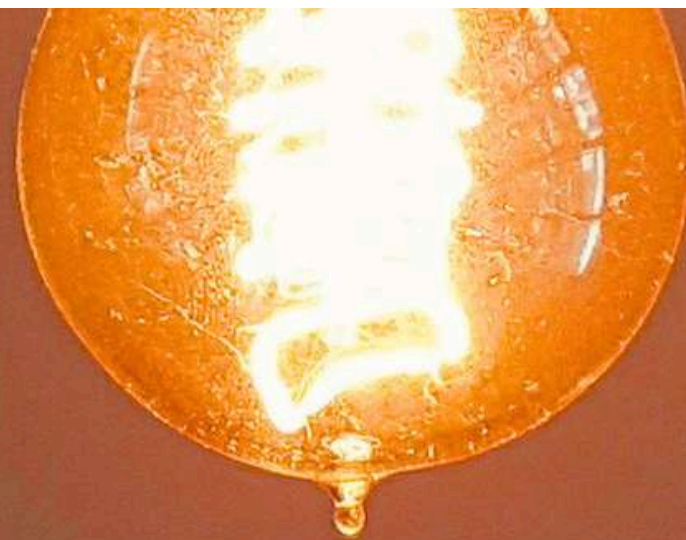


# Context

Turning off one bulb for five hours a day  
**saves** 2.1 kWh and about **₱21.00/month**

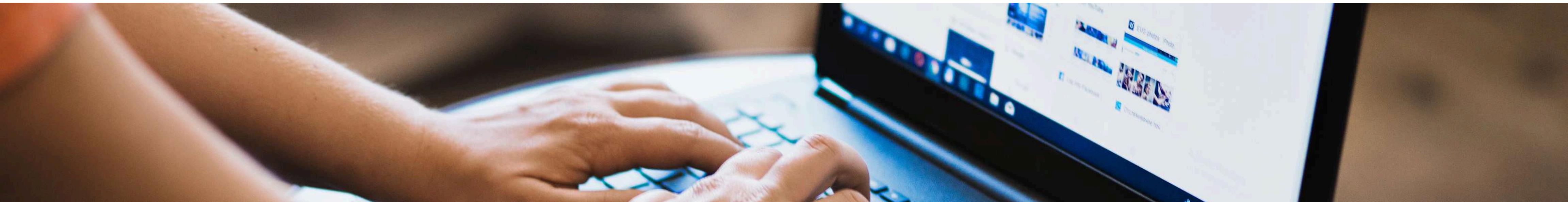
*Department of Energy, 2018*



# Context

Screensaver does not save energy, sleep is 90% better, but **shutting down** and unplugging is **best**.

*Meralco. (n.d.).*





# Context

**421 home fires** were caused by  
**overheated appliances** in 2020, an  
11.38% increase from 2019

*Bureau of Fire Protection, 2020*



# Challenge

How might we help people become *instantly aware* of their **wasteful and dangerous energy habits**, so they can take action before it's too late?







# VoltGuard



# VoltGuard

*where **Safety** and **Savings** meet*







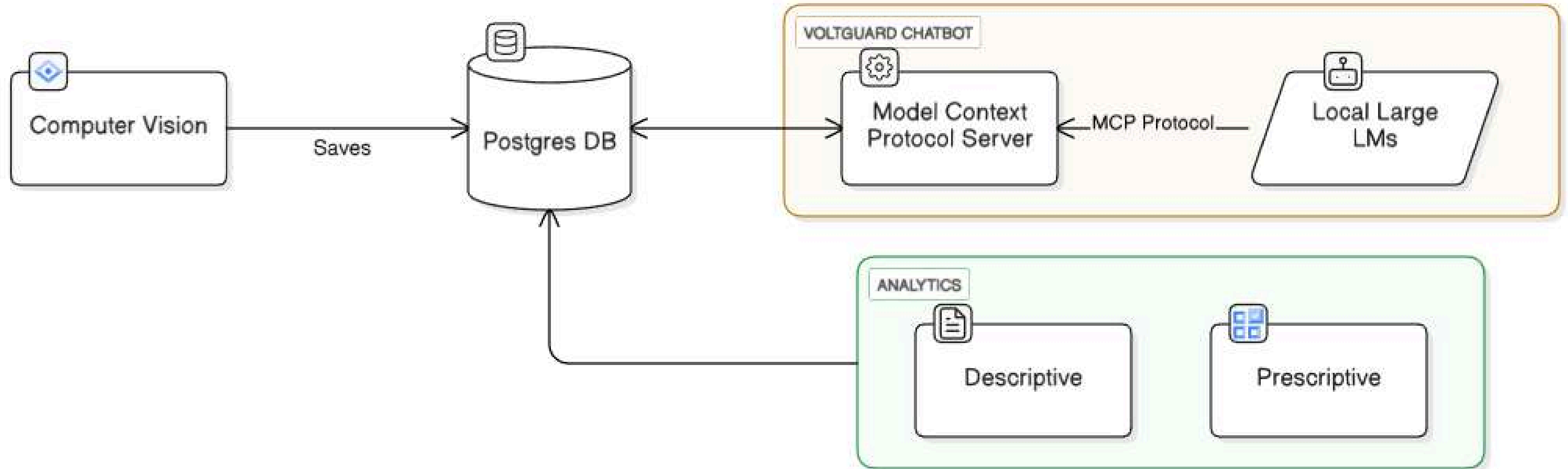
is an **AI-powered web application** with behavior analytics and smart safety monitoring. It tracks appliance and device usage patterns to ensure safe and efficient operation. This is done by combining:

