Water Visualization Challenge

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Overview

- Design Principles
- Tools
- Models and Assumptions
- Generated Graphs
- Conclusion

Design Principles

- Simplicity
  - Design for everyone
- Actionable
  - What can easily change?
- Focus on Conservation
  - “A Fine is a Price”[1]

1. Gneezy, Uri, and Aldo Rustichini. "A fine is a price." *The Journal of Legal Studies* 29.1 (2000): 1-17.

Tools

- Python
- pandas[1]
  - Data manipulation and analysis
- Matplotlib[2]
  - Plotting and visualization

1. Wes McKinney. ”Data Structures for Statistical Computing in Python.” *Proceedings of the 9th Python in Science Conference*, 51-56 (2010)
2. John D. Hunter. ”Matplotlib: A 2D Graphics Environment.” *Computing in Science & Engineering*, 9, 90-95 (2007), DOI:10.1109/MCSE.2007.55

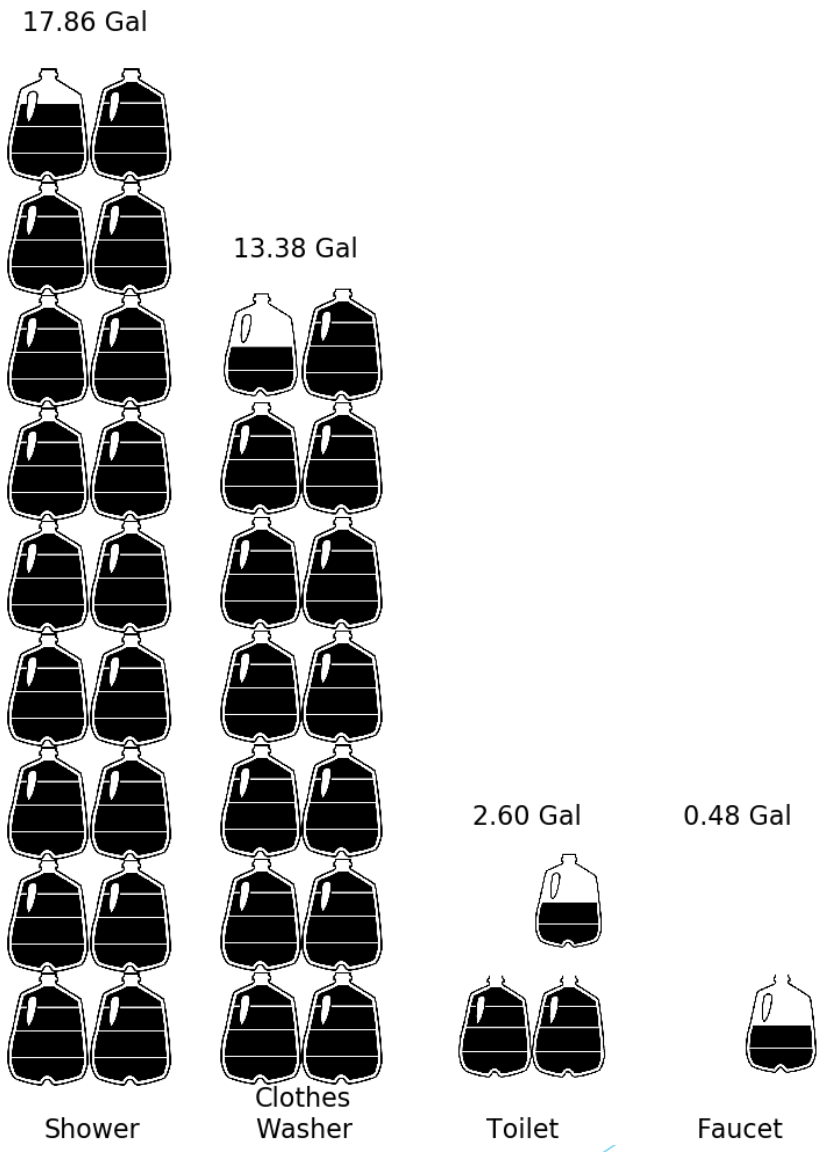
Models and Assumptions

- Plots suitable for mailing to customers
- Used event classified data
- “Ideal” Values
  - Showers: 2.0 gpm[1]
  - Faucets: 2.0 gpm[1]
  - Toilets: 1.26 gallon/flush[1]
  - Shower Duration: 5 minutes[2]
  - Irrigation Usage: 0.623 gallon/sqft[3,4]
- Reduce imperfect values to ideal and recalculate usage

