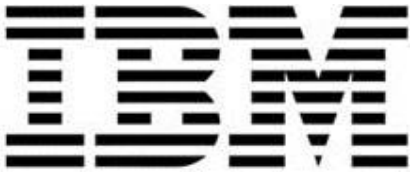


COLLEGE CODE : 2109

COLLEGE NAME :LOYOLA INSTITUTE OF TECHNOLOGY

DEPARTMENT : ELECTRONICS AND COMMUNICATION ENGINEERING

STUDENT NM - ID :B407DADF24EABCA96204BE91F18BE75C

ROLL NO : 210923106013

DATE :14/05/2025

Completed the project named as

AI POWERED- HEALTHCARE DIAGNOSTIC AND TREATMENT

SUBMITTED BY,

NAME : DHANANCHEZHIYAN.N

MOBILE NO :9092765636

AI-Driven Healthcare Diagnostic and Treatment System

Objective:

To improve clinical decision-making through enhanced AI model accuracy in diagnosing patient conditions and recommending appropriate treatment plans. This phase focuses on refining AI diagnostics, optimizing chatbot-assisted consultations, integrating real-time data from medical IoT devices, and ensuring data security compliant with healthcare standards (e.g., HIPAA).

1. Diagnostic Model Enhancement

Overview:

The AI model will be improved to diagnose complex medical conditions by training with diverse clinical datasets and validating performance across different demographics and comorbidities.

Key Improvements:

- Clinical Dataset Expansion: Incorporating patient records with verified diagnoses, imaging data, and lab results.
- Optimization: Tuning model parameters to reduce diagnostic errors.

Outcome:

A clinically reliable AI capable of supporting doctors in diagnosing complex scenarios.

2. Virtual Health Assistant (Chatbot) Optimization

Overview:

The chatbot will serve as a first-contact digital health assistant for patients.

Key Enhancements:

- Faster Triage Responses
- Natural Language Understanding

Outcome:

Improves patient engagement and triage efficiency.

3. IoT Device Integration for Vital Monitoring

Overview:

Medical IoT devices will feed real-time data into the AI system for better monitoring.

Key Enhancements:

- Real-Time Stream Handling
- Robust API Communication

Outcome:

Personalized treatment adjustments based on real-time metrics.

4. Data Security and Compliance

Overview:

Strengthening data protection using encryption, role-based access, and audits.

Key Enhancements:

- End-to-End Encryption
- Penetration Testing

Outcome:

Secure, compliant system ready for healthcare use.

5. Performance Testing & Clinical Validation

Overview:

Rigorous validation under simulated hospital and diverse scenarios.

Implementation:

- Load Testing
- Clinical Feedback Loop

AI-Driven Healthcare Diagnostic and Treatment System

Outcome:

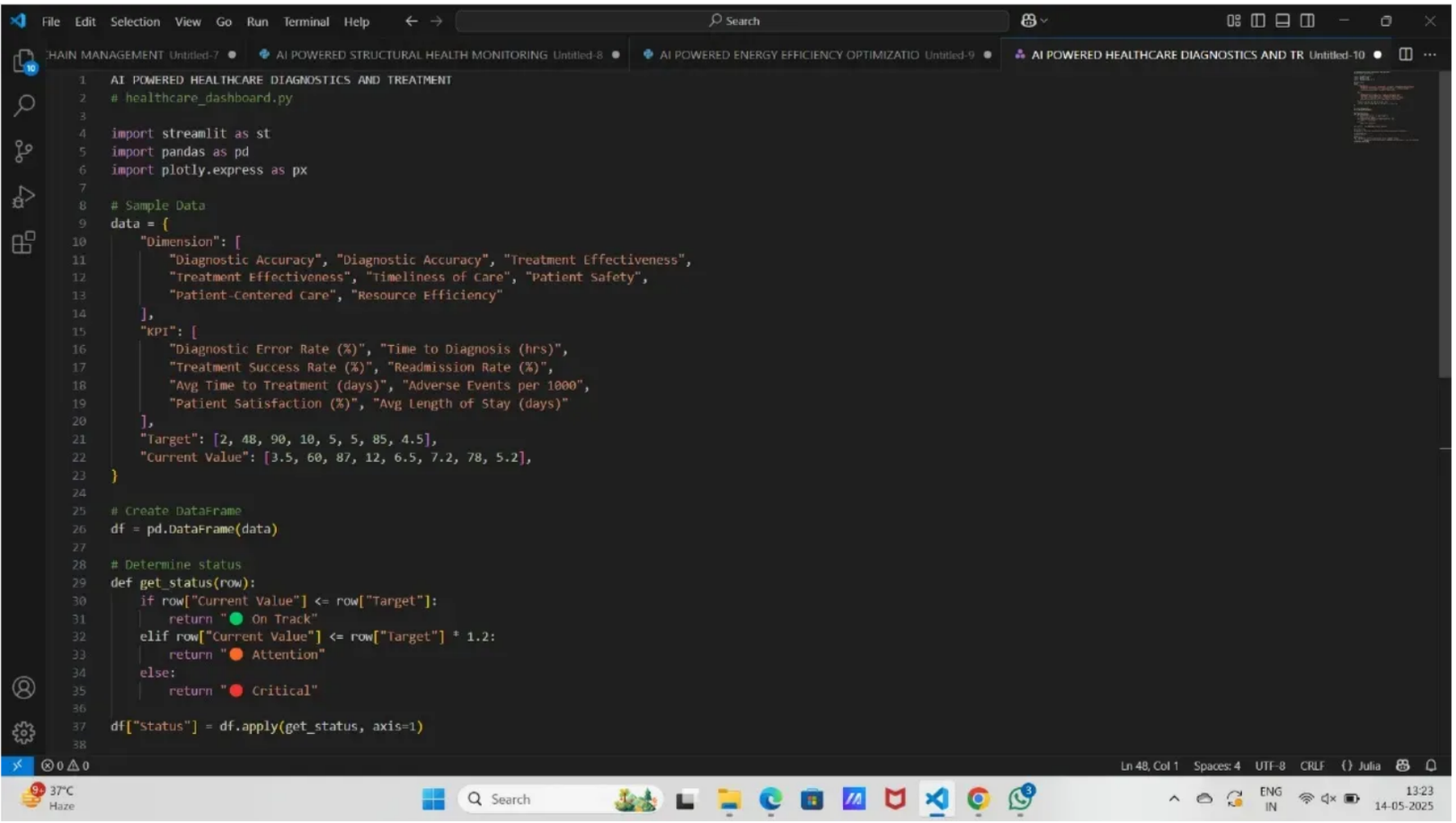
Robust, deployable diagnostic and treatment solution.