**Object detection AI**

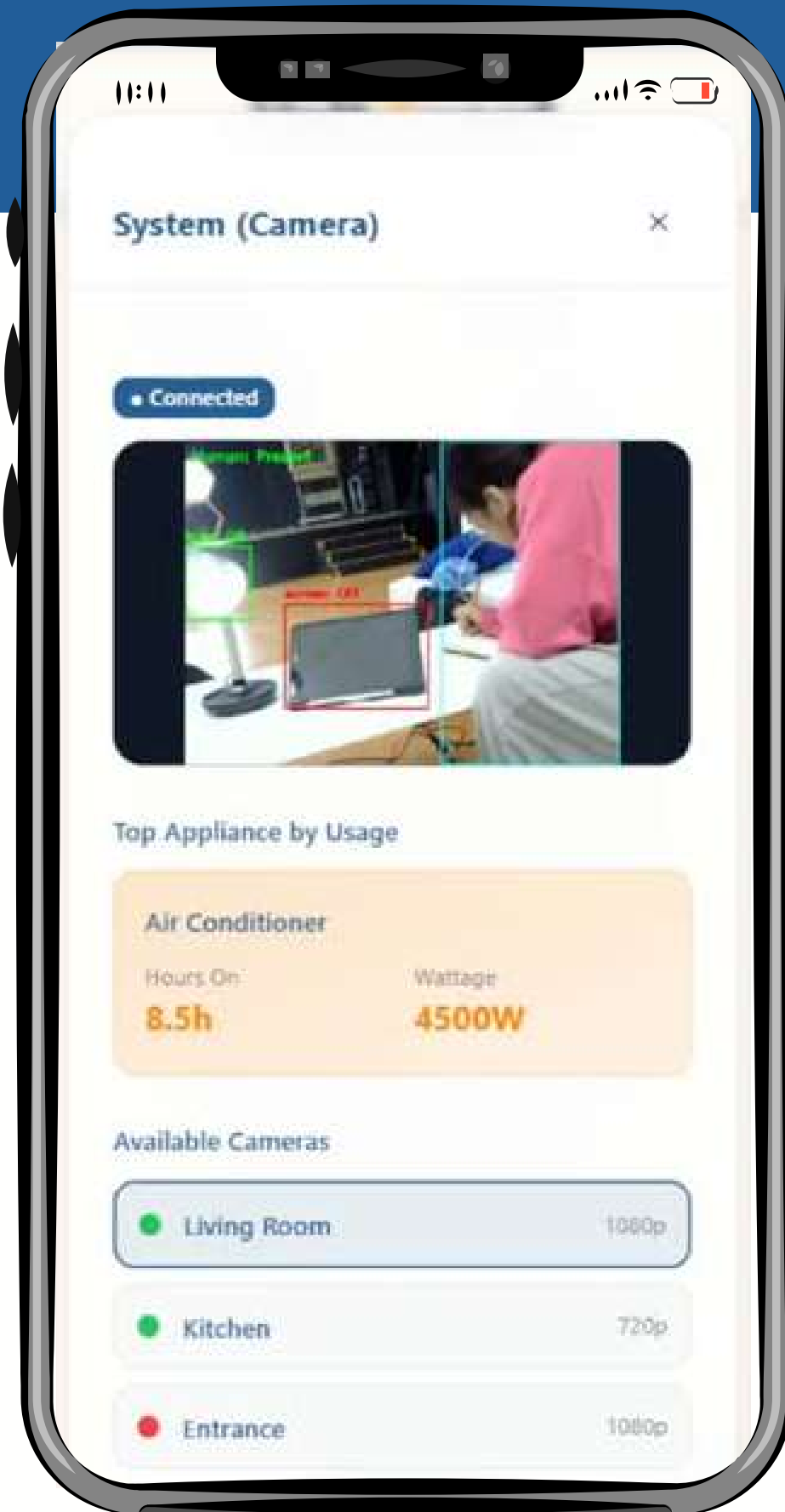
**State-of-the-art SLM chatbot**



# System Flow



# VoltGuard



- Real-time **Appliance Detection**
- Pop-Up Notifications for **Unattended Appliances**



# Computer Vision

## Dataset Analytics

Generated on November 14, 2025 at 7:32 am [Regenerate](#)

Number of Images

665

✓ 0 missing annotations

∅ 0 null examples

Number of Annotations

1209

📏 1.8 per image (average)

</> Across 3 classes

Average Image Size

0.92 mp

🔍 from 0.92 mp

🔍 to 0.92 mp

Median Image Ratio

1280x720

📏 wide

Classes ⓘ

Overview of the number of annotations for each class in your dataset.

