Comfort Based Framing UI

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Introduction

Energy conservation efforts frequently overlook affordable housing residents, who are disproportionately affected by increasing energy costs and often misunderstood regarding their energy consumption habits. The focus of my part of the study is on a comfort-based framing strategy, with a specific target on thermal and visual (lighting) comfort. The primary objective is to determine the most effective approach for encouraging individuals to adopt energy-saving practices. To gather data on users' preferences and perceptions regarding thermal comfort and lighting, a user interface has been developed. The hypothesis is that framing energy-saving behaviors in terms of comfort will increase individuals' motivation to adopt and sustain these behaviors over time. The research seeks to contribute to the development of strategies that positively impact energy usage behavior, contributing to a more sustainable and energy-efficient future.

Objective & Impact of Professor's Research

Professor Burcin Becerik-Gerber research goal is to promote the use of efficient energy behaviors to improve the health and wellness of low income housing tenants. Through designing and conducting a survey questionnaire, students will gain essential research skills, including survey design, data collection, and analysis.

How This Relates to Your STEM Coursework

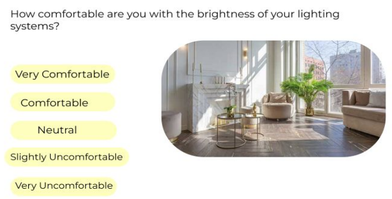
The research I have conducted on energy efficiency and comfortability through my SHINE experience has significantly enriched my understanding of college-level research practices. It has also provided me with a valuable advantage for the years ahead.

Next Steps for You OR Advice for Future SHINE Students

One piece of advice I can share to future SHINE students is to communicate with their mentors and classmates to help each other out and build friendships.

Comfort Framed UI

Interface Homepage:
A simple homepage with a circles that change size based on the user's usage of that respective appliance



Comfortability Survey:
A simple survey for the interface to collect data on the user's comfortability.

History and Comfortability History:
Has two graphs showing the comfortability of the user and objective information captured by sensors spread throughout the house.

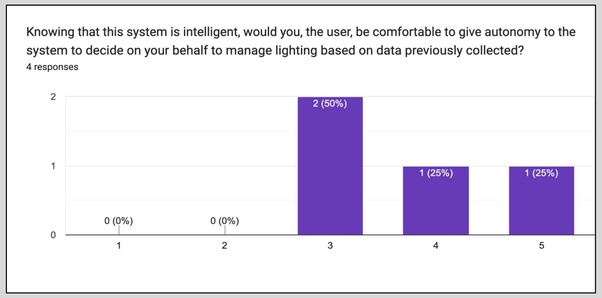
After collecting data from the user about their comfortability, the advanced AI will be able to change the settings on their appliances to ones that are more efficient, while also maintaining the users comfort .

Preliminary Test and Results

After completing the design of the interface, 4 participants were asked to tour the interface. Before exploring, a brief introduction was given and a timer was set. After each participant finished exploring the interface, each took a questionnaire with questions regarding navigation difficulty, and comfortability on a scale of 1-5, 1 very uncomfortable, and 5 very comfortable

Preliminary Test Results

The results yielded were consistent throughout the questionnaire. I was most elated when the most important question "Knowing that this system is intelligent, would you, the user, be comfortable to give autonomy to the system to decide on your behalf to manage appliances based on data previously collected?" All participants expressed comfortability, which was one of the main goals of my research.



Citations

Agarwal, R., Garg, M., Tejaswini, D., Garg, V., Srivastava, P., Mathur, J., & Gupta, R. (2023). A review of residential energy feedback studies. *Energy and Buildings*, *290*, 113071. https://doi.org/10.1016/j.enbuild.2023.113071

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