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SMART VENT: A BREATH OF FRESH AIR

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Launch Pilot

OBJECTIVE

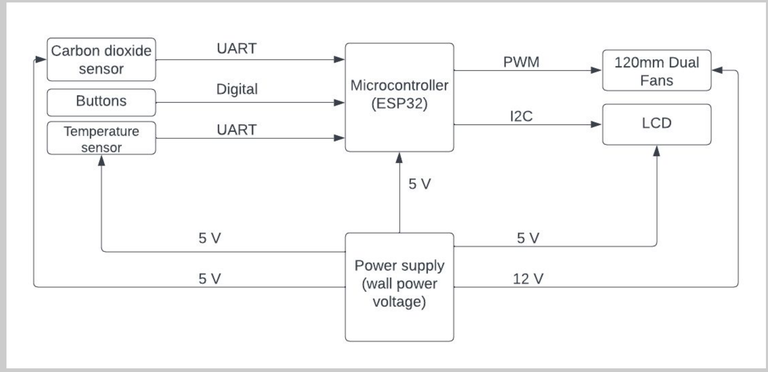
Our objective is to design a air vent that monitor and improve air quality while implementing the idea of smart devices - devices that can connect to Wifi, and communicate with other devices.

OVERVIEW

- Indoor air quality is important for health and well-being
- The commercial demand for smart vent systems is growing
- These systems are also energy efficient
- Used in Homes, Offices, & Universities
- High level of CO_2 can lead to health risks, fatigue, & decreased cognitive function
- Device CO_2 threshold levels:
  - **Good: <800**
  - **Moderate: 800-1400**
  - **Poor: 1401-2000**
  - **Unhealthy: 2001-3000**
  - **Hazardous: >3000**

METHOD & APPROACH

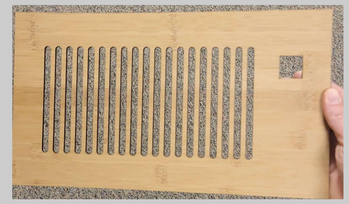
- Our Smart Vent is designed to monitor and improve air quality in its surroundings, it uses a sensor that detects both carbon dioxide levels and temperature.
  - MQ135 + DHT11
- Ability to connect to Wifi and other smart devices.
  - ESP32 Feather: Wifi + Bluetooth
- Fans
  - 120mm Regular 12V
- Display
  - Lilygo ESP32 > 128x64 Monochrome OLED



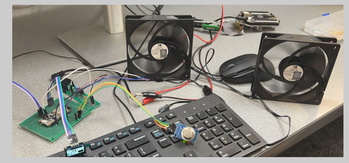
BLOCK DIAGRAM

PROTOTYPING

- Challenges:
  - Sensor calibration
  - Switching fans off
  - OLED Display location
- Change in sensor:
  - MQ135 > MHZ19B
- OLED Display
  - Face of the Grill > Outlet > Isolated
- Tools: KiCad, SolidWorks, PlatformIO (Vscode)



PROTOTYPE GRILLE



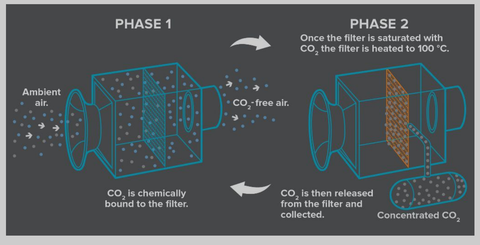
PROTOTYPE

USER MANUAL

DEMO

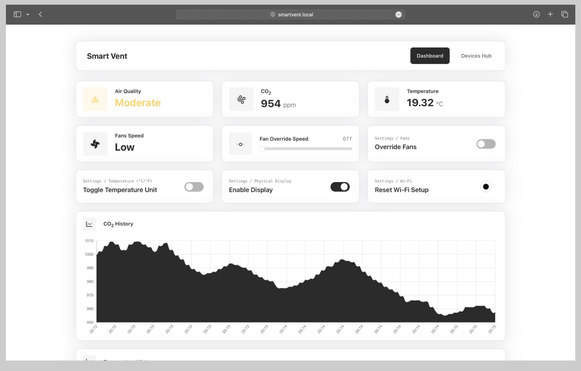
EXISTING SOLUTIONS

- Keen Home Smart Vent - Open and Closes autonomously.
- Expensive filtration systems.
- Gas alarm systems without venting option



FINAL RESULTS

- Features: Display, Wi-Fi, Buttons, CO_2 sensor
- User Interface: A dashboard for for the user to monitor the temperature and CO_2 level remotely
- Remote communication between devices



DASHBOARD

FINAL PRODUCT

Department of Electrical and Computer Engineering

Portland State UNIVERSITY

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