolver-cu12==11.7.1.2 in /usr/local/lib/pythor
Requirement already satisfied: nvidia-cusparse-cu12==12.5.4.2 in /usr/local/lib/pythor
```
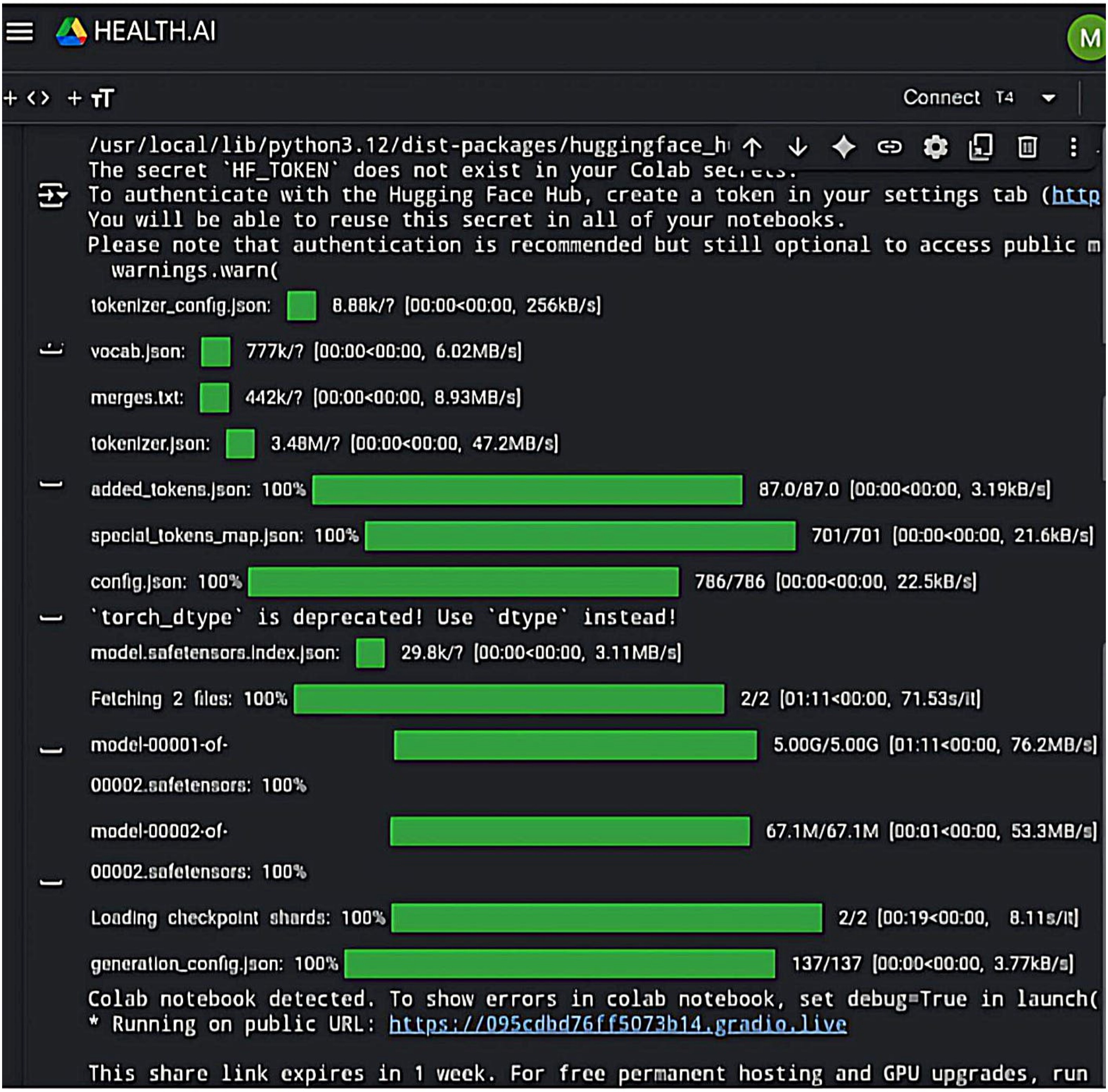
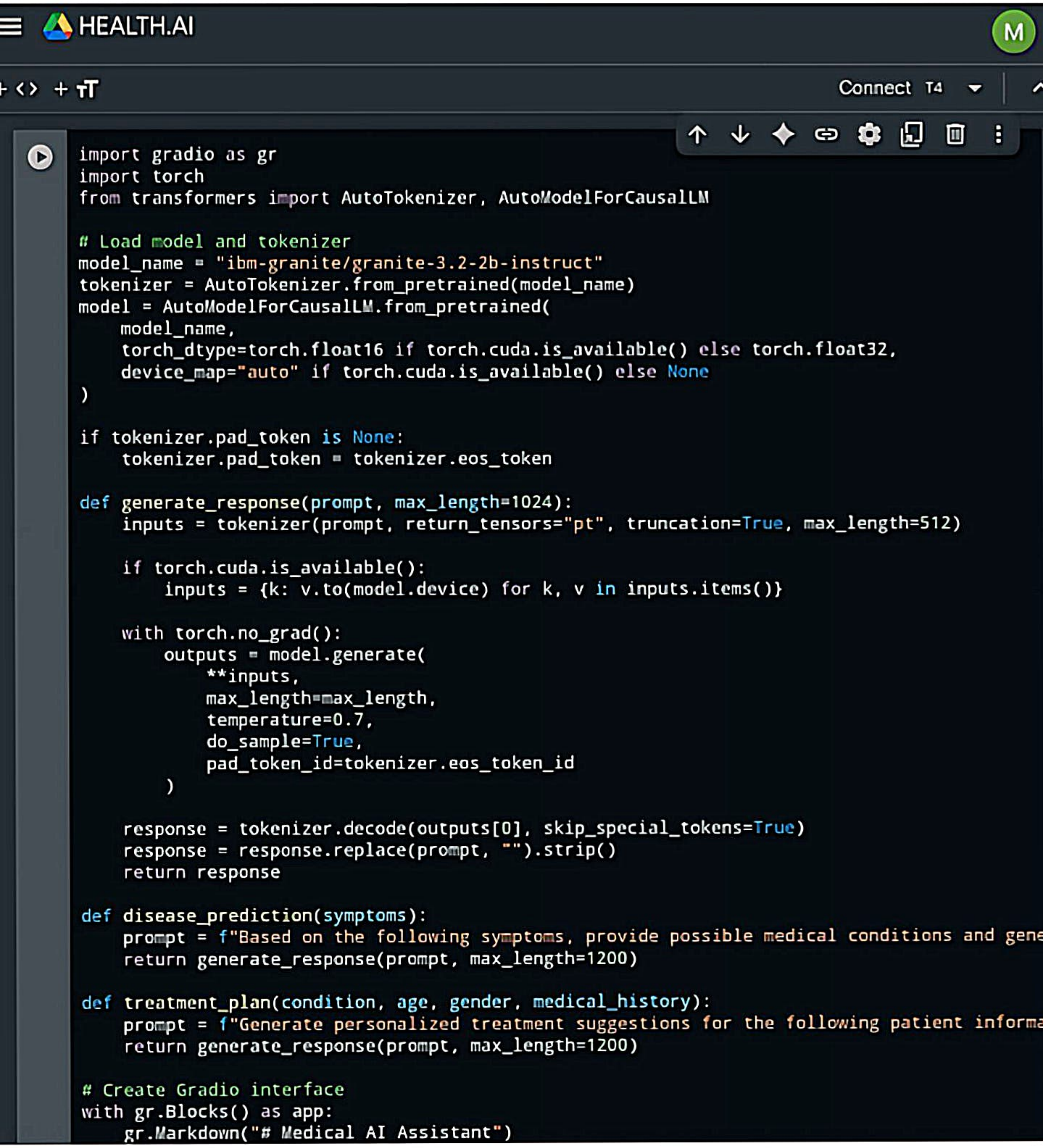
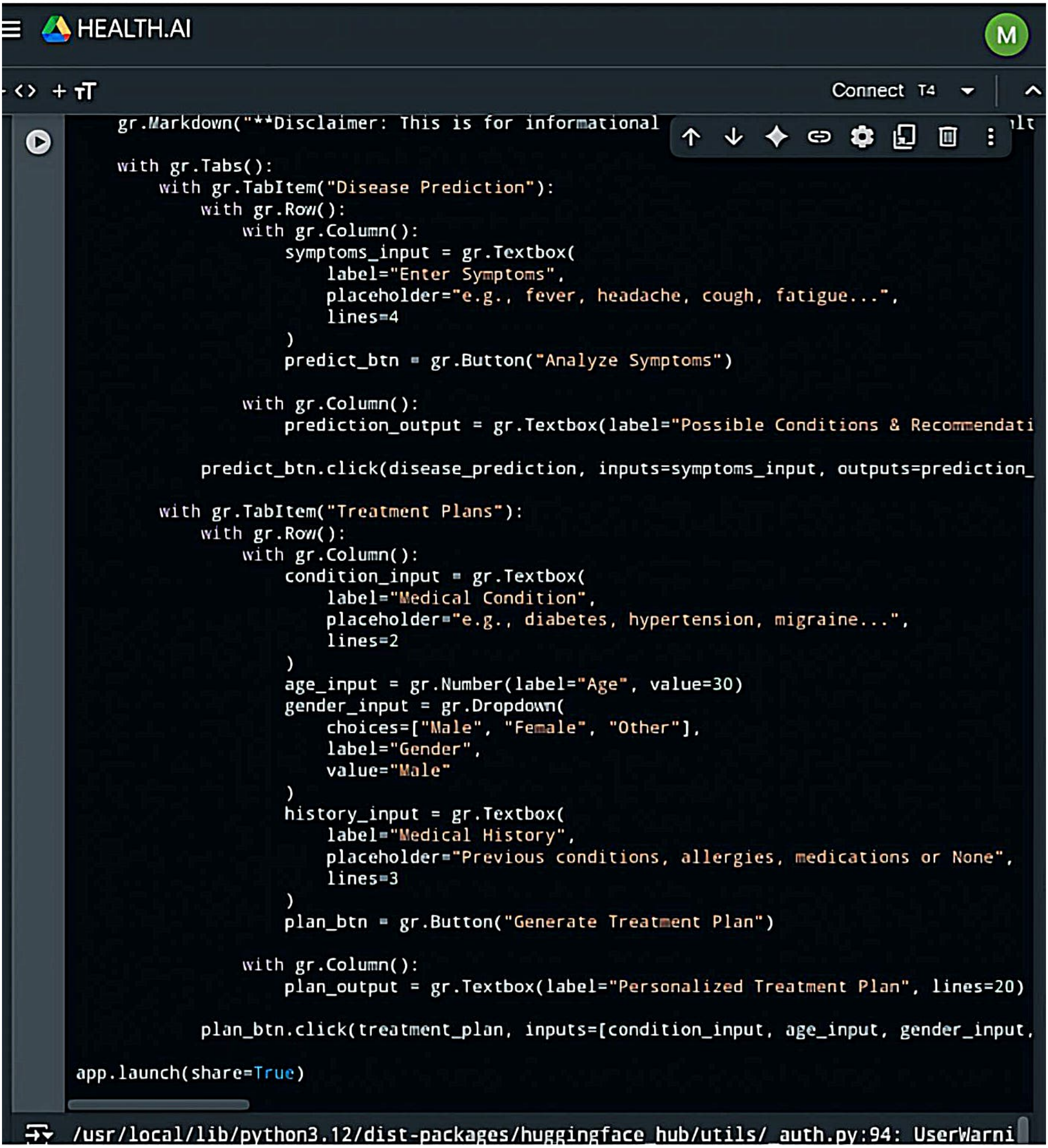



```
/usr/local/lib/python3.12/dist-packages/huggingface_h
The secret `HF_TOKEN` does not exist in your Colab secrets.
To authenticate with the Hugging Face Hub, create a token in your settings tab (http
You will be able to reuse this secret in all of your notebooks.
Please note that authentication is recommended but still optional to access public m
  warnings.warn(
tokenizer_config.json: 8.88k/? [00:00<00:00, 256kB/s]
vocab.json: 777k/? [00:00<00:00, 6.02MB/s]
merges.txt: 442k/? [00:00<00:00, 8.93MB/s]
tokenizer.json: 3.48M/? [00:00<00:00, 47.2MB/s]
added_tokens.json: 100% 87.0/87.0 [00:00<00:00, 3.19kB/s]
special_tokens_map.json: 100% 701/701 [00:00<00:00, 21.6kB/s]
config.json: 100% 786/786 [00:00<00:00, 22.5kB/s]
`torch_dtype` is deprecated! Use `dtype` instead!
model.safetensors.index.json: 29.8k/? [00:00<00:00, 3.11MB/s]
Fetching 2 files: 100% 2/2 [01:11<00:00, 71.53s/it]
model-00001-of-00002.safetensors: 100% 5.00G/5.00G [01:11<00:00, 76.2MB/s]
model-00002-of-00002.safetensors: 100% 67.1M/67.1M [00:01<00:00, 53.3MB/s]
Loading checkpoint shards: 100% 2/2 [00:19<00:00, 8.11s/it]
generation_config.json: 100% 137/137 [00:00<00:00, 3.77kB/s]
Colab notebook detected. To show errors in colab notebook, set debug=True in launch(
* Running on public URL: https://095cdbd76ff5073b14.gradio.live

