



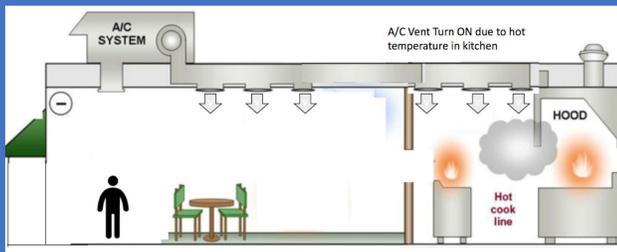
Abstract

The HatchTank SMARTair Lighting system is revolutionizing HVAC systems within buildings by combining ventilation and lighting fixtures into one structure that automates adjustments based on room usage and user preference.

Our team has designed the damper control and networking for the SMARTair system which allows strategic distribution of airflow within a building using electronic vents that wirelessly send and receive room usage data from the integrated sensors.

Need for Product

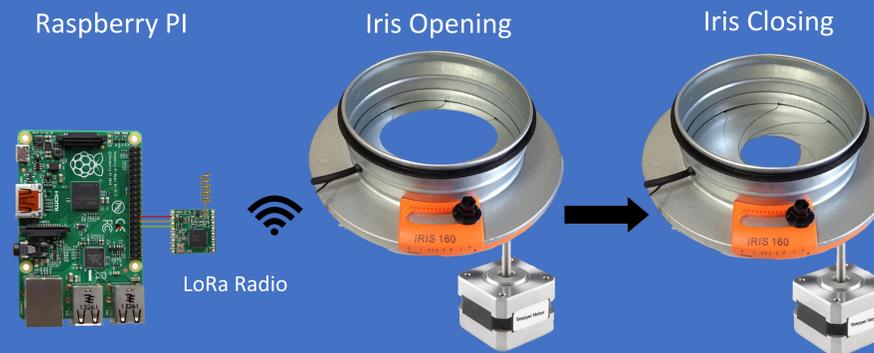
HVAC will be a large contributor to climate change, so more efficient use of HVAC for both human comfort and energy usage is our goal. Our product will minimize energy consumption and innovate heating and cooling systems by directing air flow to high usage rooms and predictive activation of the AC/Heater/Heat Pump.



Design Concept

By interfacing LoRa radios with Raspberry Pi microcomputers we've established a communication network between the wall mounted UI, sensor data, and vent aperture. Using Python, we programmed a PID controller to take in sensor data and make calculated adjustments to the stepper motor controlling the vents' aperture.

Network



Components



Conclusion

Adjustments are made based on multiple factors in the environment which provides temperature regulation with little to no input from the user. From controlling individual room temperatures to making automated adjustments this system is ideal for any household or building seeking comfort, control and savings on energy bills. The addition of various functionalities over traditional HVAC will continue to advance with future developments.

Acknowledgements

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Flowchart

SMARTair Building Flowchart

