AIR QUALITY ANALYSIS AND PREDICTION IN TAMILNADU

Creating a comprehensive plan for an air quality analysis and prediction project in Tamil Nadu requires careful problem definition, design thinking, and a structured approach. Below is a high-level outline of the elements you've mentioned:

Problem Definition:

Problem: High air pollution in Tamil Nadu leads to health issues and environmental degradation.

Scope: Develop an air quality analysis and prediction system for Tamil Nadu.

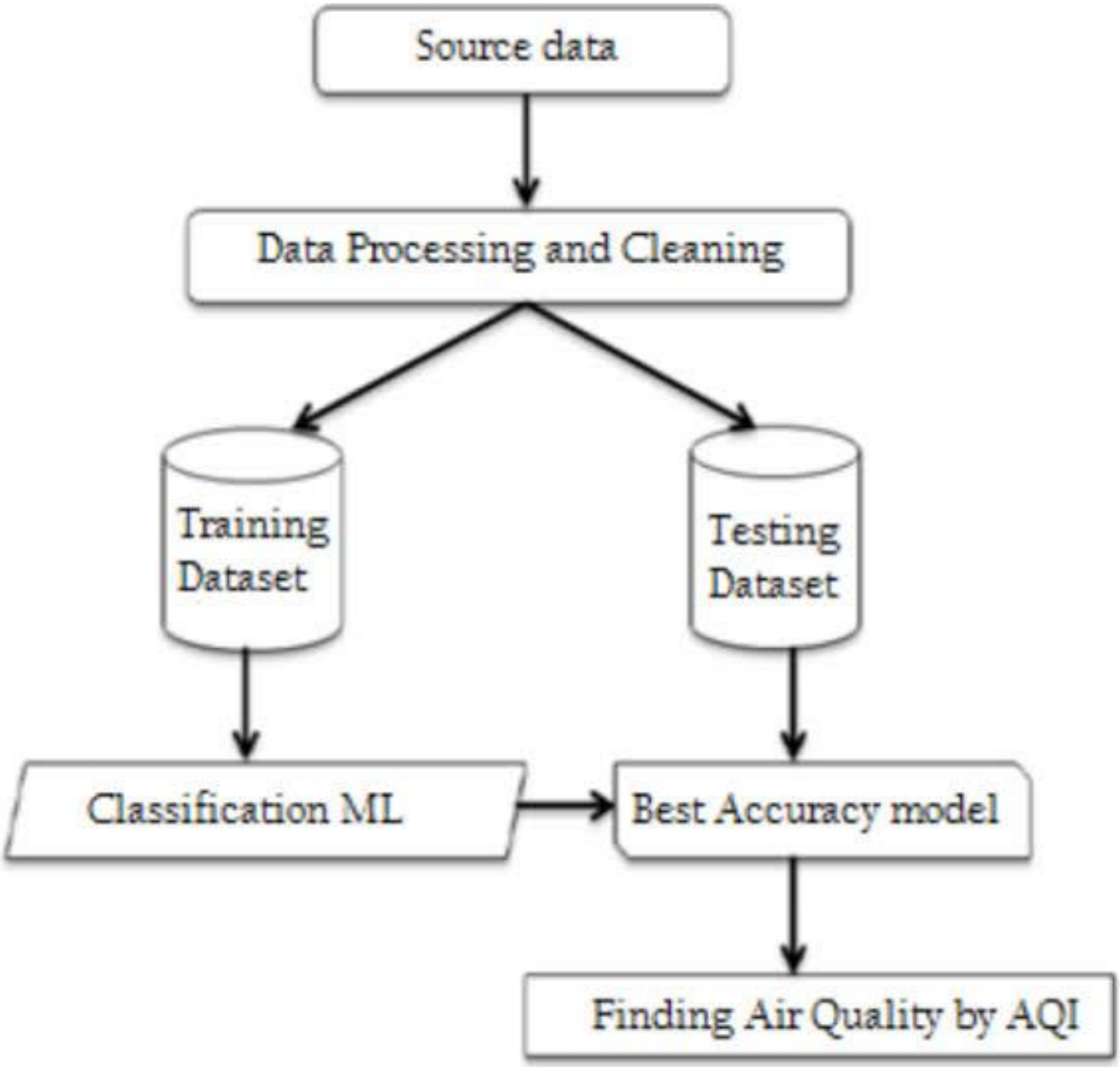
Design Thinking Problem Goals:

1. Understand: Gain a deep understanding of the factors contributing to air pollution in Tamil Nadu.
2. Ideate: Brainstorm innovative solutions for monitoring and predicting air quality.
3. Prototype: Develop a working model or system for air quality analysis.
4. Test: Evaluate the system's effectiveness and reliability.
5. Implement: Deploy the system for real-time air quality monitoring and prediction.

