



VELAMMAL
INSTITUTE OF TECHNOLOGY

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NAAN MUDHALVAN PROJECT(IBM)
IBM AI 101 ARTIFICIAL INTELLIGENCE-GROUP 1
Title : Measure Energy Consumption

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Problem Statement :

The problem at hand is to create an automated system that measures energy consumption, analyzes the data, and provides visualizations for informed decision-making. This solution aims to enhance efficiency, accuracy, and ease of understanding in managing energy consumption across various sectors.

Targeted area : Home power consumption.

Project Description : This project aims to develop an end-to-end solution for collecting energy consumption data, performing real-

time analysis, and providing insightful visualizations to support informed decision-making. The system will enhance efficiency, accuracy, and ease of understanding in managing energy consumption across various sectors.

Project Components:

1. Data Collection and Integration:

- **Data Sources:**

- Smart Meters
- IoT Sensors
- Building Management Systems (BMS)
- Weather Data
- Energy Management Systems (EMS)

- **Data Collection:**

- Implement data collection modules to retrieve data from various sources.
- Integrate data collection processes to ensure data from different sources is consolidated.

Four main steps to be follow

--> Data Sources

--> Data Collection

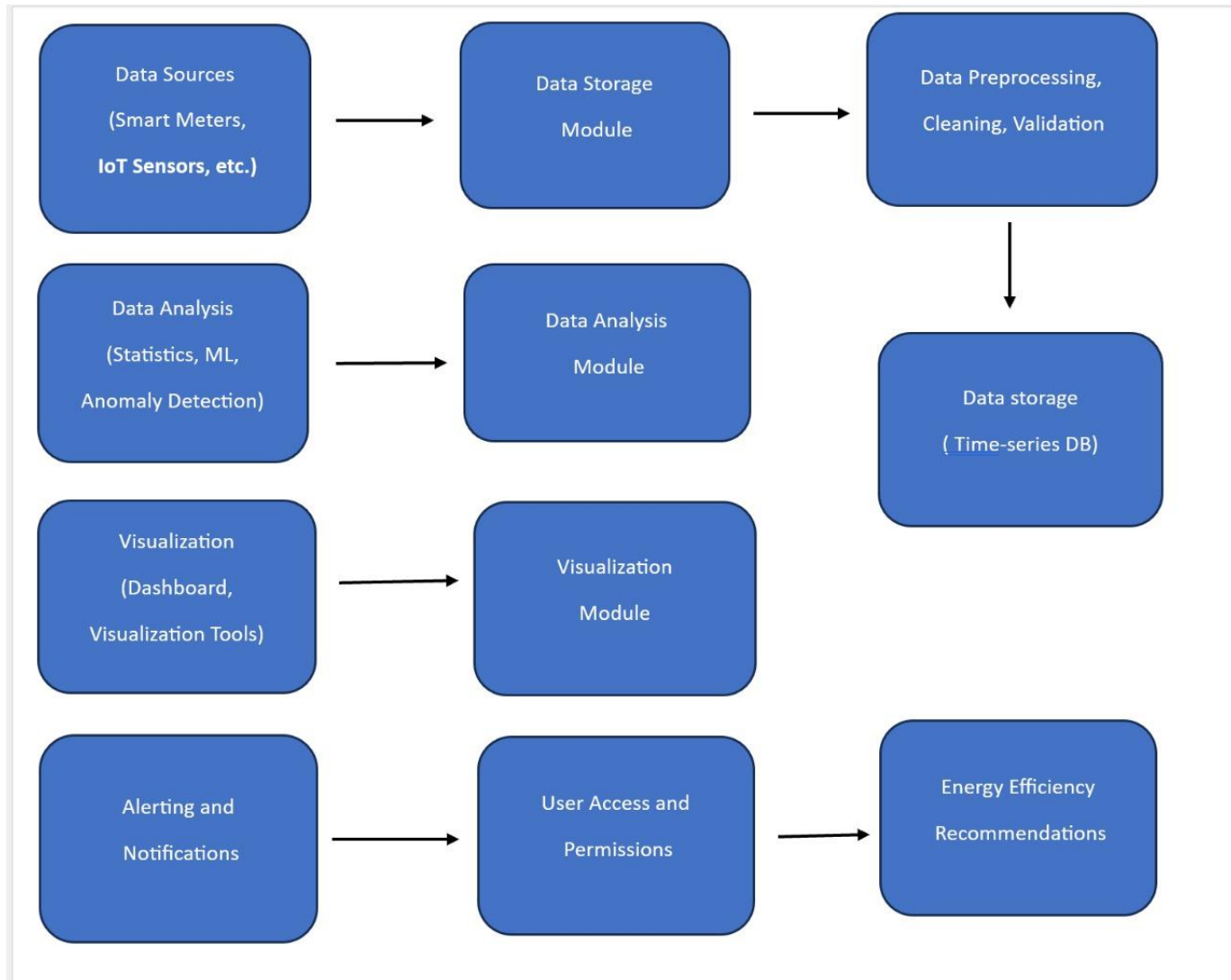
--> Data Storage

--> Data Preprocessing

Block Diagram:

A block diagram represents the major components and their relationships in the system. In this case, the block diagram would

depict the flow of data and operations within the system. Here's a textual representation of the block diagram:



1. Data Collection and Integration:

- **Data Sources:** These are the origin points of data, including smart meters, IoT sensors, BMS, weather data, and EMS.
- **Data Collection:** Data is collected from these sources using various methods like API integration, data scraping, or direct sensor communication.

- **Data Integration:** Collected data is integrated into a unified format, ensuring consistency and compatibility.

2. Data Storage:

- **Methodology:** Use a time-series database like InfluxDB for efficient storage, retrieval, and management of time-stamped data.
- **Description:** Data is stored securely with an emphasis on fast data access and minimal data loss.

3. Data Preprocessing:

- **Data Cleaning:** Remove duplicates, missing values, and outliers to ensure data quality.
- **Data Transformation:** Aggregate data at different time intervals to facilitate analysis.

4. Data Analysis:

- **Statistical Analysis:** Use basic statistics to understand data distributions and patterns.
- **Machine Learning Models:** Employ regression or time series forecasting models to predict future consumption.
- **Anomaly Detection:** Develop algorithms to identify abnormal energy usage patterns.

conclusion

The automated energy consumption management system efficiently collects and analyzes data from various sources, offering insights for informed decision-making. Interactive visualizations enhance data exploration, while robust security and compliance measures protect sensitive information. Scalability and integration ensure adaptability, and ongoing support and improvement sustain system reliability,

making it a valuable asset for optimizing energy usage and promoting sustainability.