225 Building Environment Report

NEU Seattle Devs (Hot Sauce)

2025-03-27

Table of contents

1 Sensor Charts **2**
1.1 Temperature . . . 2
1.2 Humidity . . . 2
1.3 CO2 . . . 3
1.4 PM2.5 . . . 3

2 Comfort Level & Indoor Climate Score **3**

3 Indoor Comfort Score (ICS) Calculation **4**
3.1 **Comfort Levels** . . . 4
3.2 **Scoring Logic** . . . 4
3.2.1 **How the Score is Calculated** . . . 4

Sensor Data Summary
Start Time: 0:00 | End Time: 7:59

	Temperature		Humidity		CO2		PM2.5	
	min	max	min	max	min	max	min	max
Sensor Name								
Sensor 3 - Event Space	23	24	44	45	411	448	0	0
Sensor 6 - Room 216	24	24	43	43	482	572	10	10
Sensor 7 - Staff Space	21	24	45	50	472	586	0	0

1 Sensor Charts

1.1 Temperature

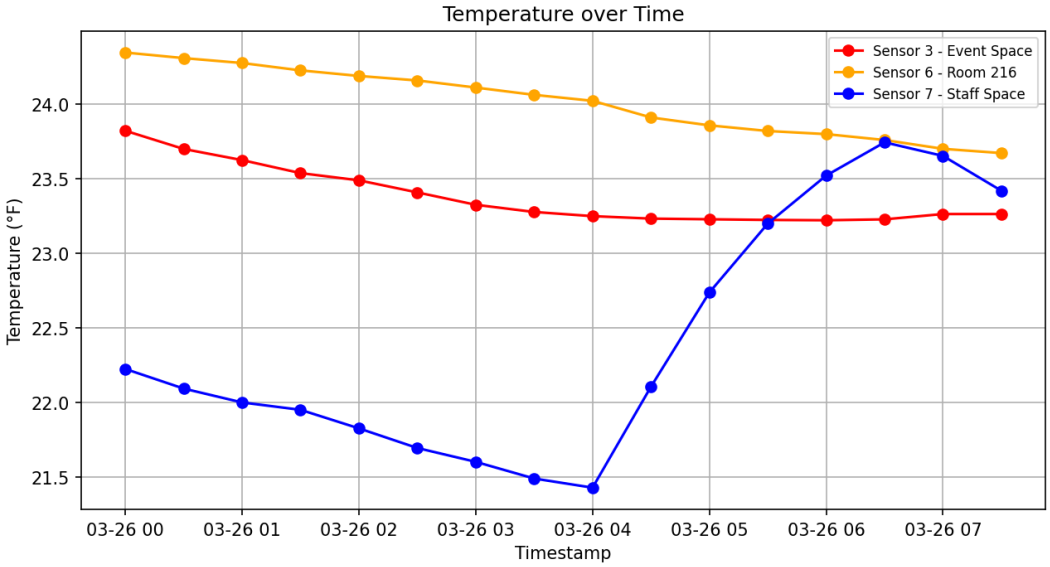

Figure 1: Temperature

1.2 Humidity

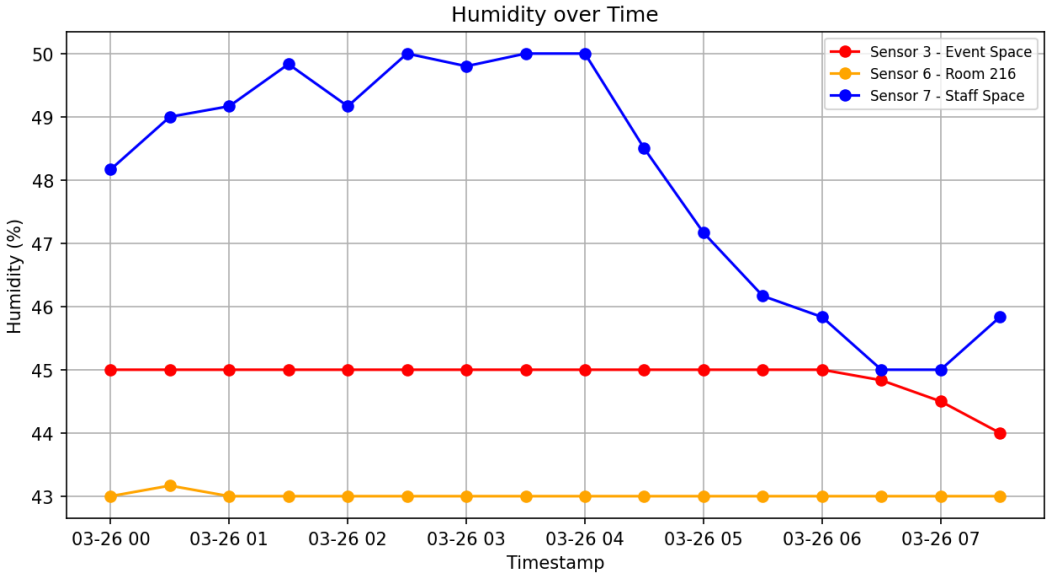

Figure 2: Humidity

1.3 CO2

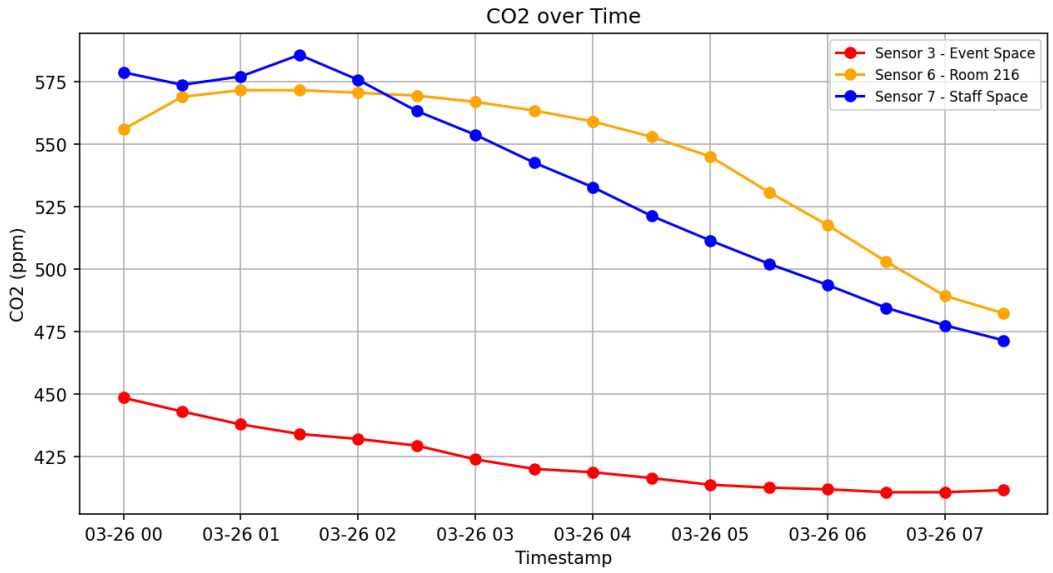

Figure 3: CO2

1.4 PM2.5

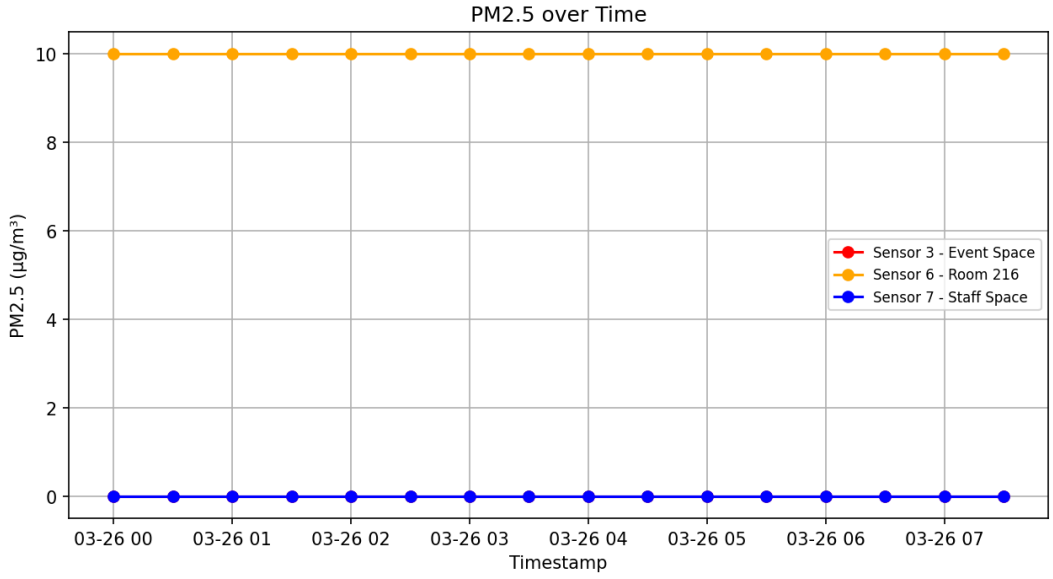

Figure 4: PM2.5

2 Comfort Level & Indoor Climate Score

`Indoor Comfort Score: 0.17`

3 Indoor Comfort Score (ICS) Calculation

3.1 Comfort Levels

- **Excellent (90-100)** – Ideal indoor conditions, highly comfortable.
