September 7th, 2022

Project and Group Selection

Team Members:

Group Number: 3

First Name	*Last Name*	*Student #*
Pierino	Zindel	8802270
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Proposed Project

Proposal:

Create a series of electronically controlled and networked air vents for homes with central HVAC systems such that the heating & cooling of rooms can be controlled more modularly and on an automatic schedule.

The vents will feature:

- a motor to control the vent position,
- wireless communication to connect back to a central hub that can be accessed by the homeowner for system control, and
- sensor input (e.g. temperature) to provide live data from the room condition.

onsemi is willing to provide us with some of their RSL15 development boards which feature Bluetooth 5.2 and ultra-low power operation which would be ideal for this project since the vents will have much idle time where minimum power should be consumed.

Current Technologies:

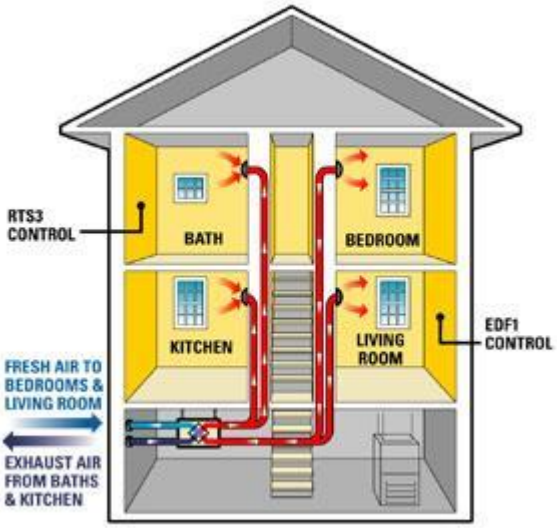
Air vents currently found in homes (such as the one pictured below) allow homeowners to open and close the vents to allow or impede the movement of forced air to specific sections of the home. However, these vents need to be physically and manually opened/closed which means they are typically just left open. As a result, whenever the central HVAC systems turn on (generally via automatic thermostat setting), the entire house is heated/cooled, resulting in more significant energy expenditure and slower response time for desired areas of the home to reach the set temperature.

September 7th, 2022

The development of a “smart” ventilation system will allow the heating/cooling of the home to be controlled more dynamically, either by a timed schedule or via direct user control.
For instance, when a user goes to sleep, they are only using the bedroom, and thus only the bedroom requires heating. Shortly before their scheduled wake-up time, the system will open the vents in the bathroom to heat it quickly. This can be expanded to a full weekly routine that follows the typical user’s typical routine.

Images of typical air vents found in homes (image source: IntallerStore.com)

Example of common central heating system to forces air to all sections of a house (image source: HamletHub.com)



September 7th, 2022

Block Diagram: