HealthAI - Final Project Report

1. INTRODUCTION

1.1 Project Overview

HealthAI is an intelligent healthcare assistant platform that leverages IBM Watson Machine Learning and Generative AI to offer users accurate medical insights. Key features include Patient Chat, Disease Prediction, Personalized Treatment Plans, and Health Analytics. By integrating IBM's Granite-13b-instruct-v2 model and built with Streamlit, HealthAI aims to improve accessibility to reliable health information through a seamless, secure, and user-friendly interface.

1.2 Purpose

The purpose of HealthAI is to empower individuals with accessible, personalized, and trustworthy medical guidance, reducing dependency on manual diagnosis and increasing awareness of potential health conditions and treatment options.

2. IDEATION PHASE

2.1 Problem Statement

Many individuals lack timely access to accurate medical information and struggle with understanding symptoms, conditions, and appropriate next steps.

2.2 Empathy Map Canvas

Says: 'I'm unsure what my symptoms mean.'

Thinks: 'What if it's serious?'

Does: Searches symptoms online.

Feels: Anxious, confused, uncertain.

2.3 Brainstorming

- AI-based symptom checker

- Chatbot for medical queries

- Visual health analytics

- Secure patient profile integration

- Personalized treatment recommendations

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. User logs in securely

2. Enters symptoms into chat

3. Receives condition predictions

4. Views suggested treatments

5. Monitors progress with health analytics

3.2 Solution Requirement

- NLP-based symptom processing

- Generative AI for response generation

- Secure API key handling

- Visual dashboard for analytics

- Scalable cloud deployment

3.3 Data Flow Diagram

User Input IBM Watson NLP Disease Prediction Model Response Generation UI Output

Analytics & Visualization

3.4 Technology Stack

Frontend: Streamlit

Backend: Python, IBM Watson Machine Learning

AI Model: Granite-13b-instruct-v2

Deployment: IBM Cloud

Security: API key management, data privacy practices

4. PROJECT DESIGN

4.1 Problem-Solution Fit

Users need a trustworthy assistant for health-related decisions. HealthAI addresses this by offering AI-powered, real-time medical insights.

4.2 Proposed Solution

An AI-driven platform that uses advanced language models to interpret symptoms, provide condition predictions, suggest treatments, and monitor health trends.

4.3 Solution Architecture

Input Layer: User interface (Streamlit)

Processing Layer: IBM Watson NLP, Granite-13b-instruct-v2

Output Layer: Disease prediction, treatment plan, analytics dashboard

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Week 1: Requirement gathering

Week 2-3: Design and UI

Week 4-5: Integration

Week 6: Testing and deployment

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

- Load testing on symptom input

- Response time validation

- Accuracy with known conditions

7. RESULTS

7.1 Output Screenshots

(*Attach screenshots of the Patient Chat interface, Disease Prediction results, and Analytics Dashboard here*)

8. ADVANTAGES & DISADVANTAGES

Advantages:

- 24/7 availability

- Personalized insights

- Scalable and secure

- Visual health tracking

Disadvantages:

- Not a clinical diagnosis

- Relies on user input

- Requires internet connectivity

9. CONCLUSION

HealthAI is a comprehensive AI-powered healthcare assistant that bridges the information gap between patients and medical insights. It supports users in making informed health decisions.

10. FUTURE SCOPE

- Wearable device integration

- Multilingual support

- EHR integration

- Diagnostic image analysis

11. APPENDIX - Source Code

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>HealthAI - Disease Prediction</title>
            <link   href="https://cdn.jsdelivr.net/npm/tailwindcss@2.2.19/dist/tailwind.min.css"
rel="stylesheet">
    <style>body {font-family: 'Arial', sans-serif; background-color: #f7fafc;}</style>
</head>
<body>
    <div class="container">
        <div class="header"><h1>HealthAI - Disease Prediction</h1></div>
        <div class="input-area">
            <h2>Describe Your Symptoms</h2>
            <textarea id="symptoms-input"></textarea>
            <button id="predict-btn">Predict Conditions</button>
```

```
        </div>
        <div id="result-area" class="hidden"><div id="predictions"></div></div>
    </div>
    <script>
        document.getElementById('predict-btn').addEventListener('click', function() {
            const symptoms = document.getElementById('symptoms-input').value.trim();
            if (!symptoms) { alert("Please enter your symptoms."); return; }
            const simulatedResponse = [
                {condition: "Migraine", likelihood: "High", nextSteps: "Rest and hydrate."},
                        {condition: "Viral Infection", likelihood: "Medium", nextSteps: "Monitor
symptoms."}
            ];
            const predictionsDiv = document.getElementById('predictions');
            predictionsDiv.innerHTML = "";
            simulatedResponse.forEach(pred => {
                const div = document.createElement('div');
                div.innerHTML = `<strong>Condition:</strong> ${pred.condition}<br>
                                 <strong>Likelihood:</strong> ${pred.likelihood}<br>
                                 <strong>Next Steps:</strong> ${pred.nextSteps}`;
                predictionsDiv.appendChild(div);
            });
            document.getElementById('result-area').classList.remove('hidden');
        });
    </script>
</body>
</html>
```