

Problem Statement 5

Problem Title

Data-Driven Urban Systems for Sustainable, Healthy and Agriculturally-Supported Smart Cities

Background & Context

Urban environments generate vast amounts of data from transportation, energy, waste management, and public services, while also depending on agricultural supply chains and healthcare systems for sustainability and resident well-being. However, much of this data remains underutilized and disconnected, limiting its potential to inform planning, sustainability efforts, and quality-of-life improvements that integrate urban, health, and agricultural considerations.

Detailed Problem Description

Design a digital platform that integrates diverse urban data sources with agricultural supply data and public health indicators to support analysis, visualization, and decision-making for holistic city management. The system should help stakeholders understand patterns, anticipate challenges, and evaluate the impact of interventions across urban development, health outcomes, and food system sustainability. The emphasis should be on building a flexible, scalable data platform that supports long-term urban intelligence while considering health-agriculture-urban nexus.

Objectives

Develop a data integration and visualization platform that includes:

1. Data ingestion from multiple simulated sources (traffic, weather, health, agriculture)
2. Data processing and storage pipeline
3. Dashboard with key metrics and visualizations
4. Predictive analytics or simulation capabilities

5. Tools for scenario planning (what-if analysis)
6. APIs for data access and integration
7. Can also implement machine learning if intended for any application upon this.

Expected Outcomes

- Working data pipeline from ingestion to visualization
- Interactive dashboard with multiple data views
- Implementation of analytics/algorithms for insights
- Demonstration with sample/simulated data sets
- Evidence of handling real-time or near-real-time data
- Documentation of data models and API endpoints
- Working and efficiency of the algorithm implemented

Judging Criteria

Criterion	Description
Data Integration:	<ul style="list-style-type: none"> • Quality of data pipeline design and implementation • Handling of diverse data types and formats • Scalability and performance of data processing
Analytics & Insights:	<ul style="list-style-type: none"> • Usefulness of analytics and visualizations • Innovation in data analysis approaches • Quality of predictive models or simulations • Quality and efficiency of algorithm implemented
System Design:	<ul style="list-style-type: none"> • Architecture for data processing and storage • API design and integration capabilities • User interface and experience of dashboard
AI-Driven Innovation (Bonus):	<ul style="list-style-type: none"> • In recognition of the current AI-driven technological landscape, any technically sound implementation or feature leveraging Artificial Intelligence (AI), Machine Learning (ML), or data-driven intelligence to enhance system performance, automation, adaptability, or decision-making can be considered for additional bonus points, provided it is relevant, efficient, and well-justified.

Target Stakeholders / End Users

Urban planners, municipal authorities, researchers, citizens, public health officials, agricultural suppliers, and community organizations.

Suggested Solution Approaches

Data pipelines, analytics systems, visualization tools, cloud-based platforms with integration of health data streams, agricultural market data, and urban IoT networks.

Constraints & Considerations

Data integration challenges, governance, scalability, ethical use, and balancing urban development needs with health priorities and agricultural sustainability.