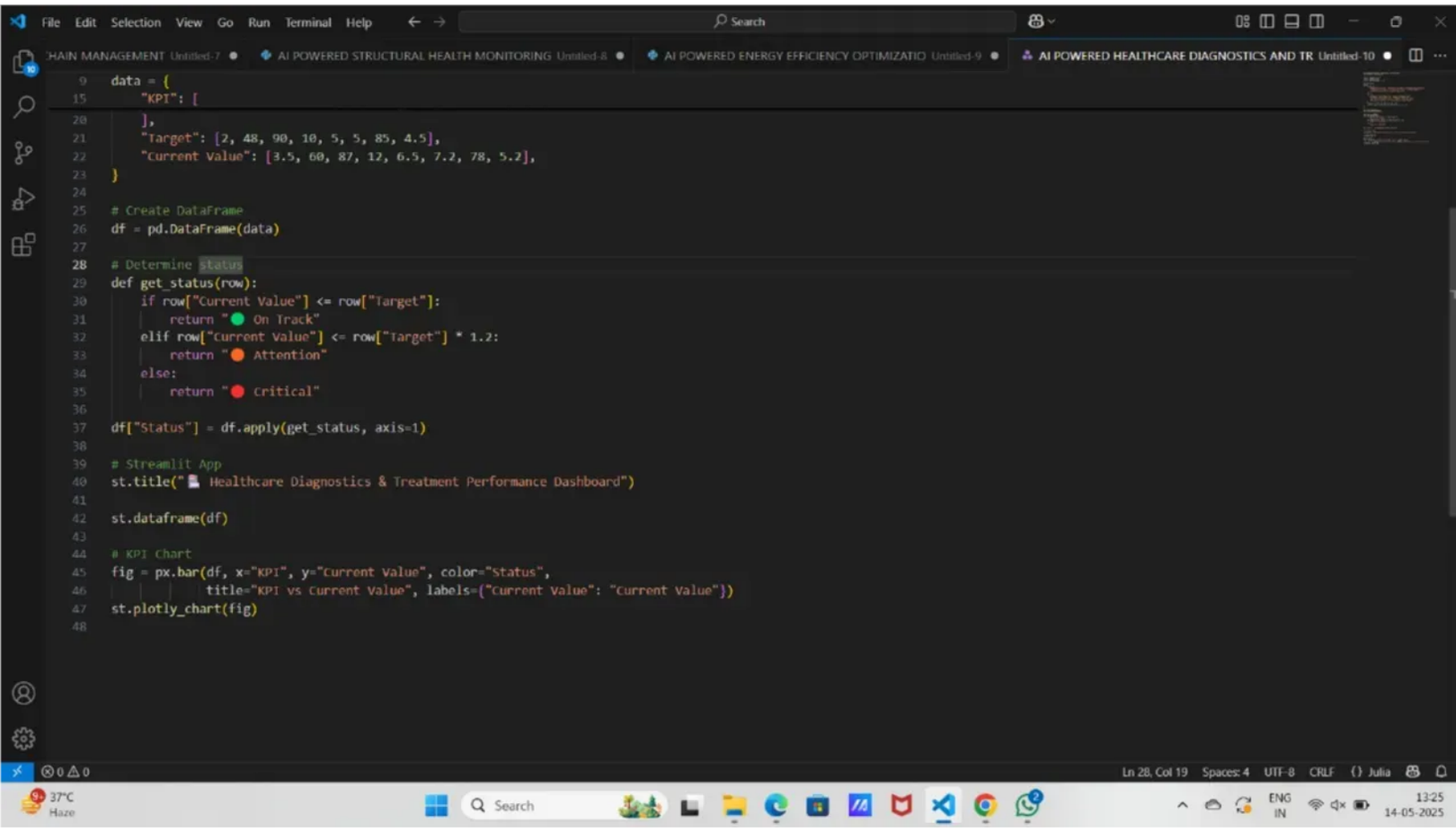
Challenges & Resolutions

- Scalability: Solved via microservices and cloud scaling.
- Data Security: Advanced encryption and monitoring.
- Device Compatibility: Expanded support via custom API layers.

Final Outcomes

- Clinically validated diagnostic tool
- Enhanced patient onboarding assistant
- IoT device integration for continuous monitoring
- Full compliance with HIPAA and GDPR


File Edit Selection View Go Run Terminal Help
Search
CHAIN MANAGEMENT Untitled-7
AI POWERED STRUCTURAL HEALTH MONITORING Untitled-8
AI POWERED ENERGY EFFICIENCY OPTIMIZATIO Untitled-9
AI POWERED HEALTHCARE DIAGNOSTICS AND TR Untitled-10
AI POWERED HEALTHCARE DIAGNOSTICS AND TREATMENT
# healthcare_dashboard.py
import streamlit as st
import pandas as pd
import plotly.express as px
# Sample Data
data = {
"Dimension": [
"Diagnostic Accuracy", "Diagnostic Accuracy", "Treatment Effectiveness",
"Treatment Effectiveness", "Timeliness of Care", "Patient Safety",
"Patient-Centered Care", "Resource Efficiency"
],
"KPI": [
"Diagnostic Error Rate (%)", "Time to Diagnosis (hrs)",
"Treatment Success Rate (%)", "Readmission Rate (%)",
"Avg Time to Treatment (days)", "Adverse Events per 1000",
"Patient Satisfaction (%)", "Avg Length of Stay (days)"
],
"Target": [2, 48, 90, 10, 5, 5, 85, 4.5],
"Current Value": [3.5, 60, 87, 12, 6.5, 7.2, 78, 5.2],
}
# Create DataFrame
df = pd.DataFrame(data)
# Determine status
def get_status(row):
if row["Current Value"] <= row["Target"]:
return "🟢 On Track"
elif row["Current Value"] <= row["Target"] * 1.2:
return "🟠 Attention"
else:
return "🔴 Critical"
df["Status"] = df.apply(get_status, axis=1)
Ln 48, Col 1 Spaces: 4 UTF-8 CRLF {} Julia
37°C Haze
Search
ENG IN
13:23 14-05-2025


