CSI 2372

Full-Semester Project

CitySense: Urban Sensor Analytics & Incident Response Simulator

Project Proposal

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Problem Statement

Large cities accumulate tremendous amounts of noise, pollutants, and people, leading to uncomfortable living conditions for their occupants and commuters. Analyzing trends in these areas can lead to improvements in infrastructure and provide smoother living conditions. The purpose of the CitySense application is to simulate the analysis of urban sensor data including traffic congestion, air quality, and noise spikes in the form of CSV and JSON files and produce actionable reports using modern C++20 practices.

Sample Data

Readings for each sensor are in the following units: traffic (T) in km/h, air-quality (AQ) in PM, and noise (N) in dB.

CSV example data:	JSON example data:
timestamp,sensorID,zoneID,reading 2025-10-24T01:23:00,N01,A,70 2025-10-24T 09:12:00,T01,B,75 2025-10-24T 12:45:00,AQ01,C,2.5	[{ “timestamp”: 2025-10-24T01:23:00, “sensorID”: “N01”, “zoneID”: “A”, “reading”: 70 }, { “timestamp”: 2025-10-24T 09:12:00, “sensorID”: “T01”, “zoneID”: “B”, “reading”: 75 }, { “timestamp”: 2025-10-24T 12:45:00, “sensorID”: “AQ01”, “zoneID”: “C”, “reading”: 2.5 },]

Risk List

Risk description	Likelihood	Impact	Mitigating action
Basic CI testing fails	High	Low/medium	Push many times throughout testing to catch bugs and errors early.
Estimated time for deliverables is not met	Medium/high	High	Set aggressive deadlines for deliverables and check-in with group mates on weekly basis to reallocate load if necessary.
Work is accidentally deleted/lost	Medium	High	Push regularly to the GitHub so copy history is available.
Compilation or runtime errors during testing.	High	Low	Implement error messages and handling to print diagnostic messages.