

SMART HOME ENERGY MANAGEMENT SYSTEM

PRESENTED BY

BASHA SHAIK

KKR & KSR INSTITUTE OF TECHNOLOGY AND SCIENCES

ARTIFICIAL INTELLIGENCE

PROBLEM STATEMENT

- **Energy consumption in residential areas is often inefficient.**
- **Leads to higher utility bills and environmental impact.**
- **Homeowners lack effective tools to monitor and optimize energy usage.**
- **Need for an intelligent system to manage and reduce energy consumption.**

PROPOSED SYSTEM/SOLUTION

- **Develop a smart home energy management system.**
- **Uses machine learning to monitor, analyze, and optimize energy usage.**
- **Controls smart appliances, predicts energy demand.**
- **Suggests energy-saving actions to homeowners.**

SYSTEM DEVELOPMENT APPROACH

Data Collection and Preprocessing:

- **Use smart meters and IoT sensors to collect real-time energy consumption data.**
- **Gather data from smart appliances and HVAC systems.**
- **Preprocess data to remove noise and ensure accuracy.**

Machine Learning Model Development:

- **Use Python and libraries like Pandas, Scikit-learn, and TensorFlow.**
- **Implement algorithms for demand forecasting, anomaly detection, and optimization**

system Integration:

- **Develop a web-based dashboard using Django or Flask for user interaction.**
- **Use MQTT or other protocols for IoT device communication.**
- **Employ cloud platforms for data storage and model deployment.**

ALGORITHM & DEPLOYMENT

Algorithm:-

Use time-series forecasting algorithms (e.g., ARIMA, LSTM) for energy demand prediction.

- Implement anomaly detection to identify unusual consumption patterns.
- Apply optimization algorithms to schedule and control smart appliances efficiently.

Deployment:-

- Deploy models on a cloud server with real-time data integration.
- Set up a web-based dashboard for monitoring and control.
- Ensure secure communication between devices and the server.

RESULT

The smart home energy management system reduces energy consumption.

Optimizes appliance usage.

Provides actionable insights to homeowners.

Evaluated using metrics such as energy savings, cost reduction, and user satisfaction.

CONCLUSION

- Demonstrates potential in reducing residential energy consumption and costs.
- Leverages machine learning and IoT for better control and visibility.
- Improves homeowner engagement and satisfaction.

FUTURE SCOPE

Scalability: Manage multiple homes or residential complexes.

Advanced Analytics: More advanced ML techniques for better prediction and optimization.

Renewable Integration: Integrate with home renewable energy sources.

User Experience: Enhance the dashboard and mobile app for better user experience.

REFERENCE

- **Research papers on energy management and optimization techniques.**
- **Documentation for IoT protocols and smart home devices.**
- **Case studies on smart energy solutions and their impact.**

COURSE CERTIFICATE

In recognition of the commitment to achieve
professional excellence



BASHA SHAIK

Has successfully satisfied the requirements for:

Getting Started with Enterprise-grade AI



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THANK YOU