

# MUC.DAI

## Smart Kitchen

### Technical Architecture & Automation

- The Smart Kitchen Project utilizes a localized Home Assistant instance to unify appliance control, telemetry, and energy monitoring.
- By integrating major appliances, smart plugs, and ambient lighting into a single ecosystem, the system enables complex automations that improve safety and energy efficiency.

#### Automated Logic & Safety Protocols

The environment relies on custom YAML automations to bridge the gap between separate devices, creating contextual alerts and fail-safes:

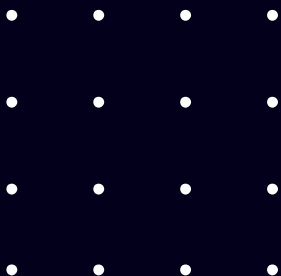
- **Visual & Mobile Alerts:** If the smart fridge door opens, integrated Nanoleaf lights automatically shift to 100% brightness and turn red. Once closed, they turn green before shutting off after 5 seconds. If the door remains open for over 30 seconds, the system pushes a notification to all connected mobile phones with a direct link to the fridge's dashboard.
- **Idle Appliance Management:** The system actively prevents energy waste. If the coffee maker remains in a „ready“ state for 5 minutes, it sends an interactive mobile notification allowing users to turn it off directly from their phone screen. If ignored, a secondary automation powers down the machine entirely after 8 minutes of inactivity.

#### Device Integration & Telemetry

Individual appliance dashboards provide granular control and real-time monitoring across the kitchen ecosystem:

- **Major Appliances:** Users can remotely select dishwasher programs like „Eco 50°C“ and toggle specific options such as Brilliance Dry or Vario speed +. The smart fridge interface provides a live internal camera feed alongside door status and precise temperature tracking. The hob (stove) dashboard is designed to monitor connectivity, alarms, and child lock states.





- **Small Appliances & Environment:** The coffee maker dashboard allows for remote program selection, cup warmer toggling, and safety controls. The Nanoleaf system offers comprehensive control over the kitchen's ambient lighting, including RGB colors, dynamic effects, and color temperature.
- **Power Monitoring:** A centralized Plugs Overview serves as a quick-reference dashboard to check the current power state (On/Off) of all connected devices, including those on smart plugs like the microwave and kettle.

### **Advanced Energy Analytics**

Beyond standard wattage tracking, the system automates specific consumption calculations to make energy data actionable:

- **Per-Use Tracking:** The system isolates and measures the precise energy consumption of a single coffee brewing cycle, calibrating and recording the data automatically after every run.
- **Contextual Data Logging:** Every night at 23:58, an automation compiles the daily energy usage across the fridge, coffee maker, dishwasher, kettle, microwave, and computer. It saves these metrics as historical data, formatting them into our custom „baked pizzas“ energy equivalent to clearly visualize the kitchen's daily power footprint.

