**Problem Statement:**

**Develop an AI-based system using Python to measure and analyze energy consumption in residential and commercial buildings. The project aims to address the following key challenges:**

**1. Data Collection: Gather comprehensive data on energy consumption, including electricity, gas, and water usage, from various sensors and meters installed in buildings.**

**2. Data Preprocessing: Clean and preprocess the collected data, handling missing values, outliers, and ensuring data consistency.**

**3. Feature Engineering: Create meaningful features from the raw data, such as daily, weekly, and monthly energy usage patterns, weather conditions, and occupancy information.**

**4. Machine Learning Model: Develop a predictive model using machine learning techniques to estimate energy consumption. The model should consider factors like historical usage, external factors (e.g., temperature, humidity), and occupancy patterns.**

**5. Real-time Monitoring: Implement a real-time monitoring system that continuously collects data and updates predictions, providing insights into current and future energy consumption trends.**

**6. Anomaly Detection: Incorporate anomaly detection algorithms to identify unusual spikes or drops in energy consumption, which may indicate faults or inefficiencies in the building's systems.**

**7. User Interface: Create a user-friendly interface or dashboard that allows users to visualize and interact with energy consumption data, view predictions, and set energy-saving goals.**

**8. Recommendations: Provide energy-saving recommendations based on the analysis, such as optimizing heating and cooling systems, lighting schedules, and appliance usage.**

**9. Scalability: Ensure that the system can scale to accommodate data from multiple buildings and adapt to different types of sensors and meters.**

**10. Energy Efficiency Reporting: Generate reports summarizing energy consumption trends, cost savings, and environmental impact for building owners and occupants.**

**The successful completion of this project will result in an intelligent energy management system that can help individuals and organizations make informed decisions to reduce energy consumption, save costs, and minimize their environmental footprint.**

**# define power consumption in watts for each component**

**Power\_cpu=50 #watts**

**Power\_gpu=75 #watts**

**Power\_memory=10 #watts**

**# Time in hours**

**Time\_hours=24 #you can adjust this as needed**

**#calculate energy consumption in killowatt-hours(kwh)**

**Energy\_cpu=power\_cpu\*time\_hours/1000 #convert to kwh**

**Energy\_gpu=power\_gpu\*time\_hours/1000**

**Energy\_memeory=power\_memeory\*time\_hours/1000**

**#Total energy consumption**

**total\_energy\_consumption=energy\_cpu\*energy\_gpu\*energy\_memory**

**Print(f”total energy consumption:(total\_energy\_consumption)khw”)**





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