Indoor Climate Control Data Visualization Tool for Marginalized Individuals

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Background

Marginalized: low-income and underserved by city officials

Many families in this population live with 2 or 3 generations in one home.

During extreme weather, it can be difficult to move the family out of the house to somewhere with a safer temperature.

Extreme indoor temperatures kill an increasing number of people each year, mostly the elderly.

Motivation

Provide marginalized individuals with tools to make better-informed climate control decisions

Prevent deaths during extreme conditions, such as heat waves

Create an interactive website to help build intuition for keeping a home cool

Goal: evaluate if interactive visualizations can teach complex relationships between many variables

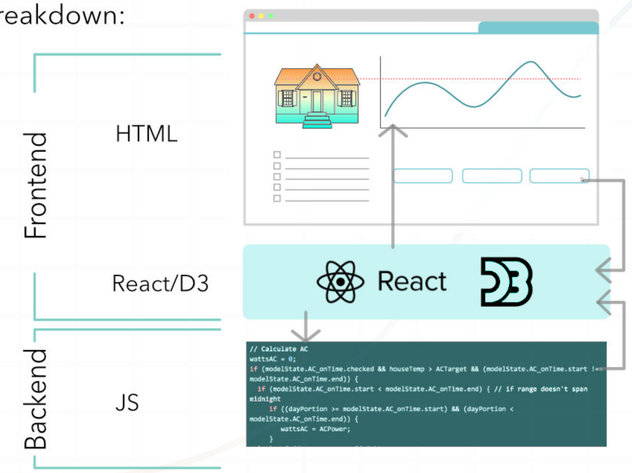
Provide the help that this population needs

Methodology

Design Process:

User Stories ➡ Story Boarding/Sketching ➡ Visualizations

Breakdown:



This architecture allows future work to rely on a more complex temperature model with a true separation between a client (providing the visuals) and a server (providing the calculations).

Evaluation

Pilot study participants (undergraduate students at Iowa State University) were presented with a pre-survey, scenarios to work through with the interactive website, then a post-survey.

This evaluation style allowed us to gain insight into how our website changed perceptions, confidence, etc. on indoor climate control.

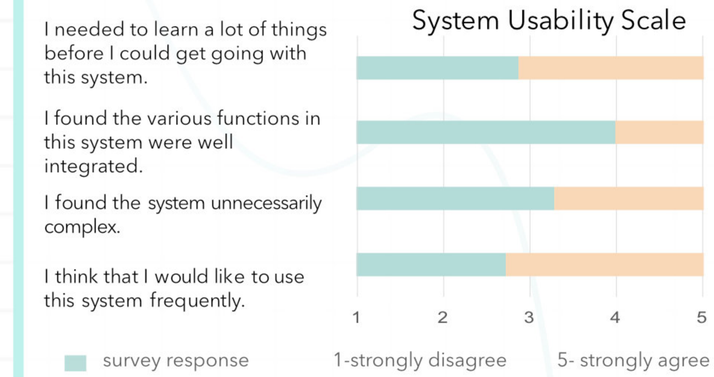
Results

User Reports

Best Application Features
- Home heat visualization
- Visualization options
- Interactivity

Areas of Improvement
- Simplicity of graph
- Better instructions
- Information about features

The case study also showed that participants' solution confidence decreased after using the application.



Future Work

Conduct a case study with the actual target population

Implement more cooling options with detailed descriptions

Implement more customizable residence options

Improve the user interface to be more intuitive

Test a variety of visualizations to find the most intuitive version

Virtual Reality Applications Center

Iowa State University of Science and Technology

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