HealthAI: Intelligent Healthcare Assistant Using IBM Granite – Final Project Report

Structure of the Final Report

1. Title Page

Project Title: HealthAI: Intelligent Healthcare Assistant Using IBM Granite

Team Members:

Rajadurai P

Rajasekar M

Prakashraj D

Sherif Khan S

2. Abstract

The Health AI project is an innovative medical assistant designed to provide users with intelligent and personalized healthcare guidance. Leveraging the IBM Granite 3.2-2B Instruct model and advanced Natural Language Processing (NLP), the system analyzes user-provided symptoms to suggest possible health conditions and treatment options. The project features two primary modules: Disease Prediction and Treatment Planning. The Disease Prediction module interprets symptoms and provides potential conditions with general advice. The Treatment Planning module generates lifestyle suggestions, home remedies, and general medication guidelines based on patient details such as age, gender, and medical history. Developed with Python, PyTorch, Transformers, and Gradio, this AI system is user-friendly, accessible, and emphasizes safe use with disclaimers to consult medical professionals. The project demonstrates how AI can enhance healthcare support by offering preliminary assistance, especially in regions with limited medical access.

---

3. Introduction

Healthcare remains one of the most critical sectors worldwide, where timely diagnosis and treatment can significantly improve patient outcomes. However, limited access to doctors and rising medical costs pose challenges. Artificial Intelligence (AI) offers a promising solution to bridge this gap. Health AI aims to provide quick, preliminary health insights to users based on symptoms and medical history. While it does not replace professional consultation, it empowers individuals with better awareness of their health conditions.

---

4. Objectives

The key objectives of the Health AI project are:

To analyze patient symptoms and predict possible medical conditions.

To generate personalized treatment suggestions including home remedies.

To provide general medication guidelines in an easy-to-understand format.

To demonstrate the integration of AI models with a user-friendly Gradio interface.

To raise awareness while emphasizing the importance of professional healthcare consultation.

---

5. Literature Review

Several AI systems have been developed in healthcare, including symptom checkers, virtual assistants, and disease prediction models. Projects like IBM Watson Health, Ada Health, and Babylon AI provide valuable insights into the effectiveness of AI in medical guidance. However, most solutions are either commercial or limited to specific conditions. Health AI differentiates itself by providing a general, customizable, open-source solution built using transformer-based NLP models, offering flexibility and adaptability.

---

6. System Design & Architecture

The system architecture consists of the following components:

Input Layer: Collects user input in the form of symptoms, age, gender, and medical history.

NLP Model (IBM Granite 3.2-2B): Processes input data and generates meaningful predictions.

Processing Layer: Implements disease prediction and treatment planning logic.

Output Layer (Gradio Interface): Displays the predicted conditions and treatment suggestions in a structured format.

(A diagram can be included here for clarity.)

---

7. Implementation

The implementation uses the following tools and technologies:

Programming Language: Python

Libraries: Transformers, PyTorch, Gradio, Torch

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

Platform: Google Colab / Local Environment

Steps followed:

1. Loading and fine-tuning the pre-trained model.

2. Creating functions for disease prediction and treatment plan generation.

3. Designing a Gradio UI with tabs for different modules.

4. Testing and validating the outputs with different inputs.

---

8. Modules

(a) Disease Prediction

Input: Symptoms

Output: Possible medical conditions and general recommendations

Features: NLP-based interpretation of health data

(b) Treatment Planning

Input: Condition, Age, Gender, Medical History

Output: Personalized treatment suggestions, lifestyle tips, and medication guidelines

Features: Emphasizes safety by advising consultation with doctors

---

9. Results & Discussion

The Health AI system successfully provides preliminary health information to users. It demonstrates how AI can enhance healthcare awareness while reducing dependency on traditional consultations for minor conditions. Users tested the system with various symptom combinations and received relevant suggestions. Although the AI is effective in generating useful insights, the outputs depend on model knowledge and should not be treated as a replacement for professional diagnosis.

---

10. Conclusion & Future Work

The Health AI project proves the potential of artificial intelligence in improving healthcare accessibility. By combining NLP with an interactive interface, it creates a valuable tool for initial medical guidance. However, further improvements can be made, such as:

Adding support for multilingual inputs.

Integrating real medical datasets for better accuracy.

Extending modules for mental health and emergency conditions.

Deploying the system on cloud platforms for broader accessibility.

---

11. References

Hugging Face Transformers Documentation

IBM Granite Model Documentation

PyTorch Official Documentation

Gradio User Guide

Research papers on AI in Healthcare