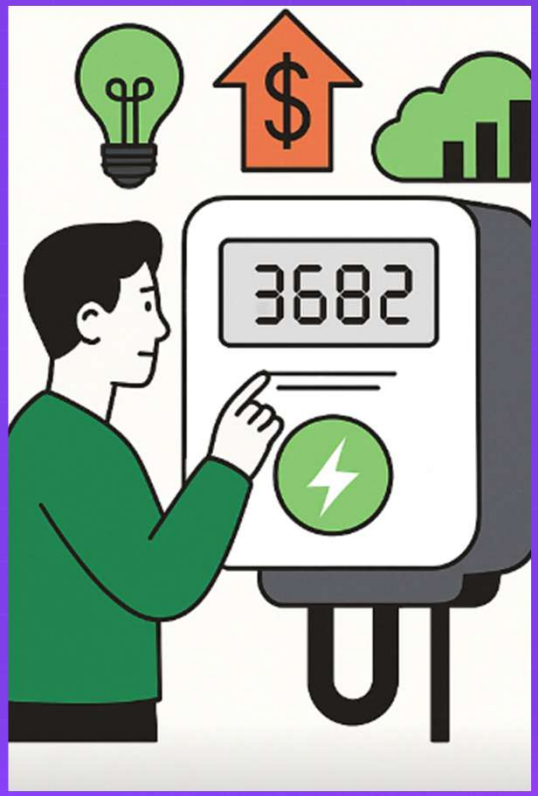
ENERGY USAGE OPTIMIZER

By Team TECHFORGE

Contents

Introduction

- In today's world, with increasing energy demands and rising electricity costs, efficient monitoring and manag ement 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.

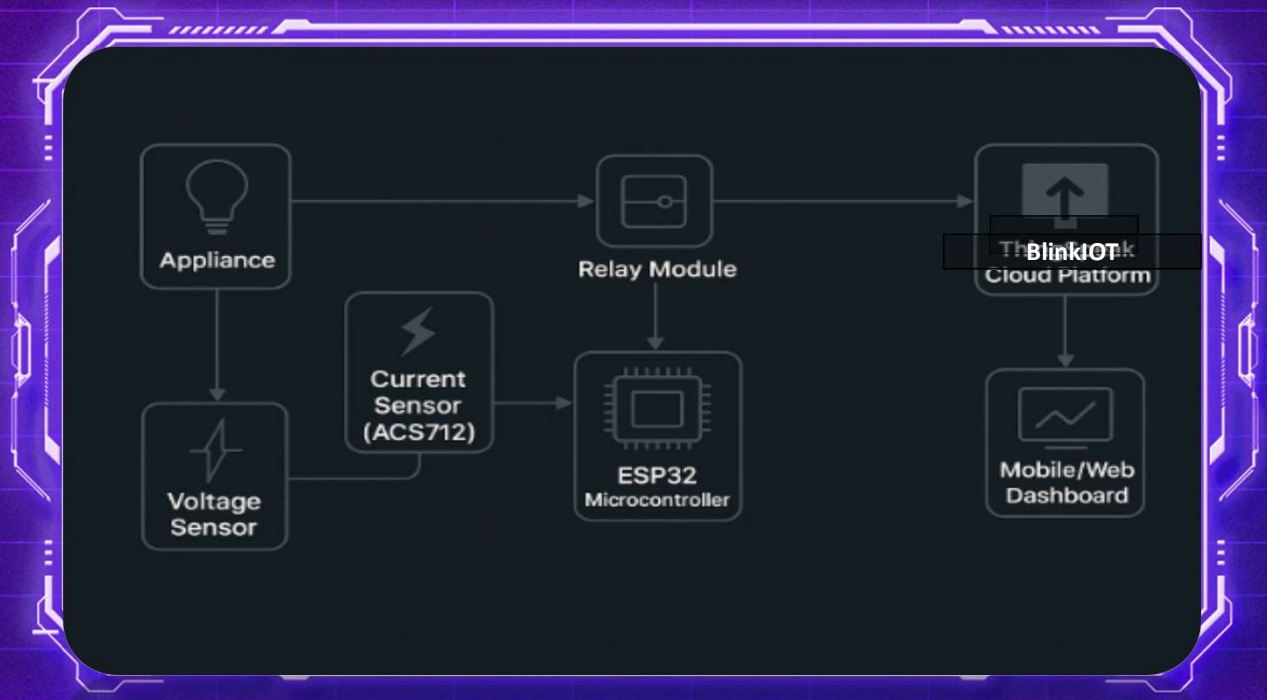
Components

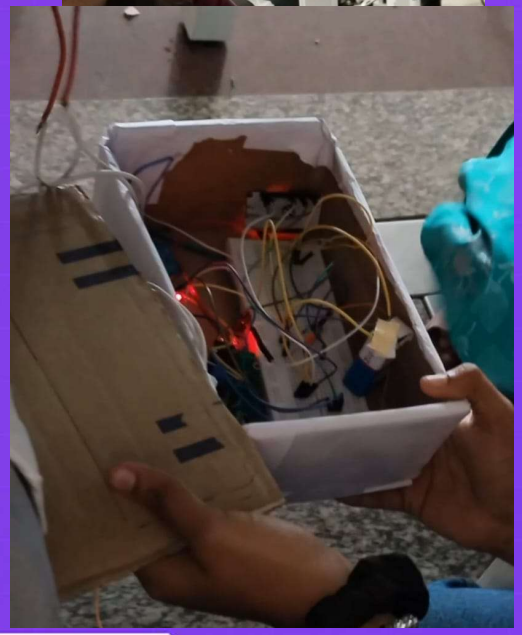
- ESP32 microcontroller
- ACS712 current sensor
- Voltage sensor
- Relay module (for appliance control)
- Wi-Fi network
- Power supply (e.g., 5V USB)
- Jumper wires, breadboard, connectors
- USB Cable
- Laptop with BlinkIOT + coding tools (Arduino IDE / PlatformIO)

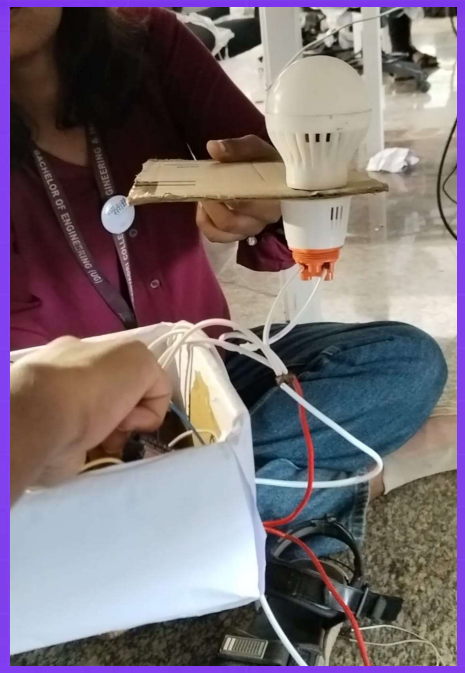
Working Methodology

- ACS712 measures current.
- Voltage sensor measures voltage.
- ESP32 calculates power = V x 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 O N/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.

THANK YOU !