🔍 Search by class name

All Splits

○ Train

○ Valid

○ Test

Sort ↓

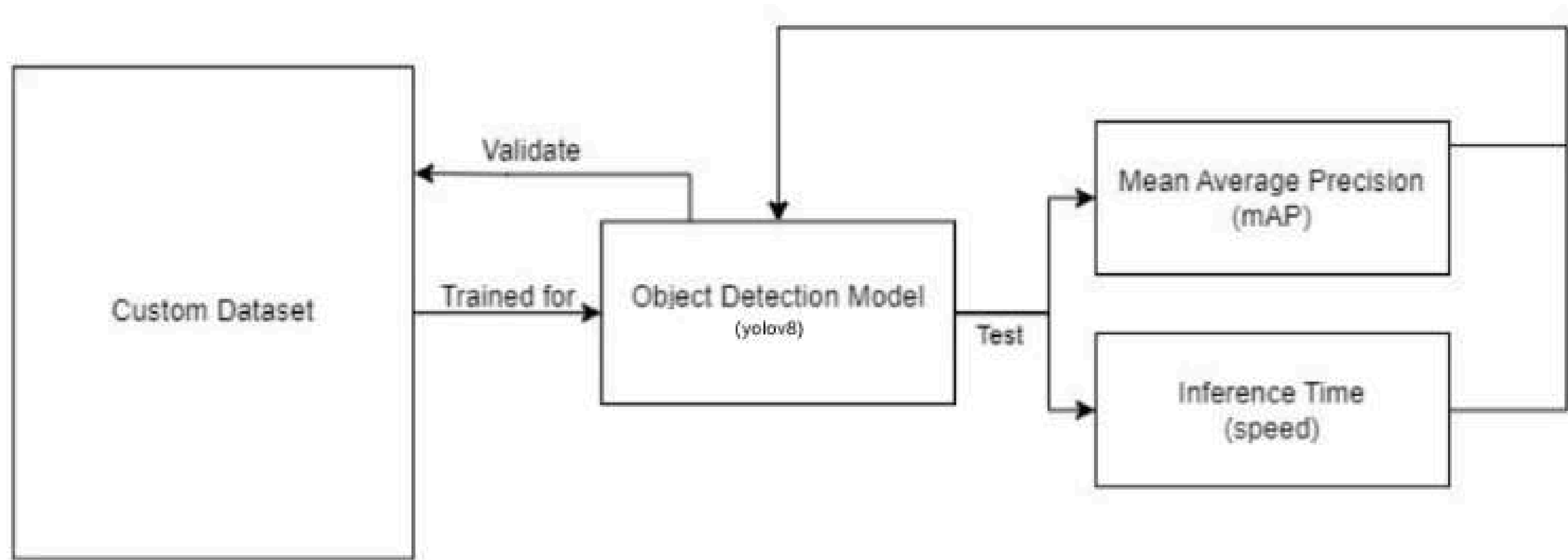
screen	478	
lamp	427	
person	304	

Dataset

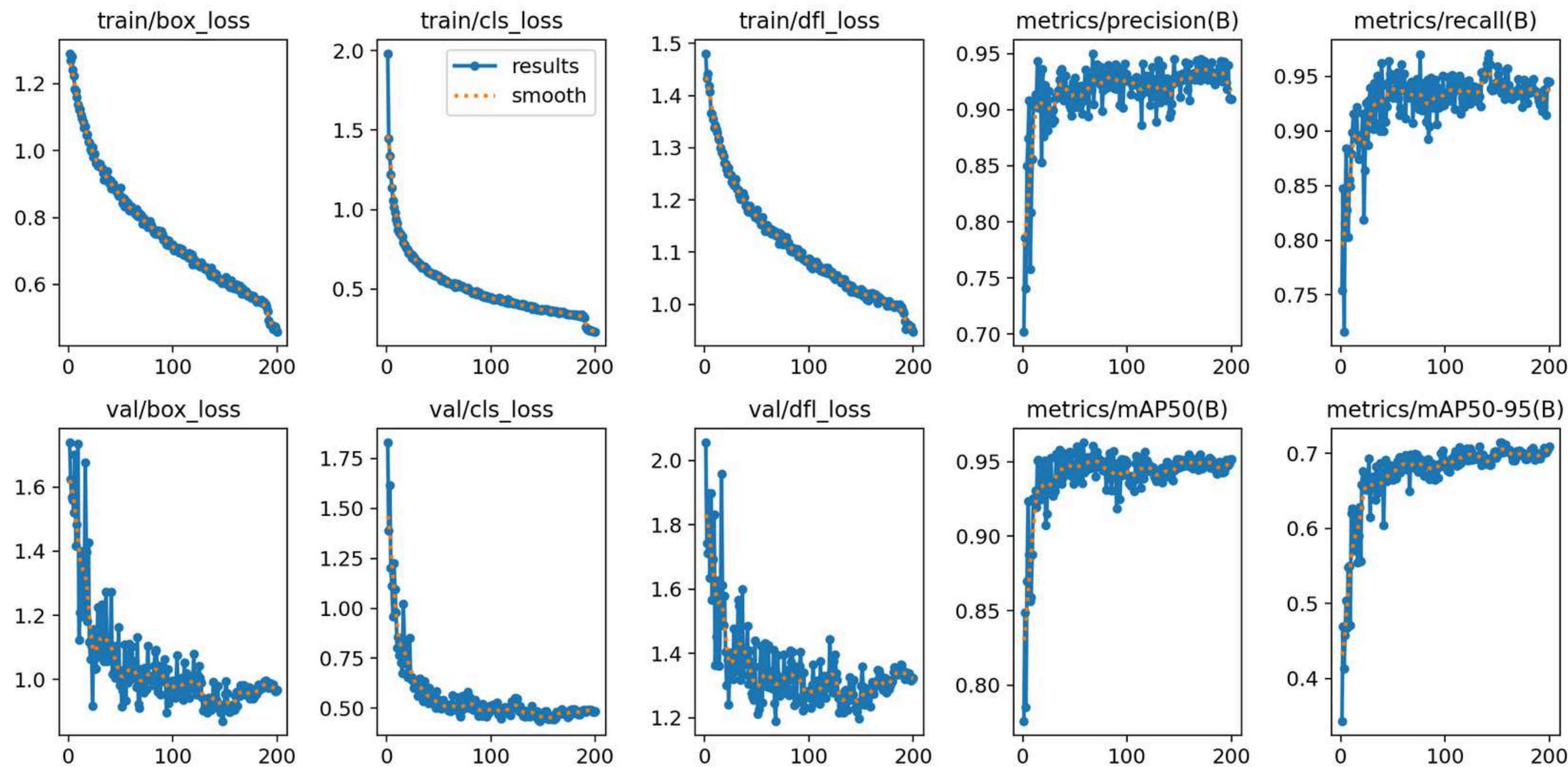




# Computer Vision



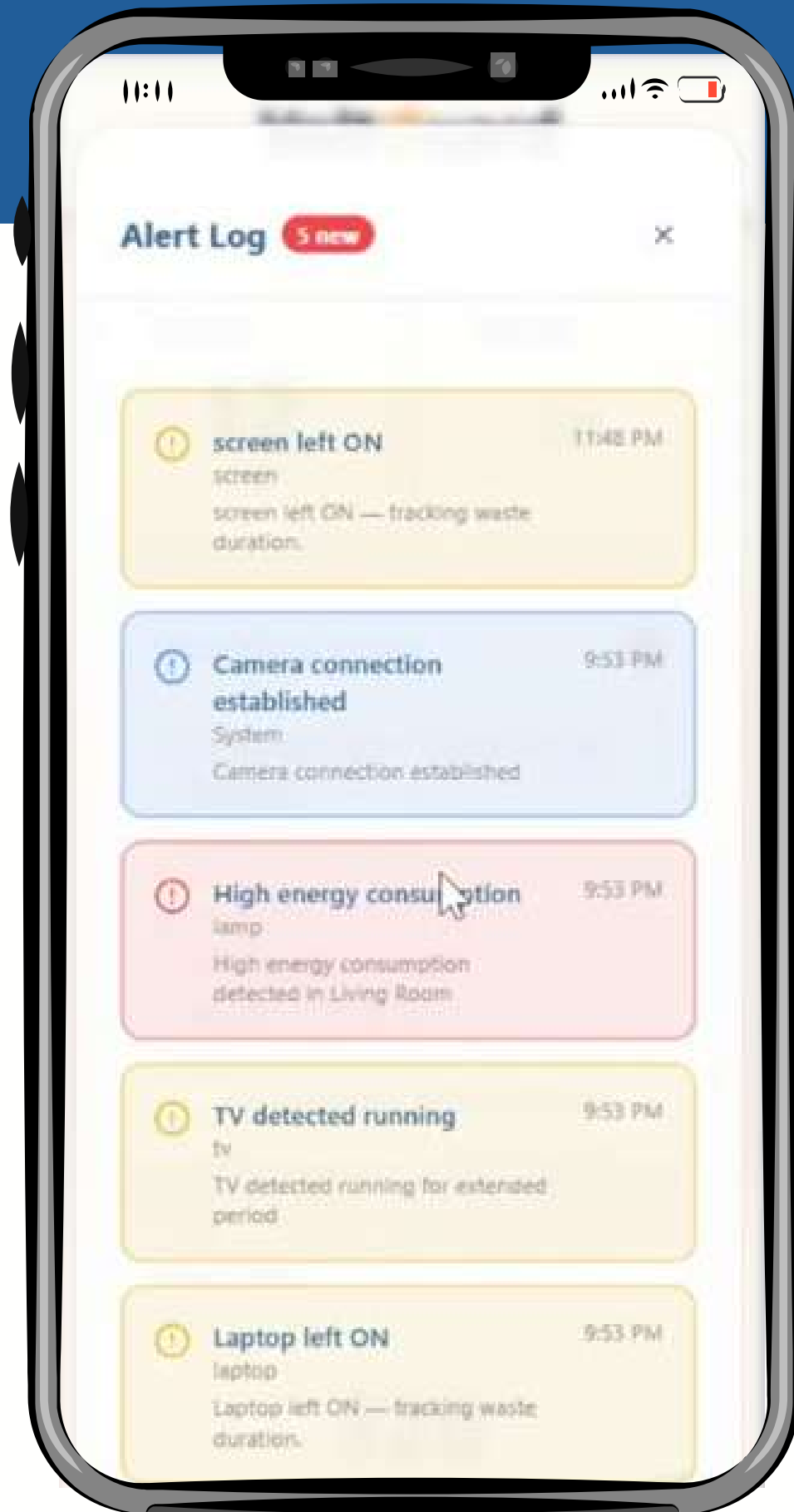
