It's Getting Hot in Here!

Baker, Gavin (School: Fleming Island High School)

A lot of people struggle with their air conditioning system with problems like hot and cold spots. Air conditioning systems need to be more effective in cooling and heating rooms properly and adapt to the changing needs of each room. If smart vents are used to open and close dampers then they will decrease hot spots and cold spots because smart vents will direct conditioned air where needed and adapt to different settings. The original experimental procedure performed in 2016 included building a makeshift air conditioner from PVC pipes and cardboard boxes. It also included programming a Raspberry Pi to both read temperature sensors and open and close dampers driven by servos. This engineering design project took the concept to the next stage by researching commercial-grade components that could be used to implement the concept. Bluetooth functionality was used to show the most critical feature of the smart vent, wireless control. The original experiment proved the hypothesis correct. By controlling the airflow using servo motors, or “smart vents”, it balanced the HVAC system. The prototype built shows that the design constraints established to fulfill the vision of the smart vent. It can be met with existing technology and limit owner involvement beyond anything more than setting the desired temperatures of each room in the house using their smartphone. Future iterations of the design will require the creation of each of the three dedicated components for the system to operate as envisioned.

Awards Won:

Arizona Public Service Company: First Award $4,000