

HealthAI – Intelligent Healthcare Assistant

1.Introduction

- **Project Title:** Medical AI Assistant
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2.Project Overview

Purpose:

The Medical AI Assistant provides users with safe and intelligent healthcare insights through:

- Disease Prediction
- Treatment Plan Generation

It leverages **Hugging Face Transformers**, **PyTorch**, and **Gradio** inside **Google Colab** for accessible healthcare support.

Future Scope:

- Expand to include a patient chatbot.
- Add an analytics dashboard for health metrics.
- Multi-language support for regional users.

3.Architecture

Frontend (Gradio UI):

- Interactive tabs for disease prediction and treatment plan generation.

Backend (Python in Google Colab):

- Hugging Face `ibm-granite/granite-3.2-2b-instruct` model.
- PyTorch for inference.

Model Integration:

- Default Model: `ibm-granite/granite-3.2-2b-instruct`

- Guardrails: Ensures disclaimers and prevents unsafe responses.

4.Setup Instructions

Prerequisites:

- Python 3.9+
- Google Colab account
- Hugging Face access

Installation in Colab

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

Run the Application

```
app.launch(share=True)
```

5.Folder / Notebook Structure

```
medical_ai.ipynb
```

```
|
```

```
|— Model Loader
```

```
|— Disease Prediction
```

```
|— Treatment Plan
```

```
|— Guardrails
```

```
└— Gradio UI
```

6.Running the Application

- Open Google Colab.
- Upload and run `medical_ai.ipynb`.
- Install dependencies.

- Launch Gradio interface.
- Use tabs for prediction and treatment.

7.API Documentation

POST /prediction/analyze

- Input: Symptoms text.
- Output: Possible conditions + recommendations.

POST /treatment/plan

- Input: Condition, Age, Gender, Medical History.
- Output: Personalized treatment suggestions (with disclaimer).

8.User Interface

- **Tab 1:** Disease Prediction
- **Tab 2:** Treatment Plan

Each output includes a disclaimer:

“This is for informational purposes only. Always consult healthcare professionals.”

9.Testing

- **Unit Testing:** Prompt formatting, response validation.
- **Manual Testing:** Disease prediction and treatment plan accuracy.
- **Edge Cases:** Empty inputs, irrelevant text.

10. Screenshots

Medical AI Assistant

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

Disease Prediction

Treatment Plans

Enter Symptoms

| g., fever, headache, cough, fatigue...

Analyze Symptoms



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11.0output

Medical AI Assistant

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Disease Prediction

Treatment Plans

Enter Symptoms

Malaria

Analyze Symptoms

Possible Conditions & Recommendations

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes. It can lead to serious complications if left untreated, including anemia, organ failure, and death. Prompt, appropriate treatment is crucial for effective management and recovery.

- "Diagnosis":** If you suspect malaria, consult a healthcare professional immediately. They will perform blood tests (microscopy or rapid diagnostic tests) to confirm the presence of the *Plasmodium* parasites.
- "Medications":** The most common treatment for malaria is artemisinin-based combination therapies (ACTs). These are considered the most effective drugs against *Plasmodium falciparum*, the deadliest species of malaria parasite. The choice of ACT may vary depending on factors such as age, pregnancy status, and local resistance patterns.
 - "artemether + lumefantrine":** This is a popular choice for adults and pregnant women. It requires once-daily dosing for five days.
 - "malarone (atovaquone + proguanil)":** This is another effective option, especially for travelers. It is taken twice daily for five days.
 - "dihydroartemisinin-piperaquine":** This is an alternative for those who cannot take quinine, a drug often included in older malaria treatments. It's also taken once daily for five days.
- "Prevention":** Since malaria is primarily mosquito-borne, preventive measures are essential:
 - Use insect repellents and wear protective clothing (long sleeves and pants) when in malaria-prone areas.



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Disease Prediction Treatment Plans

Enter Symptoms

Malaria

Analyze Symptoms

Possible Conditions & Recommendations

3. ****Prevention****: Since malaria is primarily mosquito-borne, preventive measures are essential:

- Use insect repellents and wear protective clothing (long-sleeved shirts and long pants) when in malaria-endemic areas.

- Sleep under insecticide-treated bed nets.

- Consider taking antimalarial medications as prescribed by a healthcare provider before and during travel to high-risk regions.

4. ****Supportive care****: If you have malaria, supportive care is essential to manage symptoms and prevent complications:

- Stay hydrated with oral rehydration solutions.

- Manage fever with over-the-counter pain relievers (paracetamol or ibuprofen).

- Address any anemia-related complications with iron supplements or blood transfusions if necessary.

- Monitor kidney function if there are signs of kidney issues.

5. ****Follow-up****: After completing the malaria treatment course, follow up with a healthcare provider to ensure resolution of symptoms and no relapse.

6. ****Education****: Understand the importance of adhering to the full course of antimalarial medication, as incomplete treatment can lead to drug resistance and increased risk of severe malaria.

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Disease Prediction Treatment Plans

Enter Symptoms

Malaria

Analyze Symptoms

Possible Conditions & Recommendations

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6. ****Education****: Understand the importance of adhering to the full course of antimalarial medication, as incomplete treatment can lead to drug resistance and increased risk of severe malaria.

****Remember****: These recommendations are general and may vary based on individual health factors, local malaria transmission patterns, and the specific prescribed medication. Always consult with a healthcare professional for personalized advice and treatment.

Use via API Built with Gradio Settings



12.Treatment Plan

Medical AI Assistant

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Disease Prediction Treatment Plans

Medical Condition

Malaria

Age

19

Gender




Female

Medical History

None

Generate Treatment Plan

Personalized Treatment Plan

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13.Output

Medical AI Assistant

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Disease Prediction Treatment Plans

Medical Condition

Malaria

Age

19

Gender

Female

Medical History

None

Generate Treatment Plan

Personalized Treatment Plan

Strong evidence supporting garlic as a primary treatment for malaria. Use garlic supplements cautiously at home, but do not replace prescribed medication.

- **Ginger:** Ginger can help alleviate nausea, which is common with antimalarial drugs. You can consume ginger-infused tea or fresh ginger pieces. Be cautious with high doses, as they might interfere with blood thinning medications.
- **Increase Water Intake:** Stay hydrated by drinking plenty of fluids, especially if you have fever or vomiting.
- **Rest:** Allow your body to rest and recover, as malaria can be physically draining.



4. **Prevention and Follow-up:**

- After completing the course of medication, continue to take prophylactic antimalarials if advised by your healthcare provider for future travel to malaria-endemic areas.
- Follow up with your healthcare provider for any post-treatment concerns or recommendations.

5. **General Tips:**

- Carry a malaria diagnosis certificate if traveling internationally, as it may be required for entry and exit.
- Use insect repellent containing DEET (N,N-diethyl-meta-toluamide) and wear long-sleeved shirts and pants to protect against mosquito bites.

Remember, malaria is a serious disease that requires prompt and appropriate medical treatment. Always consult a healthcare professional for accurate diagnosis, treatment, and guidance regarding your specific situation.

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14.Known Issues

- Model may load slowly in Colab.
- Long responses may exceed token limits.

- Results are **not medical advice** (informational only).

15.Future Enhancements

- Add patient chatbot with safe guardrails.
- Add analytics dashboard (with Plotly).
- Multi-language support.
- Secure login & role-based access.