# Computer Vision



- Trained for 300 epochs
- Total training time  $\approx$  2 hours

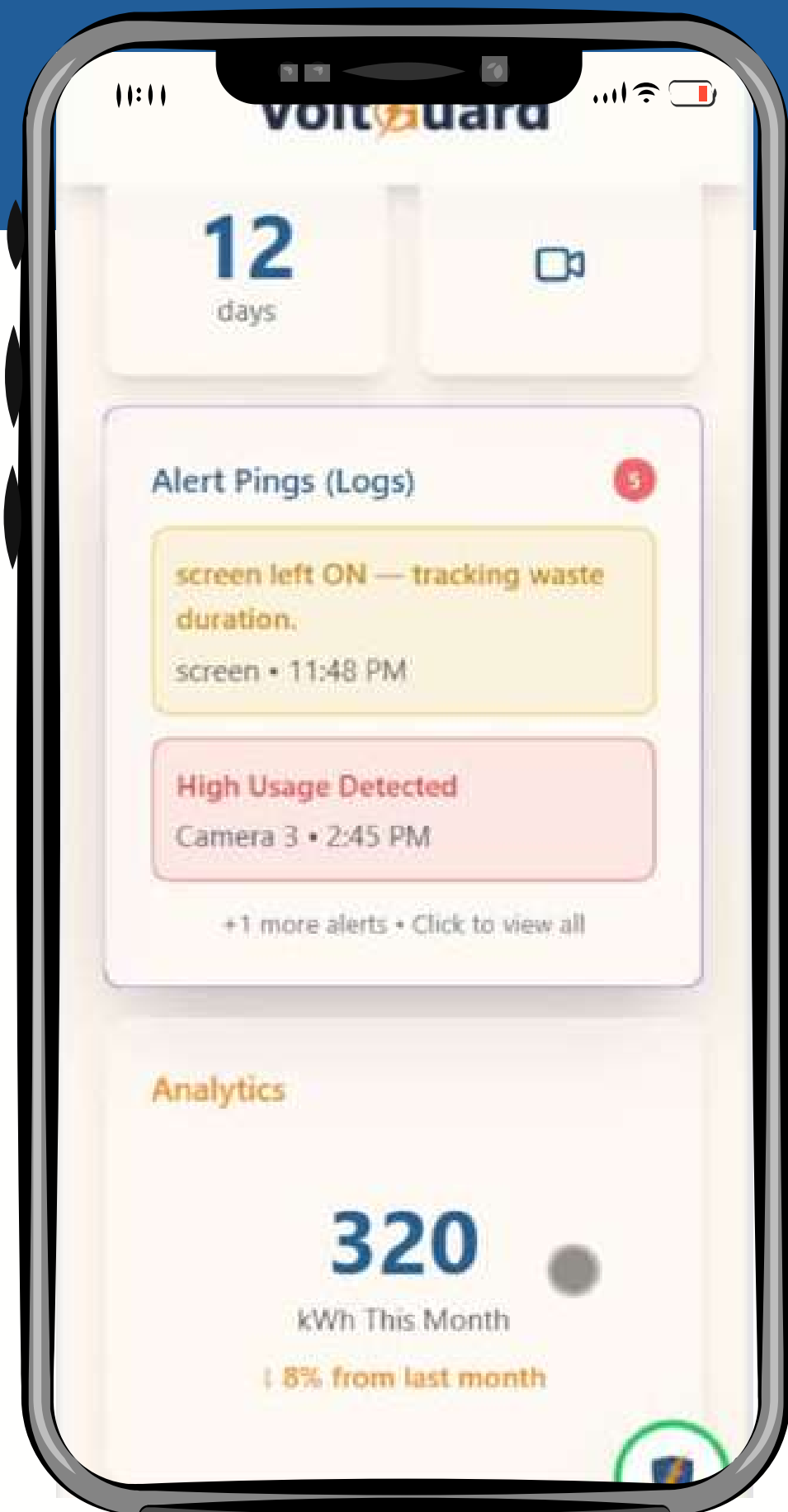


# Alert Logs



- Pop-Up Notifications for **Unattended Appliances**
- **Identify** and take **action**

# Consumption Analytics



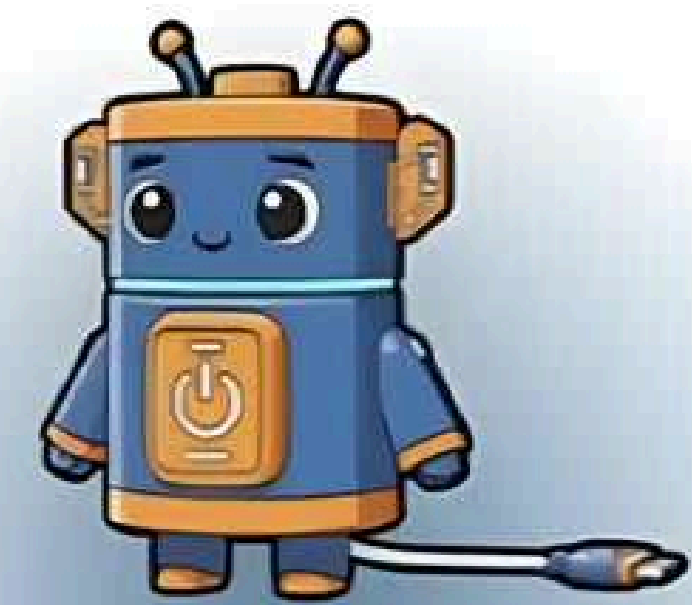
- Shows daily **energy consumption** for the current month through charts.
- Compares current **usage** with the previous month.
- Identifies **peak usage hours** and the top **power-consuming** appliance.
- Helps users understand habits and reduce waste and cost.





