Intelligent window control for energy efficiency and health

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Smart Windows for a Sustainable and Safe Home

IoT Controlled Window Opening

- Indoor temperature
- Secure time to open (vacation mode)
- Human override for accessibility

Cloud Monitoring and Control for Homeowners

- Outdoor temperature
- Air Quality
- Humidity

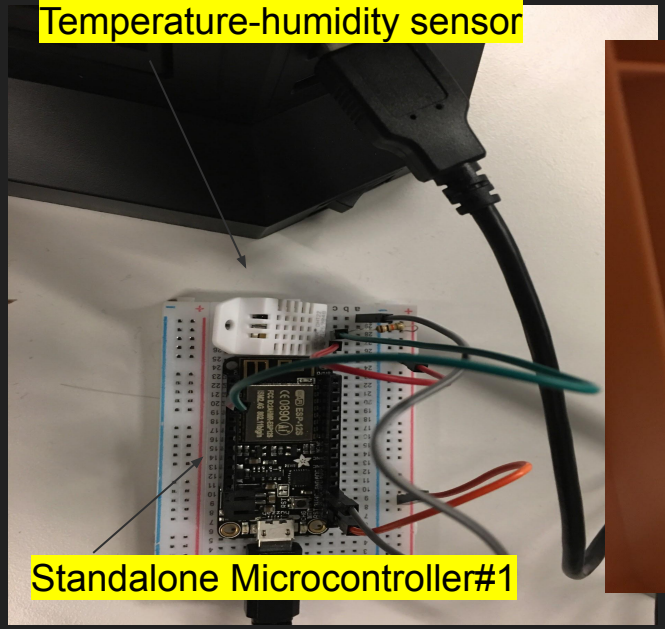
Devices and Stack

- 2x Adafruit Feather Huzzah ESP8266 (2)
  - DHT22 - temp/humidity sensor
  - Tower Pro SG92R - control servo
  - Tactile switch - human control
- 1x Playmobil toy house

- Arduino IDE + maker libraries, C
- Adafruit IO cloud, realtime data feeds
- React/Node/Express web app
- Script running on cron job to pull from weather and air quality APIs and publish to Adafruit IO feeds

Devices and Stack (cont'd)

Temperature-humidity sensor



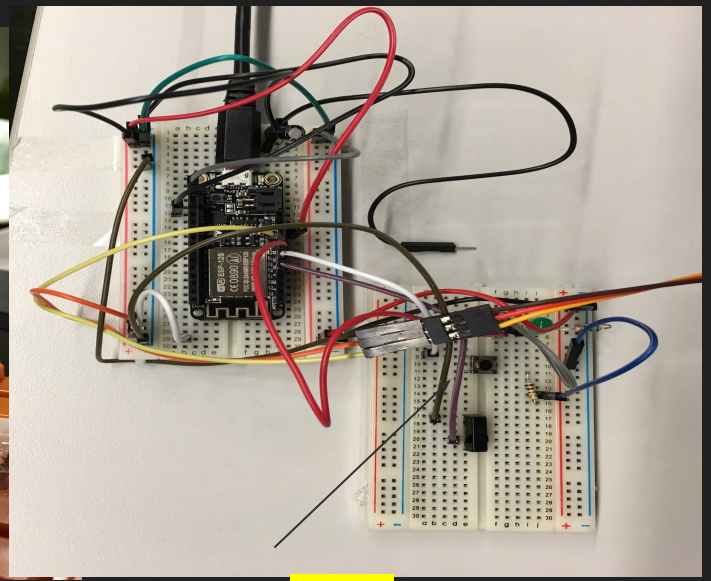
Standalone Microcontroller#1

- measure temperature and humidity
- publish to io-hub in real-time

Servo opening/closing door

Standalone Microcontroller#2:

- control servo
- subscribe to io-hub
- control logic



switch for manual intervention through servo

DEMO: Click here to watch in YouTube!

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Problem Statement

Current IOT climate control solutions focus on thermostat and ignore energy savings and health benefits of heating and cooling via open windows.

Our Story

- Some of us live with people audacious enough to bump the A/C up when it’s colder outside than it is inside.
- From removing indoor pollutants to letting in beneficial outdoor microbes, open windows boost health.
- Power of IoT means that we don’t have to choose between convenience and sustainability or health.

Our Approach

- Intelligent window control
- Vacation mode for security
- Internal temperature monitoring
- Outdoor weather and air quality monitoring
- Remote control options for accessibility and convenience
- *Forecast monitoring to determine optimal time of day to open windows*Still to do...
- Add sensors to make sure people, pets, and objects aren’t nearby
- Control window treatments