KGiSL INSTITUTE OF TECHNOLOGY
co-KreateyourGenius

PYEXPO25

Genius innovation leaves behind a legacy...

Team ID: T053

Team Name: Data Mavericks (Registered in portal)

PS Number: PY088

PS Title: Smart Energy Meter for Energy Consumption

Domain: IoT

Category: Hardware

Problem Statement:

What Are We Solving?

Conventional energy meters provide only total consumption, and user optimization of electricity is not feasible.

Main issues are:

i) No real-time consumption monitoring and appliance-level information.
ii) Excessive bills because of inefficient consumption.
iii) Environmental degradation because of excessive consumption.

Solution:

A smart energy meter that tracks real-time consumption, informs users of excessive consumption, and recommends savings.

Target Audience:

i) Residential homeowners and renters who wish to save bills.
ii) Environmentally conscious individuals.
iii) Utility companies that need increased energy intelligence.
iv) Smart home enthusiasts.

Proposed Solution:

Purpose:

The IoT system aims to:

Collect real-time data on energy usage by household appliances.

Send the data to a cloud platform to analyze.

Present users with recommendations and insights through a mobile application.

System Overview:

The system includes:

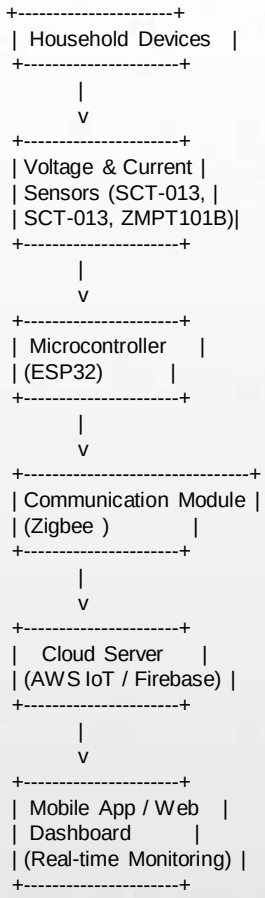
Sensors: Capture current, voltage, and power usage.

Microcontroller: Sends sensor data for processing and transmission to the cloud.

Communication Protocols: Zigbee for data transmission.

Cloud Platform: Stores, analyzes data, and creates insights.

Mobile App: Presents users with real-time data, reminders, and suggestions.



Architecture & Hardware-Software:

HARDWARE

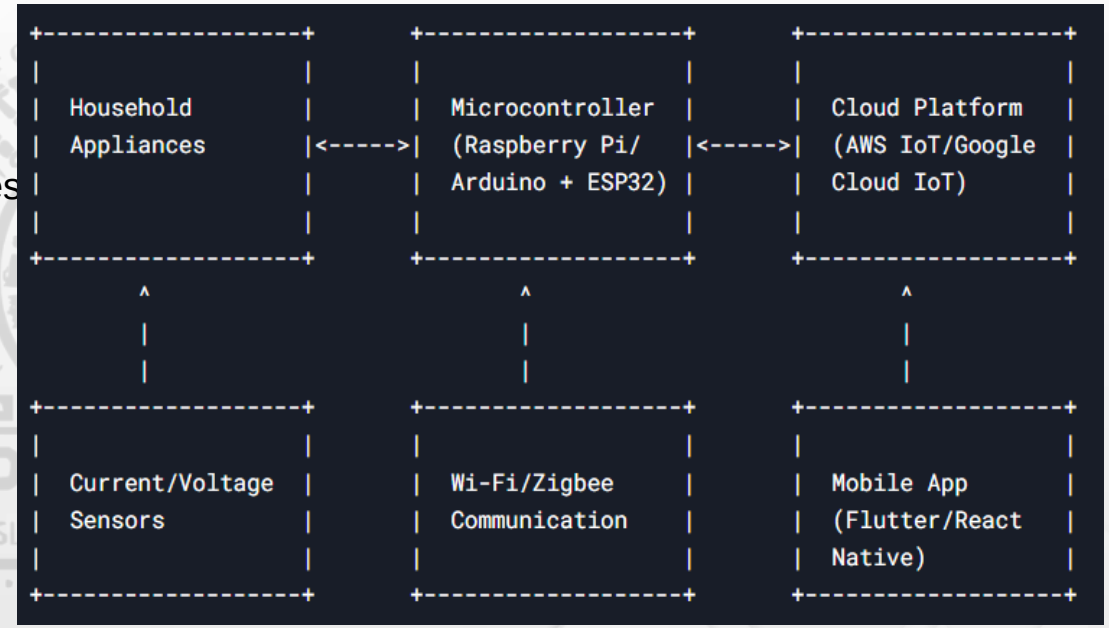
Current sensor = SCT-013
Voltage sensor = ZMPT101B
microcontrollers = Arduino
Communication Modules = Zigbee Modules
power supply = AC-DC adapter

SOFTWARE

Data Transmission Protocols:
MQTT
HTTP/HTTPS
Zigbee

Cloud Platforms:
AWS IoT/Google Cloud IoT

Mobile App Development:
Flutter/React Native



Demo:

Impact and Future Scope:

- **How does our solution improve efficiency or solve a real problem?**

i)Real-Time Monitoring ii)Appliance-Level Insights iii)Cost Reduction

iv)Eco-Friendly v)Scalable & Secure.

- **It can be scaled to larger systems by,**

Modular Design: Add sensors/microcontrollers for more appliances/buildings. **Cloud Scalability:** Use AWS IoT/Google Cloud IoT for large-scale data handling.

Mesh Networking: Implement Zigbee/LoRaWAN for wide-area, low-power communication. **Data Analytics:** Use ML for community-wide energy insights.

Additional Features:

Energy Forecasting: Predict usage with ML. **Smart Home Integration:** Voice control via Google Home/Alexa.

Gamification: Earn rewards for saving energy. **Solar Integration:** Monitor solar output for optimization.

Theft Detection: Detect unusual usage patterns.

Research and References:

Smart Grid Technologies:"Smart Grid Technologies" by James Momoh: This book provides a comprehensive overview of smart grid technologies, including smart meters, communication infrastructure, and data management. It's a good starting point for understanding the broader context of smart meters.

"The Smart Grid: Enabling Energy Efficiency and Demand Response" by Ahmad Faruqui and Mohammad Abid Khan: This book focuses on the role of smart grids in improving energy efficiency and enabling demand response programs. It includes discussions on smart meters and their role in these applications.

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THANK YOU !