Your Energy Pet

High Performer



High Performer

*"Fully evolved - glowing and animated"*

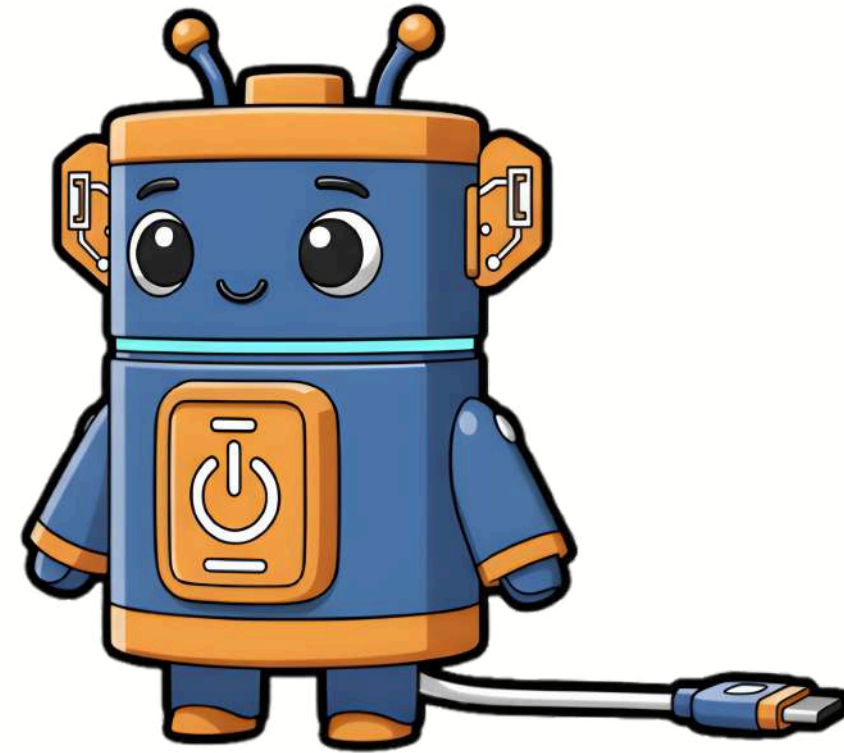
Tier Progress

15 days



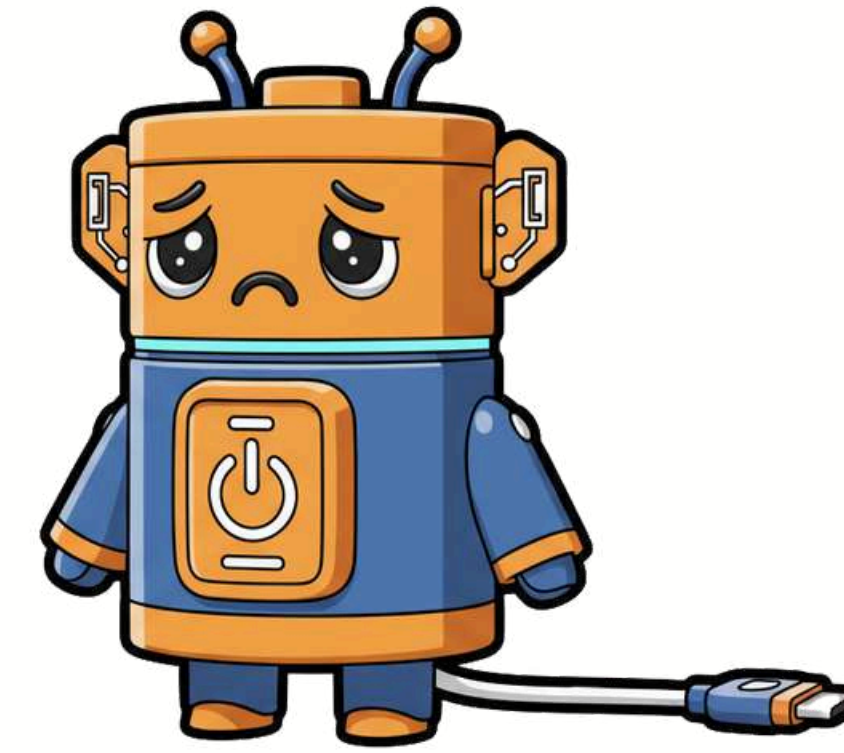
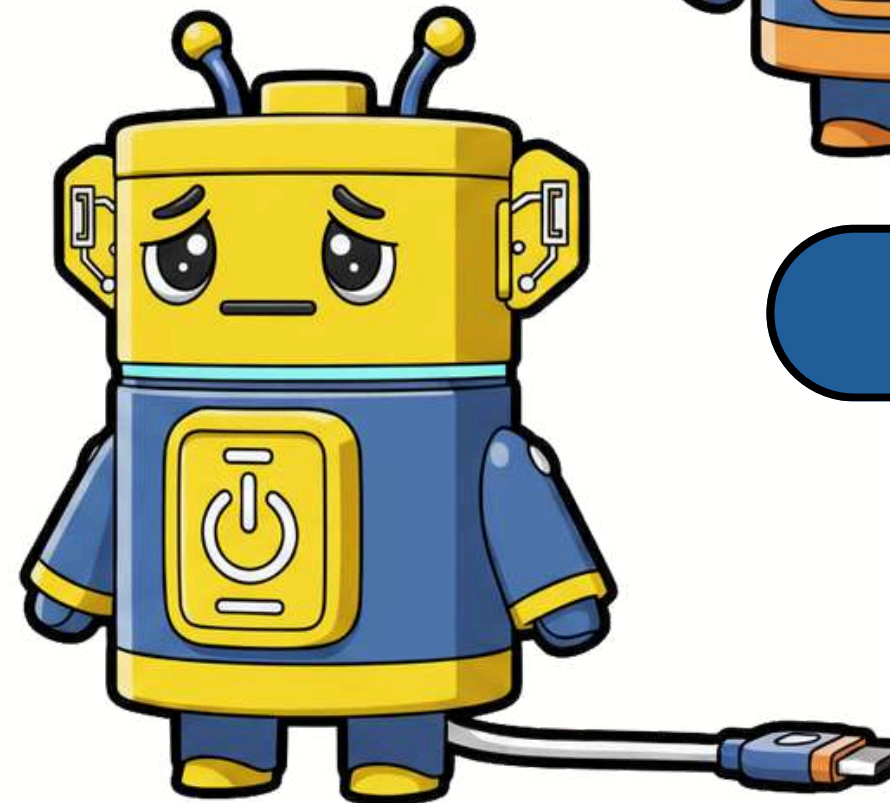
# Meet Volt!

