

ENERGY USAGE OPTIMIZER

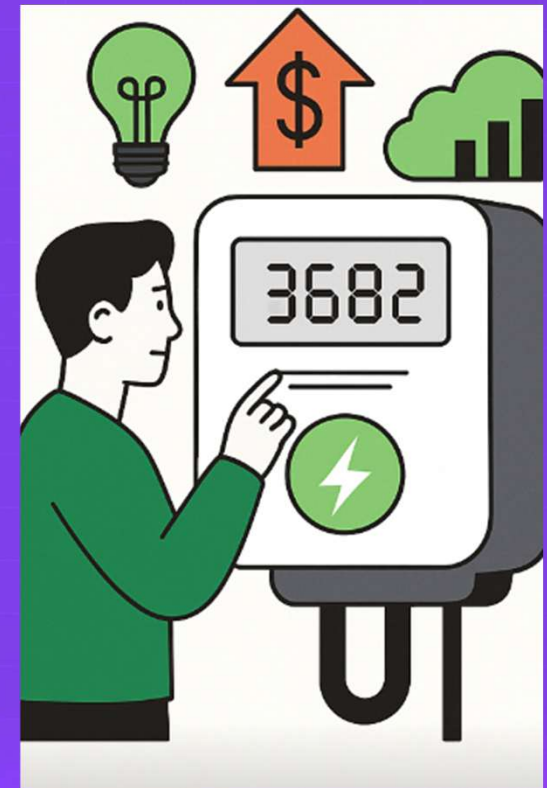
By Team TECHFORGE

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Introduction

- In today's world, with increasing energy demands and rising electricity costs, efficient monitoring and management of power usage is crucial.
- Growing need for efficient energy usage.
- High electricity bills due to unaware consumption.



Problem Statement

- Lack of visibility in individual appliance consumption.
- Difficulty in identifying wastage and inefficiencies.
- No low-cost solution for real-time power tracking.



Objectives

- Measure voltage, current, and power.
- Send real-time data to cloud (BlinkIOT).
- Display live + historical usage trends.
- Provide optimization suggestions.
- Use BlinkIOT's charting tools for energy insights.
- Enable remote control of appliances using relays.