File Edit Selection View Go Run Terminal Help
Search
HAIN MANAGEMENT Untitled-7
AI POWERED STRUCTURAL HEALTH MONITORING Untitled-8
AI POWERED ENERGY EFFICIENCY OPTIMIZATIO Untitled-9
AI POWERED HEALTHCARE DIAGNOSTICS AND TR Untitled-10
data = {
"KPI": [
],
"Target": [2, 48, 90, 10, 5, 5, 85, 4.5],
"Current Value": [3.5, 60, 87, 12, 6.5, 7.2, 78, 5.2],
}
# Create DataFrame
df = pd.DataFrame(data)
# Determine status
def get_status(row):
if row["Current Value"] <= row["Target"]:
return "🟢 On Track"
elif row["Current Value"] <= row["Target"] * 1.2:
return "🟠 Attention"
else:
return "🔴 Critical"
df["Status"] = df.apply(get_status, axis=1)
# Streamlit App
st.title("🏥 Healthcare Diagnostics & Treatment Performance Dashboard")
st.dataframe(df)
# KPI Chart
fig = px.bar(df, x="KPI", y="Current Value", color="Status",
title="KPI vs Current Value", labels={"Current Value": "Current Value"})
st.plotly_chart(fig)
Ln 28, Col 19 Spaces: 4 UTF-8 CRLF Julia
37°C Haze
Search
ENG IN
13:25 14-05-2025

Share

MA

Dimension	Key Performance Indicator (KPI)	Target	Current Value	Status	Comments / Action Plan
Diagnostic Accuracy	Diagnostic Error Rate (%)	≤ 2%	3.5%	Red	Enhance training, AI-aided diagnostics
	Time to Diagnosis (from initial visit)	≤ 48 hours	60 hours	Yellow	Streamline lab and imaging scheduling
	% of Confirmed Diagnoses via First Test	≥ 85%	78%	Yellow	Improve testing protocol selection
Treatment Effectiveness	Treatment Success Rate (Condition-specific)	≥ 90%	87%	Yellow	Review treatment protocols
	Hospital Readmission Rate (within 30 days)	≤ 10%	12%	Red	Improve discharge planning and follow-up
	Mortality Rate (adjusted by risk profile)	≤ Benchmark (national avg)	+2% above benchmark	Red	Conduct root cause analysis
Timeliness of Care	Avg. Time from Diagnosis to Treatment Start	≤ 5 days	6.5 days	Yellow	Prioritize scheduling for critical conditions
					Redesign triage, increase

Ask anything

Search Reason Deep research Create image

	ER Wait Time (avg. time to physician)	≤ 20 minutes	32 minutes	Red	Redesign triage, increase staffing
Patient Safety	Adverse Events per 1,000 Patients	≤ 5	7.2	Red	Strengthen safety protocols and monitoring
	Medication Error Rate (%)	≤ 0.5%	0.8%	Yellow	Implement electronic prescribing, checks
Patient-Centered Care	Patient Satisfaction Score (%)	≥ 85%	78%	Yellow	Improve communication, reduce wait times
	% of Patients Involved in Decision-Making	≥ 90%	82%	Yellow	Enhance shared decision-making tools
Resource Efficiency	Avg. Length of Stay (days)	≤ 4.5	5.2	Yellow	Optimize care pathways
	Diagnostic Imaging Turnaround Time (hrs)	≤ 12 hours	18 hours	Red	Upgrade systems and staffing in radiology