1. www.epa.gov/watersense
2. https://www.home-water-works.org/indoor-use/showers
3. https://blog.lawneq.com/calculating-lawn-irrigation-water-usage-and-costs/
4. https://todayshomeowner.com/calculating-lawn-irrigation-costs/

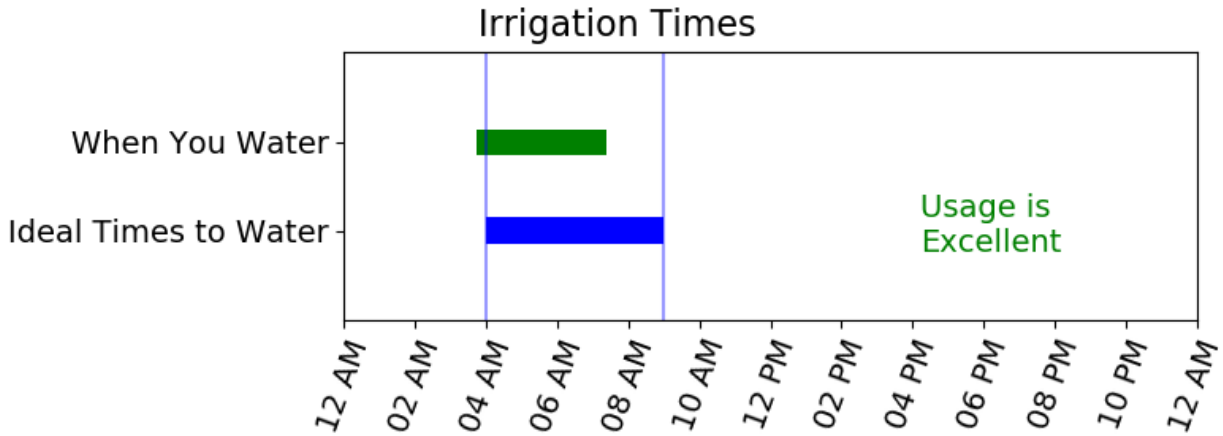
Usage Visualization

- Show average use for each event
- Help put water usage in context



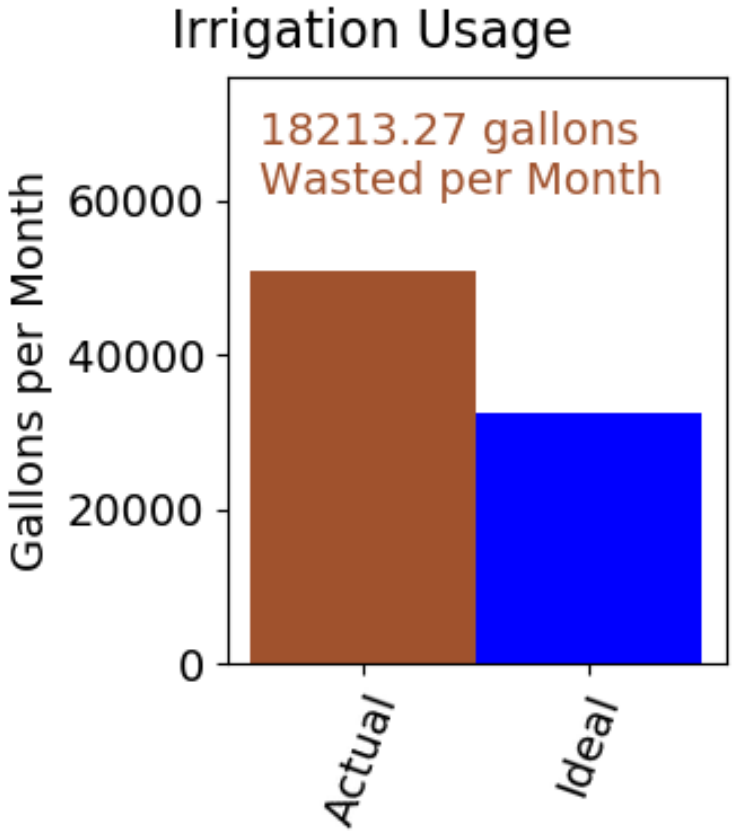
Irrigation Timing

- Display when irrigation happens
- Used interquartile range to eliminate outliers
- Encourage earlier watering times



