Energy Performance Visualization of Buildings
by: Arash Shadkam
Background

• Energy Consumption of the CIRS building
  • Plug load consumption
  • Lighting load consumption
  • Mechanical load

• Minute by minute consumption data for 24 panels
  • 15 Excel workbooks around 160 MB each
Points of Interest and Motivation

• Poor visualizations to give a historical energy consumption feedback of the building
• No proof of weekly/seasonal trends in consumption
• Of interest to the building managers and researchers working on the building
High level Goals

• Discovering overall trends in consumption in specific spaces
• Knowing the proportion of each space
• Understanding what an average week looks like
• Web-enabled tool
Data Abstraction

- Dataset
  - Dataset Type
    - Table
  - Dataset Availability
    - Static
- Attribute
  - Types
    - Categorical
    - Quantitative
  - Ordering direction
    - Sequential
    - Cyclic
But what it really means

- Interactive Line chart
• Pie Chart

Plug Load Share

LoopCafe: 64%

Off3S: 13%

Off1N: 8%

Off2S: 6%

Off2N: 4%

Off3N: 4%

App: 1%
• Heat map
Demo!
Task Abstraction

• Actions
  • Consume
    ➢ Discovering
  • Search
    ➢ Explore
  • Query
    ➢ Identify
    ➢ Summarize

• Targets
  • Trends
  • Features

How

• Encode
  • Align and Express
• Color
  ➢ Hue
  ➢ Shades
• Shape
• Size
• Manipulate
  • Select
• Facet
  • Juxtapose
• Reduce
  • Filter
  • Aggregate
Learning experience and Limitations

• Learning experience
  • Working with a client
  • Applying freshly gained knowledge to real world problems
  • Learning HTML, D3, jQuery, highcharts

• Limitations
  • Time
  • Coding Knowledge
Lastly
THANKS!