Indoor Air Quality Monitoring System Simulation

This application simulates the **Indoor Air Quality Monitoring System with Fuzzy Logic Control Based On IOT** described in the research paper by Fadli Pradityo and Nico Surantha. It models CO2 and PM10 levels, applies a Mamdani fuzzy logic system to control an exhaust fan, and visualizes the air quality over time.

Simulation Parameters

Initial CO2 (PPM)

1500

500 2000

Initial PM10 (µg/m³)

300

50 500

Simulation Duration (minutes)

30

5 120

Environmental Increase Rates (per second when fan is OFF):

CO2 Increase Rate (PPM/s)

0.50

0.00 1.00

PM10 Increase Rate (µg/m³/s)

0.45

0.00 0.50

Exhaust Fan Reduction Rates (per second when fan is ON):

CO2 Reduction Rate (PPM/s)

3.20

1.00 10.00

PM10 Reduction Rate (µg/m³/s)

11.70

5.00 30.00

Run Simulation

Simulation Results

Simulation Summary (Duration: 30 minutes)

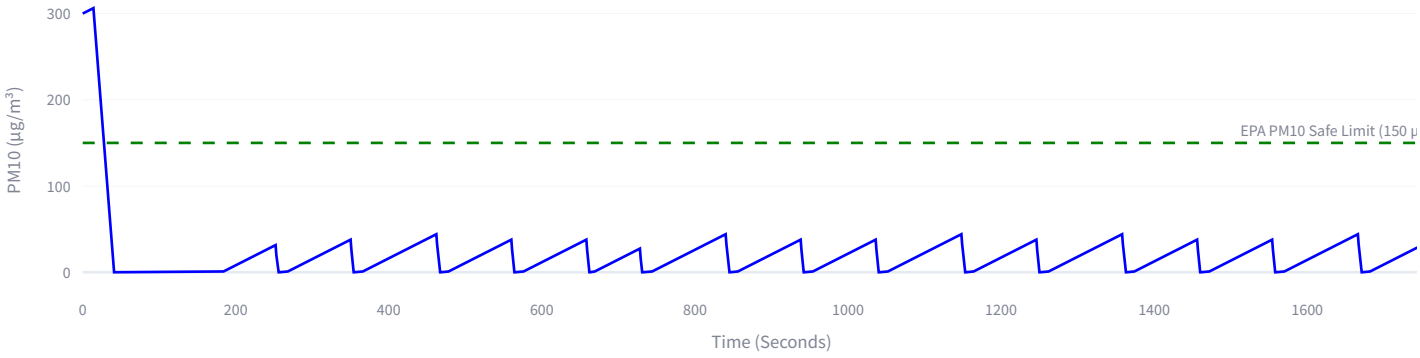
- **Total time CO2 was within safe limits (<1000 PPM):** 1514 seconds
- **Total time PM10 was within safe limits (<150 µg/m³):** 1773 seconds
- **Total time both CO2 and PM10 were safe:** 1514 seconds
- **Total time exhaust fan was active:** 387 seconds

Note: The paper's safe thresholds are CO2 ≤ 1000 PPM and PM10 ≤ 150 µg/m³.

Air Quality Trends Over Time

CO2 Concentration Over Time

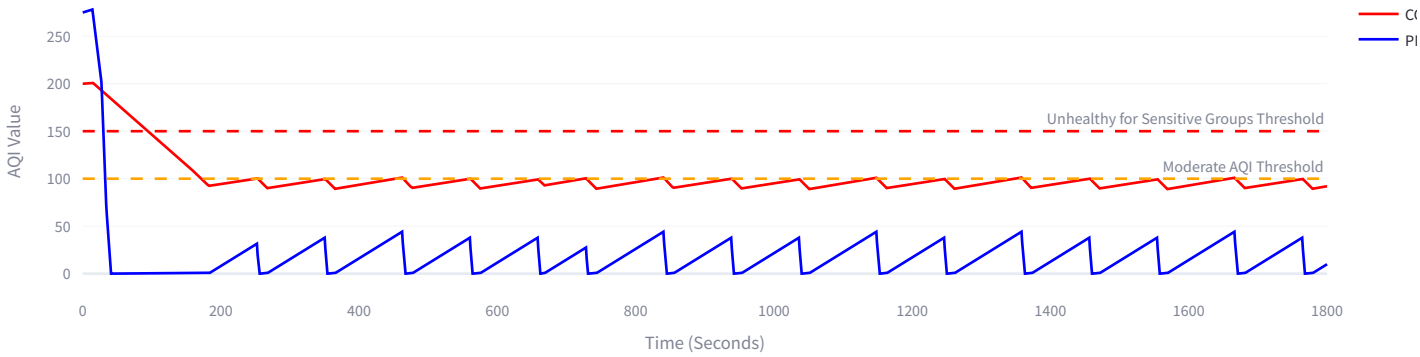
PM10 Concentration Over Time



Exhaust Fan Activity Over Time

Simulated AQI Over Time

Simulated AQI Values



Raw Simulation Data

	Time_Seconds	CO2_PPM	PM10_UG/M3	Fan_Active	CO2_AQI	PM10_AQI	Is_AQI_Safe
588	588	965.2	6.3	0	91.3	6.3	☑
589	589	965.7	6.75	0	91.425	6.75	☑
590	590	966.2	7.2	0	91.55	7.2	☑
591	591	966.7	7.65	0	91.675	7.65	☑
592	592	967.2	8.1	0	91.8	8.1	☑
593	593	967.7	8.55	0	91.925	8.55	☑
594	594	968.2	9	0	92.05	9	☑
595	595	968.7	9.45	0	92.175	9.45	☑
596	596	969.2	9.9	0	92.3	9.9	☑
597	597	969.7	10.35	0	92.425	10.35	☑