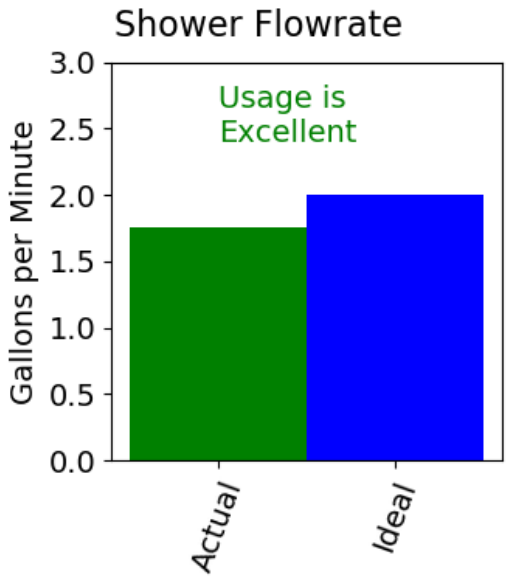
Irrigation Usage

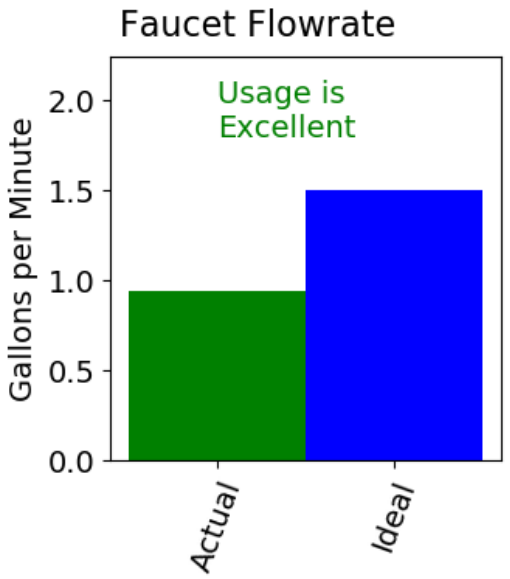
- Display actual and ideal irrigation usage
- Ideal usage based on reported acreage
- Scaled to represent 1 month

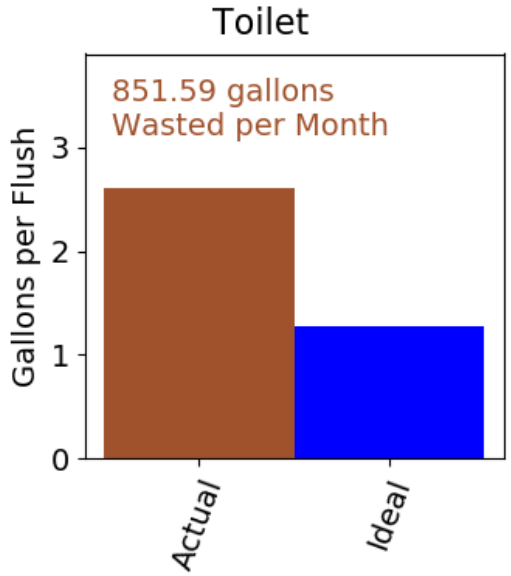


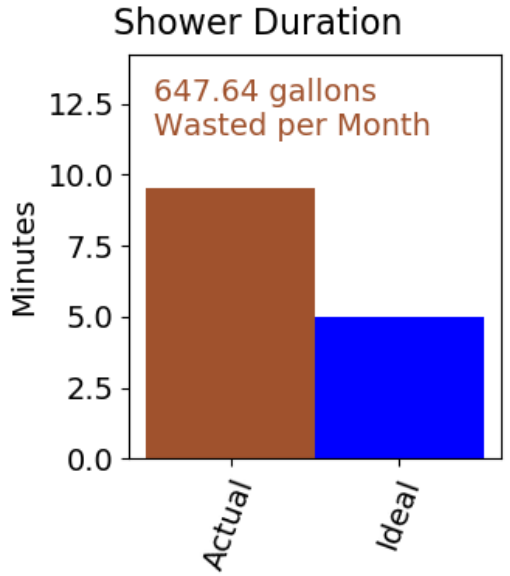
Indoor Usage

- Display actual and ideal scenarios
- Automatically generate text









Conclusion

- Easy to understand plots
- Actionable data
- Motivate change