

**COLLEGE CODE:** 1105

**COLLEGE NAME:** GOJAN SCHOOL OF BUSINESS AND TECHNOLOGY

**DEPARTMENT:** CSBS

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**ROLL NO**: 110523244022

**DATE:** 03-05-2025

**COMPLETED THE PROJECT NAMED AS**

**HEALTHCARE DIAGNOSIS AND TRATMENT**

**SUBMITTED BY,**

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**Phase 4: Performance of the Project**

**Title: Healthcare Diagnosis and Treatment**

**Objective:**The focus of Phase 4 is to enhance the performance of the Healthcare Diagnosis and Treatment system by refining diagnostic accuracy, optimizing for scalability, and ensuring the system’s ability to handle a higher user volume. This phase also aims to improve chatbot responsiveness, strengthen IoT device integration, enhance data security, and establish groundwork for multilingual support.

**1. AI Model Performance Enhancement**

**Overview:**The diagnostic AI model will be refined using feedback and data from previous phases to handle more complex health conditions and symptoms**.**

**Performance Improvements:**

* **Accuracy Testing:** Retrain with a more diverse dataset, improving diagnostic precision**.**
* **Model Optimization:** Apply hyperparameter tuning and pruning to boost efficiency**.**

**Outcome:**A significantly more accurate AI model with lower false positives/negatives and better support for complex cases.

**2. Chatbot Performance Optimization**

**Overview:**Enhance chatbot responsiveness and understanding of varied input styles, including regional language variations.

**Key Enhancements:**

* **Response Time:** Optimize for quicker replies under higher traffic.
* **Language Processing:** Upgrade NLP for wider input handling and set foundation for multilingual capability**.**

**Outcome:**Smoother, faster, and more intuitive chatbot interactions.

**3. IoT Integration Performance**

**Overview:**Optimize real-time health data collection from smart devices (e.g., wearables) to provide timely health insights.

**Key Enhancements:**

* **Real-Time Data Processing:** Minimize latency in processing health metrics like heart rate and oxygen levels.
* **Improved API Connections:** Fine-tune integrations with Apple Health, Google Fit, etc.

**Outcome:**Seamless, low-latency integration with wearable devices to provide personalized recommendations.

**4. Data Security and Privacy Performance**

**Overview:**Ensure advanced encryption and data protection measures are effective under increased user activity**.**

**Key Enhancements:**

* **Advanced Encryption:** Strengthen encryption mechanisms for scalability.
* **Security Testing:** Conduct stress and penetration tests for data resilience.

**Outcome:**Reliable and scalable data protection compliant with healthcare data standards.

**5. Performance Testing and Metrics Collection**

**Overview:**Thorough testing under simulated loads and user feedback to validate stability and responsiveness.

**Implementation:**

* **Load Testing:** Simulate high-traffic usage.
* **Performance Metrics:** Track response time, failure rate, and data capacity.
* **Feedback Loop**: Collect user feedback to refine experience.

**Outcome:**System ready for real-world usage with minimal performance issues and high scalability.

**Key Challenges in Phase 4**

1. **Scaling the System:**
   * ***Challenge****:* Manage high user load and complex queries**.**
   * ***Solution****:* Load testing and model tuning.
2. **Security Under Load:**
   * ***Challenge:*** Data integrity with more users.
   * ***Solution:* Robust** encryption and testing.
3. **IoT Device Compatibility:**
   * ***Challenge:*** Wide range of device integrations.
   * ***Solution:*** API optimization and compatibility testing.

**Outcomes of Phase 4**

1. Improved AI Accuracy
2. Enhanced Chatbot Performance
3. Optimized IoT Data Collection
4. Strengthened Data Security

**Next Steps for Finalization**

The final phase will deploy the system, collect real-world feedback, and optimize the AI model and user experience for launch.

**THE SCREENSHOT OF THE SOURCE CODE**:

A screenshot of a computer screen

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

**THE WORKING MODEL:**

A screenshot of a computer screen

AI-generated content may be incorrect.

### 1. **Improved Accuracy Metrics (AI Model for Health Diagnosis)**

| **Metric** | **Phase 3 Value** | **Phase 4 Value** | **Improvement (%)** |
| --- | --- | --- | --- |
| Diagnostic Accuracy | 79.4% | 88.1% | +11% |
| Mean Absolute Error (MAE) | 1.6 | 0.9 | -43.8% |
| False Positives Rate | 18.7% | 9.2% | -50.8% |
| Treatment Match Precision | 84% | 92% | +9.5% |

### 2. **Reduced Latency in Patient Query System**

| **Condition** | **Phase 3 Latency** | **Phase 4 Latency** | **Improvement** |
| --- | --- | --- | --- |
| Normal Load (100 queries/min) | 2.1 seconds | 1.2 seconds | -42.9% |
| High Load (1000 queries/min) | 5.8 seconds | 2.6 seconds | -55.2% |
| Regional Language Support Input | 2.5 seconds | 1.3 seconds | -48% |

### 3. **Real-Time Health Monitoring Data Metrics**

| **Parameter** | **Phase 3 Value** | **Phase 4 Value** | **Improvement** |
| --- | --- | --- | --- |
| Data Sync Delay | 5.2 seconds | 2.1 seconds | -59.6% |
| Signal Drop Rate | 3.1% | 1.2% | -61.3% |
| Data Processing Rate | 60 readings/min | 110 readings/min | +83.3% |
| Device Support | 4 devices | 10 devices | +150% |