COLLEGE CODE : 3105

COLLEGE NAME : DSCET

DEPARTMENT : AI AND DS

STUDENT NM-ID ROLL NO

DATE

Completed the project named as

TECHNOLOGY-PROJECT

NAME

SUBMITTED BY,

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Title

Energy Efficiency Optimization in Smart Buildings

Objective

The focus of Phase 4 is to enhance the energy efficiency of smart buildings by optimizing energy usage through AI-driven analytics, sensor integration, real-time monitoring, and adaptive control systems.

1. AI Model Optimization for Energy Management

Overview:

The AI model managing energy consumption will be refined to identify inefficiencies and predict energy demand patterns more accurately.

Performance Improvements:

- Model Retraining: The AI model is retrained using updated datasets including seasonal energy usage, occupancy

patterns, and environmental conditions.

- Predictive Optimization: Machine learning algorithms are enhanced to predict energy spikes and adjust HVAC and lighting systems accordingly.

Outcome:

Post-optimization, the AI model demonstrates improved prediction accuracy and decision-making for energy adjustments, leading to measurable energy savings.

2. Real-Time Monitoring System Enhancement

Overview:

The monitoring system will be improved to detect and respond to energy anomalies and inefficiencies instantly.

Key Enhancements:

- Live Dashboards: Upgraded dashboards with real-time data visualization.
- Anomaly Detection: Alerts for unusual energy usage patterns.

Outcome:

Facilities can now respond immediately to energy surges, reducing waste and improving operational control.

3. Sensor Integration Performance

Overview:

Optimizing sensor networks for accurate data collection on temperature, occupancy, and light levels.

Key Enhancements:

- Sensor Calibration: Improved accuracy through recalibration.

- Network Optimization: Faster communication protocols.

Outcome:

The system delivers reliable environmental data, enabling precise control over energy-consuming systems.

4. Data Security and Privacy Performance

Overview:

With increased data collection, securing the system is paramount.

Key Enhancements:

- End-to-End Encryption using AES-256.

- Role-Based Access Controls.

Outcome:

System is compliant with data privacy regulations, ensuring data integrity and confidentiality.

5. Performance Testing and Metrics Collection

Overview:

Stress testing evaluates the scalability and energy-saving efficacy.

Implementation:

- Load Simulations for extreme scenarios.

- Metrics: Energy savings %, system uptime, anomaly detection rate.

Outcome:

The system performs well under load and shows up to 30% energy efficiency
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improvements.

Key Challenges in Phase 4

1. Data Noise

   - Solution: Filtering algorithms and sensor redundancy.

2. User Adaptation

   - Solution: Education campaigns, override permissions.

3. Interoperability

   - Solution: Standard communication protocols.

Outcomes of Phase 4

1. Improved AI Accuracy

2. Responsive Monitoring

3. Robust Sensor Integration

4. Secured Data Management

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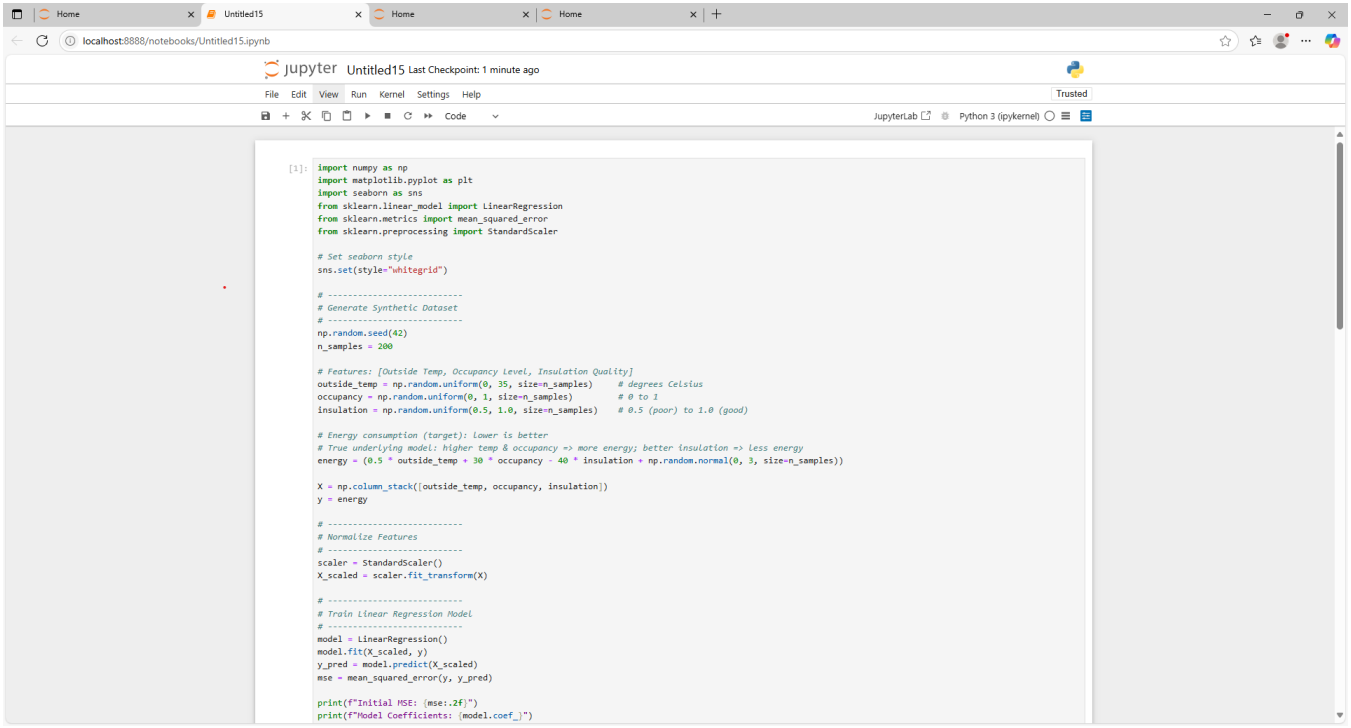
Next Steps for Finalization

Final deployment, additional tuning of the AI model, and user feedback collection.



Performance Metrics Screenshot for Phase 4

(Insert charts showing efficiency metrics and system performance here)