This share link expires in 1 week. For free permanent hosting and GPU upgrades, run
```

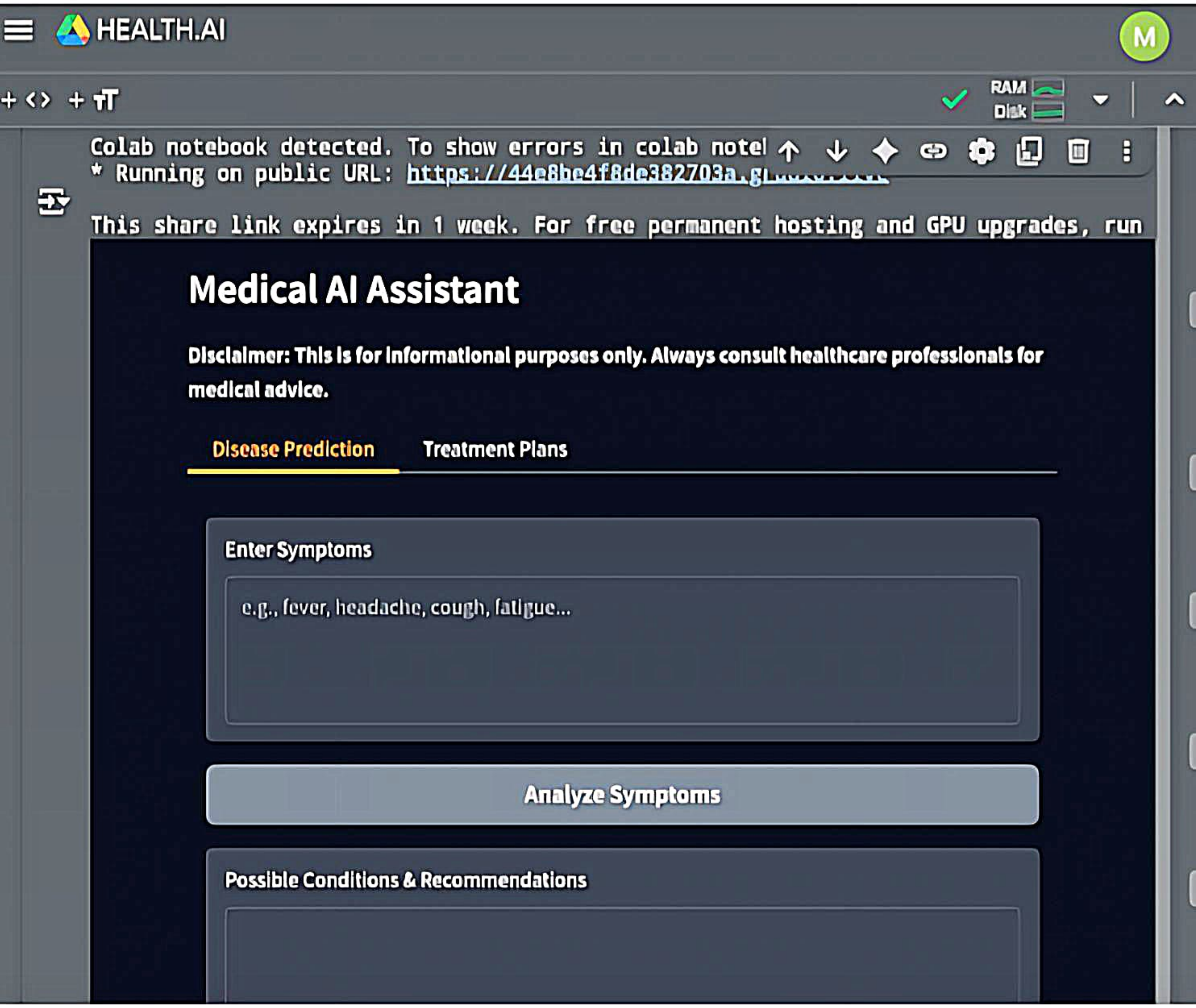


```python
import gradio as gr
import torch
from transformers import AutoTokenizer, AutoModelForCausalLM

# 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
        )

    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 gene
    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 informa
    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

    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 & Recommendati

            predict_btn.click(disease_prediction, inputs=symptoms_input, outputs=prediction_

        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,

app.launch(share=True)
```

```
/usr/local/lib/python3.12/dist-packages/huggingface_hub/utils/_auth.py:94: UserWarni
```



```
Colab notebook detected. To show errors in colab note
* Running on public URL: https://44e8be4f8de382703a.g

This share link expires in 1 week. For free permanent hosting and GPU upgrades, run
```

Medical AI Assistant

Disclaimer: This is for informational purposes only. Always consult healthcare professionals for medical advice.

Enter Symptoms

e.g., fever, headache, cough, fatigue...

Possible Conditions & Recommendations

12.KnownIssues

- Occasionallongresponse timeforlargePDFs.
- Forecastinglimitedto structuredCSVdata.
- Requires stable internetforIBMAPI access.

13.FutureEnhancements

- Addvoice-basedinteraction.
- Expandforecasting toinclude traffic&pollutiondata.
- Developamobileappversion.
- IntegratewithIoTsmartsensors.
- Supportmulti-languageoutputsfor localcommunities.