**Volt** is here to help you track how active you've been on our app and cheer you on along the way!



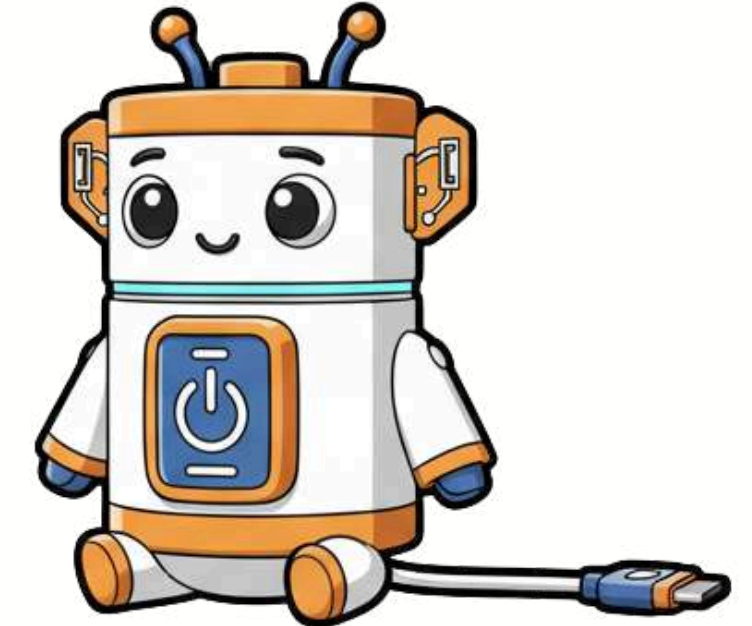
**High**

**Steady**



**Low**

**Starter**

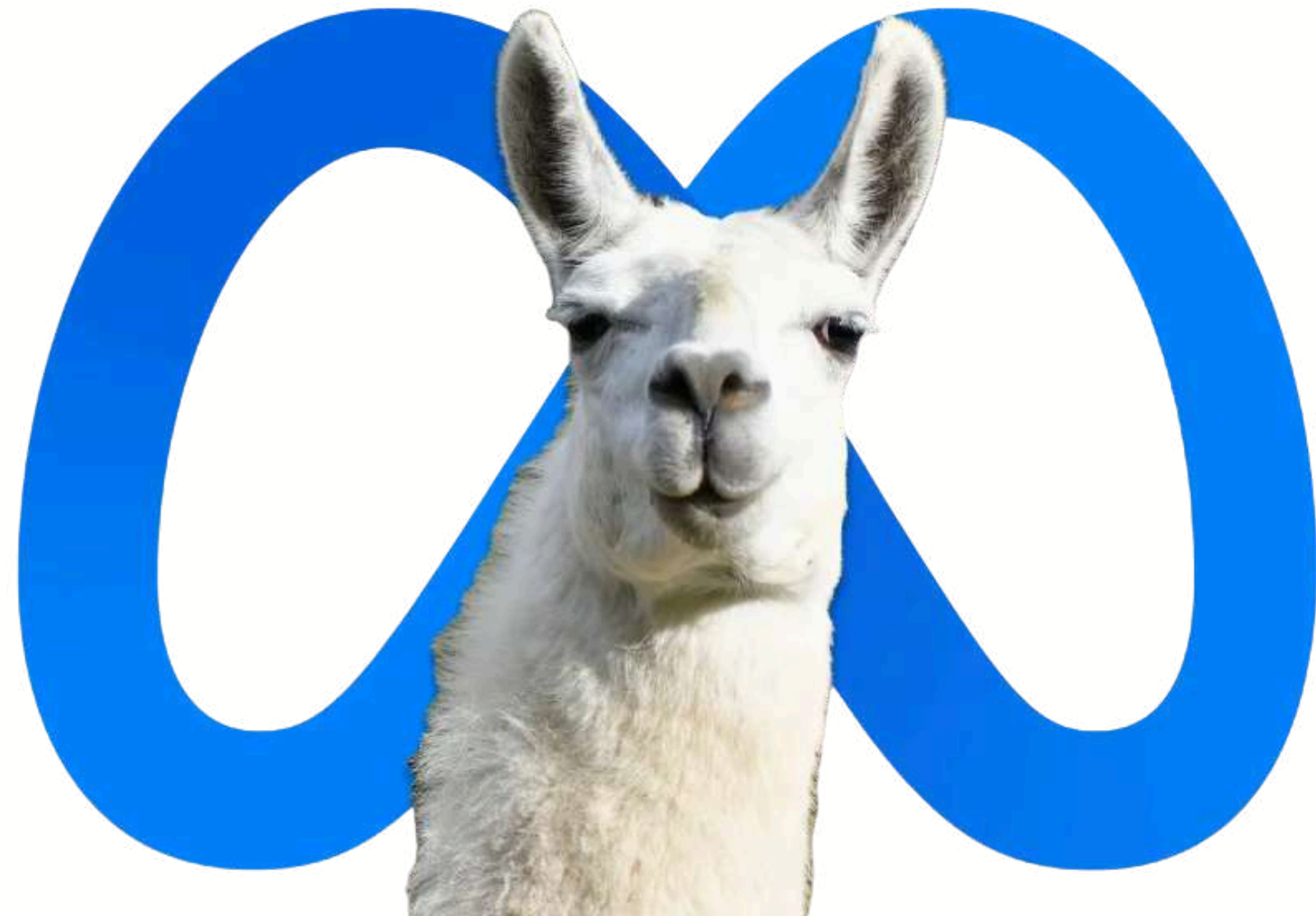


# Volt Streaks



- **Gamified system** that rewards daily app usage.
- Shows **Weekly Activity**.

