## Smart Panels

Christopher Mancuso, Vinay Panjabi, Eric Jacob, and Cole Abramson
{cam513, vhp20, ca331, ebj17}@scarletmail.rutgers.edu
Advisor: Prof Yangyong Zhang

### Goal

- User friendly home energy monitoring system
- Graphical detail on energy use
  - Real time as well as weekly, monthly, annual
- User customization of panels and relevant information
- Allow consumers to identify areas of high energy consumption

### Motivations and Objectives

#### Motivations

- Create energy saving habits and detect high usage areas
- Easy to navigate views show trends in consumption
- Help facilitate efficient decisions with regard to new appliance purchases

#### Objectives

- Integrated mobile access with notifications and alerts
- Personal panel and breaker cluster customization
- Provide accurate energy bill estimates

### Research Challenges

- Stabilizing and calibrating AC current values
- Efficiently utilizing Arduino code
- Quickly sending data over network for real time performance
- Staying within NEC code
- Multi-platform integration
- Accurate real-time values

### Methodology

- Use ACS712 based current sensor to read current values (AC & DC)
- Read analog values (0-1023 units) and convert to appropriate voltage using 4.9mV/unit.
- Convert voltage to amps using chip sensitivity (66mV/Amp)
- Ruby on Rails
  - MVC Framework
  - Rails API for JSON doc storage
- HighCharts
  - Pure JS Charts
  - AJAX to update
- Twitter Bootstrap

### Results

- Real time POST
- Modern UI
- Immediate and extended current draw values
- View and panel customization

### References


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