SMART EV CHARGING

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OPTIMIZING EV CHARGINGIN RESIDENTIAL BUILDINGS

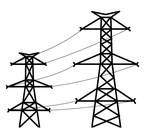
PROBLEM

- **Surging Demand**: The rapid adoption of electric vehicles (EVs) has created a critical need for charging infrastructure, particularly in urban residential buildings. Currently, many charging points are underutilized or poorly distributed.

- **Overload and Waste:** This inefficiency results in several issues:
  - Overloading of the building's electrical system, leading to power constraints.
  - Current solutions tend to be rudimentary, without the ability to dynamically adjust to usage patterns.

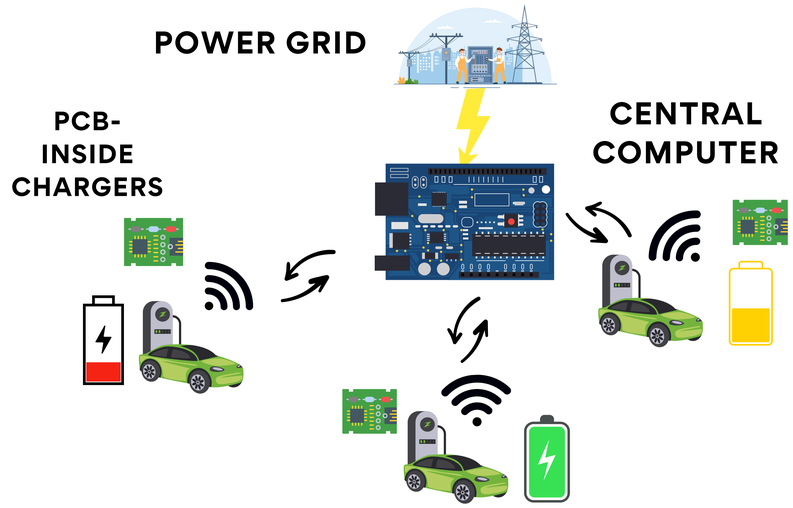
BENEFICIARIES

- **EV Owners in Multi-Family Housing**: Residents needing convenient, accessible, and efficient charging solutions within shared building grids.
- **Building Administrators**: Those responsible for managing energy resources, ensuring a safe power supply, and optimizing charging infrastructure.
- **Electricity Companies**: Utilities benefiting from more efficient energy management and the ability to maintain a stable power supply.



SOLUTION

- **Intelligent Optimization**: Prevents grid overload by dynamically managing power allocation.
- **Smart Prioritization:** Prioritizes charging for EVs with lower battery levels, ensuring fair and balanced energy distribution.



The **central computer** (Raspberry Pi) is decision-making core.

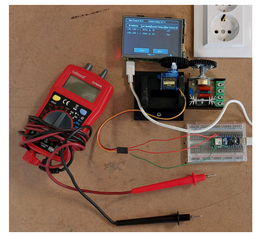
1. It continuously receives information wirelessly:
2. **Total building grid consumption** (including non-EV loads).
3. **Data from each EV charger**: current energy consumption and the vehicle's **State of Charge (SoC)** (acquired locally by an Arduino in each charger).
4. Based on this data and using advanced algorithms, **the central computer analyzes and decides in real-time:**
   a. Analyzes grid load to **determine if balancing is needed**.
   b. **Prevents overloads** by dynamically adjusting available power.
   c. Optimizes energy distribution, **prioritizing EVs with lower SoC for fairer and more efficient charging.**
   d. Dynamic Control: Decisions are sent wirelessly to the EV charger PCBs. **These boards act as actuators, regulating the amount of energy delivered to each vehicle in real-time**, ensuring balanced and sustainable energy use within the building.

IMPLEMENTED:

CENTRAL COMPUTER COMMUNICATES WITH CHARGER ESPS, WHICH REPORT CHARGING PERCENTAGE AND SPEED TO A DASHBOARD.

STAND-BY:

DEVELOP A MATHEMATICAL FUNCTION FOR BATTERY CHARGE (INCLUDING FLOW) AND ENABLE THE CENTRAL COMPUTER TO MANAGE AVAILABLE ENERGY.



BENEFITS

TIME SAVING

ENERGY EFFICIENCY

COST SAVING

GRID INDEPENDECE

FIND US!

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