Intelligent Healthcare Assistant - Project Report

Project Title

Intelligent Healthcare Assistant using IBM Granite LLM

Objective

To develop a smart assistant that provides healthcare-related support, such as symptom checking, treatment recommendations, patient chat, and disease prediction using AI and natural language processing.

Technologies Used

- Python
- Streamlit (Frontend)
- FastAPI/Flask (Backend)
- IBM Granite 3.3-2B Instruct
- IBM Cloud / Hugging Face
- Transformers, Torch, Pandas, Matplotlib

Modules/Features

1. Patient Chatbot
2. Symptom Checker
3. Disease Prediction
4. Treatment Plan Generator
5. Health Analytics Dashboard

Architecture

User Streamlit UI FastAPI Server IBM Granite Model Hugging Face

Optional: IBM Cloud DB

Input

- User Queries (e.g., 'I have a headache and fever')

- Health Records / Symptoms (CSV or form inputs)

- Vitals (e.g., BP, glucose level)

Output

- AI-generated response or suggestions

- Disease probability (ML model)

- Treatment advice (text)

- Visual charts and graphs

Dataset

- Heart Disease Dataset, Diabetes Dataset (Kaggle/UCI)

- Format: CSV with patient metrics

Model Inference Code

```
from transformers import AutoTokenizer, AutoModelForCausalLM
import torch

model_id = 'ibm-granite/granite-3.3-2b-instruct'
tokenizer = AutoTokenizer.from_pretrained(model_id)
model = AutoModelForCausalLM.from_pretrained(model_id)

prompt = 'What are the symptoms of diabetes?'
inputs = tokenizer(prompt, return_tensors='pt')
outputs = model.generate(**inputs, max_new_tokens=150)
response = tokenizer.decode(outputs[0], skip_special_tokens=True)
print(response)
```

Evaluation Metrics

- Response Relevance
- Prediction Accuracy
- Response Time
- User Satisfaction Score

Folder Structure

healthcare-assistant/

app.py

model_inference.py

ml_models/

data/

templates/

requirements.txt

README.md

Documentation

- Installation Guide
- Model Setup
- API Usage
- Sample Inputs/Outputs
- Screenshots of UI

Future Scope

- Integration with IoT health devices
- Multi-language support
- Secure patient record storage
- Real-time telemedicine chat