Team 18

Comfort Control System

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Customer Background

Chakolas is focused on creating a neural network powered solution for a residential thermostat

Problem Statement

The team must create an analytical model and a physical model that a future software team can use to test and compare their neural network thermostat to existing solutions.

Requirements

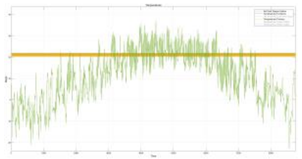
Analytical Model
- Completed in MATLAB & Simulink
- Simulates same box size as real life but can be scaled to full size house

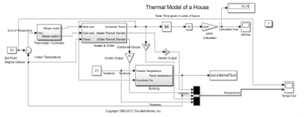
Physical Model
- 1 foot cube
- Heat and Cool
- Effectively hold temp

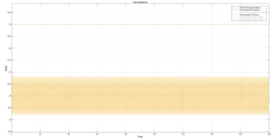
Experimentation & Concepts

MATLAB

A test was ran with a simulated version of the Physical Box over a year of real temperatures taken from West Lafayette in 2023.

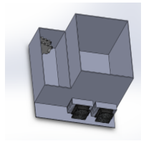






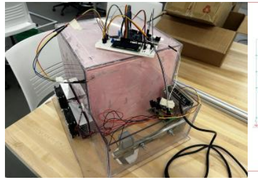
3 Hour MATLAB Sim W/ Ambient Temp @ 23deg C

Physical Box

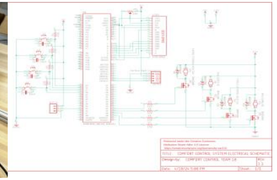


Final Design

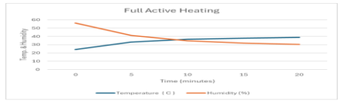
FInal Product Picture



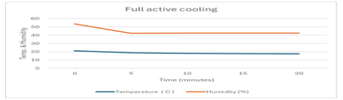
Schematic



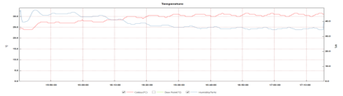
Testing



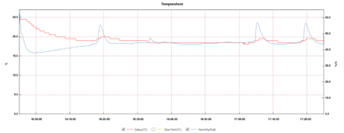
20 min heating



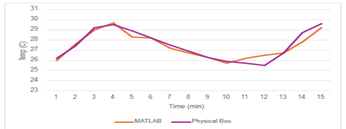
20 min cooling



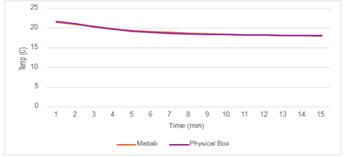
1 hour 30 min Heat (static set temp)



1 hour 30 min Cool (static set temp)



Matlab vs. Real Box Heat



Matlab vs. Real Box Cool