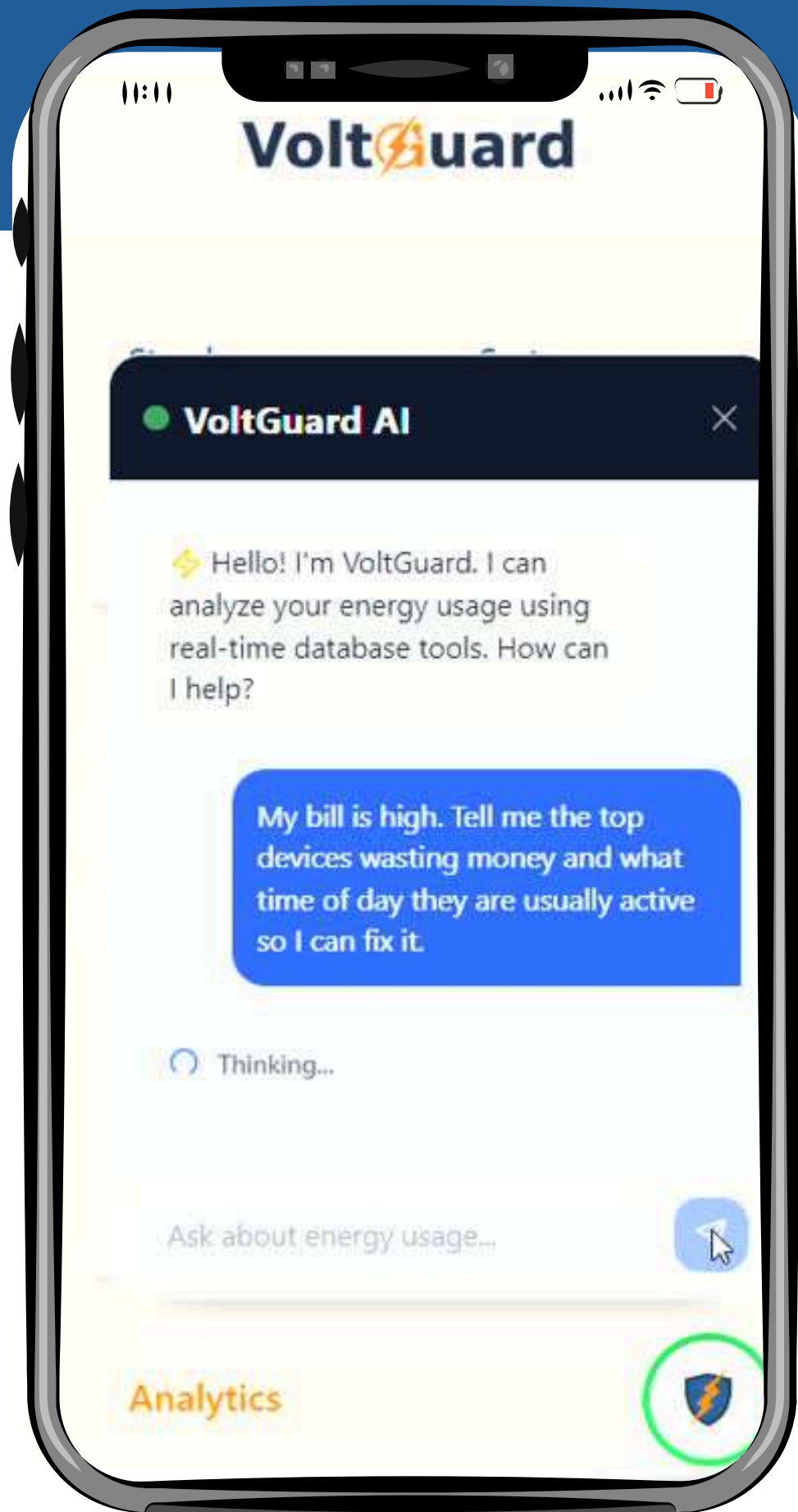




A **small LLaMA-based language model** that answers questions and provides **descriptive** and **prescriptive insights** about our energy monitoring system.




# Chatbot



- Context-Aware: Understands complex, natural language queries.
- Real-Time Analysis: Fetches live data via MCP (Model Context Protocol).
- Actionable Insights: Converts raw data into specific, money-saving advice.

# Integration to Meralco Infrastructure

& Payment   Bright Ideas  News & Advisories   Help

− Php 1,000 +  
Enter your average monthly bill amount

Select an appliance

Fluorescent Lamp 21" (20 Watts) 🔍

**Wattage**  
This is the appliance power rating  
**32**

**Hours used per day**  
How long do you operate the appliance daily?  
**1**

Used the **Meralco Appliance Energy Calculator** to **estimate appliance consumption** and calculate energy loss when devices are left on.

## 12 RESPONSIBLE CONSUMPTION AND PRODUCTION



## SDG 12: Responsible Consumption and Production

- **Target 12.2**
  - By 2030, achieve the **sustainable management and efficient use of natural resources**.
- **Target 12.8**
  - By 2030, ensure that people everywhere have the **relevant information and awareness** for sustainable development and lifestyles in harmony with nature.



# VoltGuard





# VoltGuard

*where **Safety** and **Savings** meet*



# References

Bureau of Fire Protection. (2020, April). 2020 highlights of accomplishment report. <https://bfp.gov.ph/wp-content/uploads/2022/04/2020-Highlights-of-Accomplishment-Report.pdf>

Department of Energy. (2018, December 30). E-Power your 2019 energy resolution [Press release]. <https://legacy.doe.gov.ph/press-releases/e-power-your-2019-energy-resolution>

Meralco. (n.d.). Energy efficiency [FAQ page]. <https://company.meralco.com.ph/faq-about/energy-efficiency>

United Nations. (n.d.). Goal 12: Ensure sustainable consumption and production patterns. United Nations Sustainable Development Goals. <https://www.un.org/en/academic-impact/sdgsinacademia-goal-12>