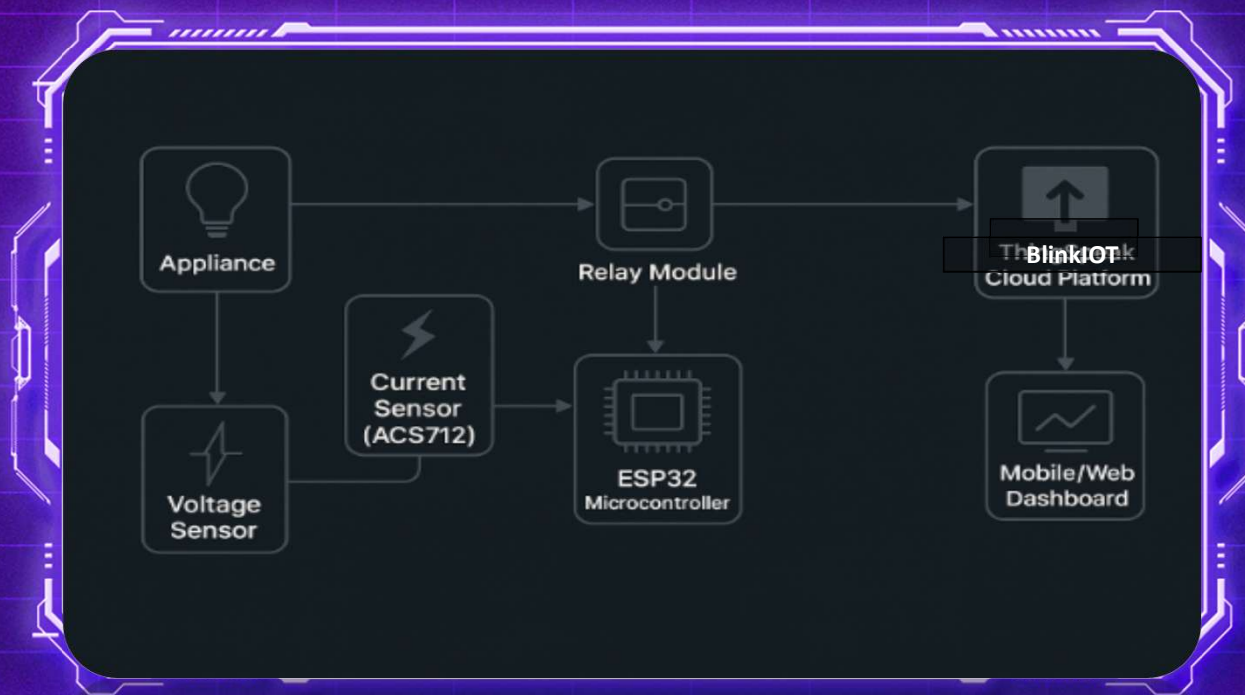
Components

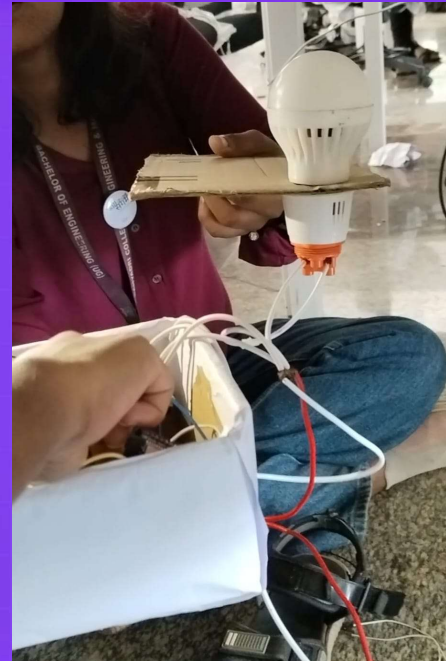
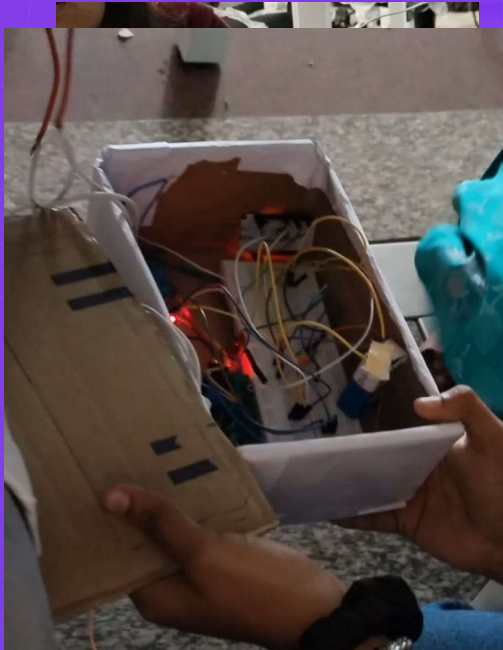
- ESP32 microcontroller
- ACS712 current sensor
- Voltage sensor
- Relay module (for appliance control)
- Wi-Fi network
- Power supply (e.g., 5V USB)
- Jumper wires, breadboard, connectors
- USB Cable
- Laptop with BlinkIOT + coding tools (Arduino IDE / PlatformIO)

Working Methodology

- ACS712 measures current.
- Voltage sensor measures voltage.
- ESP32 calculates power = $V \times I$.
- Sends data to BlinkIOT over Wi-Fi.
- BlinkIOT auto-plots graphs for Voltage, Current, and Power.
- User views live dashboard from phone/laptop.
- Tips triggered based on usage patterns.
- Relay module connected to ESP32 can switch appliances ON/OFF based on usage thresholds.

Block Diagram





Expected Results

- Real-time tracking of energy data.
- Easy-to-understand dashboard.
- Line graphs and bar charts show trends in appliance usage.
- Better energy awareness.
- Reduced wastage and smarter usage.
- Relay automation based on usage insights.

Future Scope

- Add AI-based pattern learning.
- Integrate billing estimate features.
- Smartphone app interface.
- Control appliances remotely.

The image features a dark blue background with a fine grid pattern. In the center, there is a glowing blue rectangular frame with a futuristic, metallic design. The frame has rounded corners and small, rectangular protrusions on its sides, resembling a high-tech display or a control panel. Inside this frame, the words "THANK YOU !" are written in a clean, white, sans-serif font. The overall aesthetic is modern and digital, with a strong emphasis on blue and white colors.

THANK YOU !