- **Good (75-89)** – Slight deviations, but still comfortable.
- **Moderate (50-74)** – Noticeable discomfort, but tolerable.
- **Poor (25-49)** – Significant discomfort, action needed.
- **Unacceptable (0-24)** – Severe discomfort, unhealthy conditions.

3.2 Scoring Logic

The **Indoor Comfort Score (ICS)** is based on four key indoor environmental factors:

Factor	Optimal Range
Temperature (°F)	**69.8 - 77**
Humidity (%)	**40 - 60**
CO2 (ppm)	**400 - 800**
PM2.5 (µg/m³)	**0 - 12**

3.2.1 How the Score is Calculated

1 **Ideal Conditions:**
- If a value falls **within the optimal range**, no penalty is applied.

2 **Penalty for Deviations:**
- If a value is **outside the optimal range**, a **sigmoid-based penalty** is applied:
- **Small deviations → minimal penalty**
- **Larger deviations → exponentially stronger penalty**

3 **Final Score Calculation:**
- The **Indoor Comfort Score (ICS)** is computed using a **weighted geometric mean**:
- Ensures **no single factor dominates**
- Balances **all environmental parameters proportionally**
- Generates a **realistic comfort score**

Sensor Models: ESP8266, PMS5003(PM2.5), SHT31-D(Temp/Hum), S8(CO2)
Calibration Date: January 15, 2025
Sampling Interval: 5 minutes