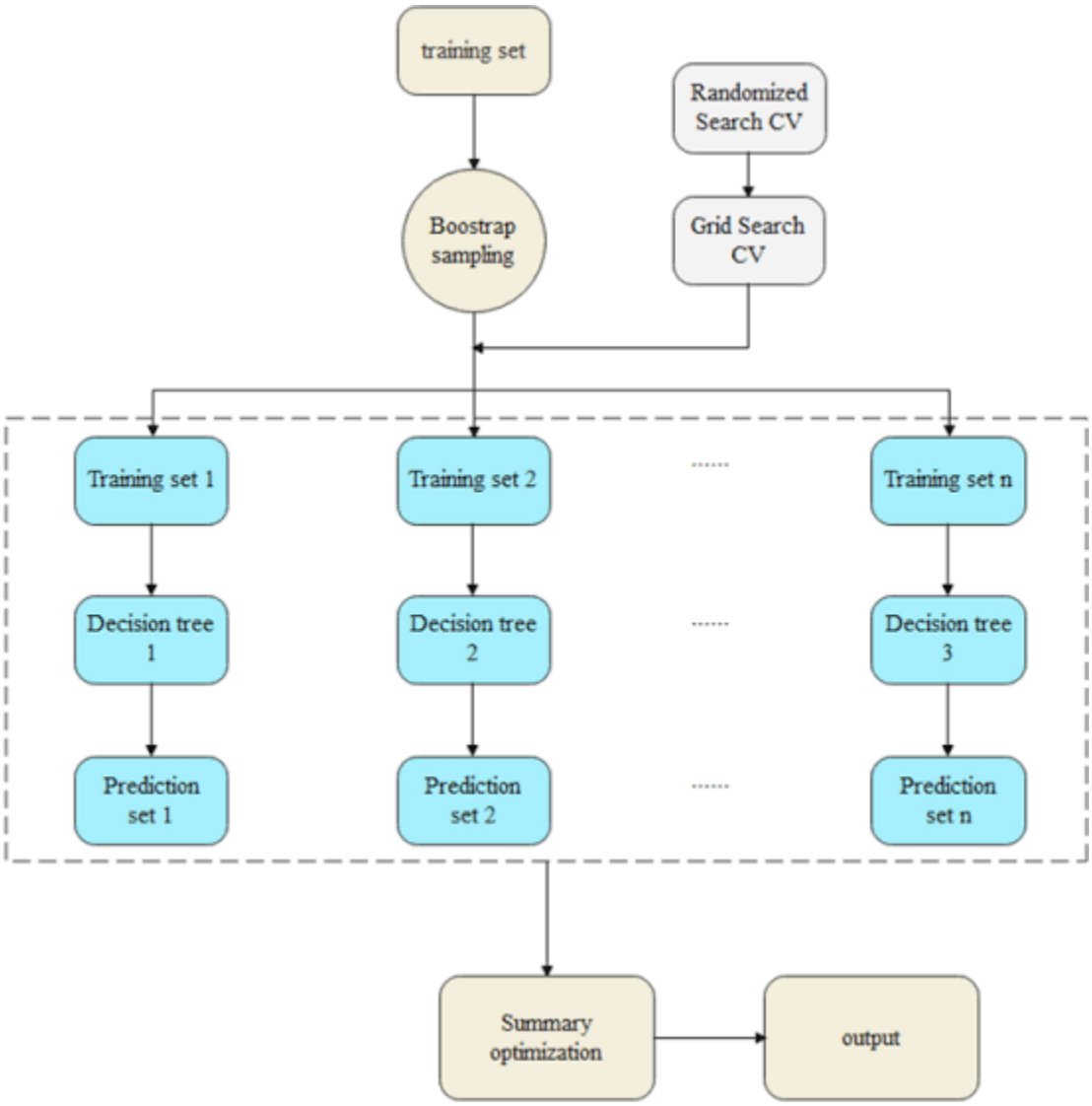
Project Objectives:

1. Data Collection: Gather historical and real-time air quality data from sensors, satellites, and government sources.
2. Data Preprocessing: Clean, integrate, and prepare the data for analysis.
3. Feature Engineering: Identify relevant features, such as pollutants, weather, and location data.
4. Model Development: Build machine learning models for air quality prediction.
5. Evaluation: Assess the model's accuracy and reliability using validation data.
6. Real-time Monitoring: Implement a system for real-time air quality monitoring.
7. Early Warning System: Create alerts and warnings for poor air quality events.
8. Data Visualization: Develop visualizations to make data accessible to the public.
9. Policy Recommendations: Suggest policy changes based on the analysis.

Flow chart


Source data
Data Processing and Cleaning
Training Dataset
Testing Dataset
Classification ML
Best Accuracy model
Finding Air Quality by AQI

Entity Relationship Diagram(ER Diagram):



Algorithm Steps (for Air Quality Prediction):

1. Data Ingestion: Collect data from various sources, including sensors and satellites.
2. Data Preprocessing: Clean and format the data, handle missing values, and perform quality checks.
3. Feature Selection: Identify relevant features (e.g., pollutant levels, meteorological data).
4. Model Selection: Choose appropriate machine learning algorithms (e.g., regression, neural networks).
5. Model Training: Train the model using historical data.
6. Model Evaluation: Validate the model's performance using test data.
7. Real-time Data Integration: Continuously collect and integrate new data.
8. Real-time Prediction: Apply the trained model to predict current air quality.
9. Alert Generation: Generate alerts or warnings when air quality is poor.
10. Data Visualization: Create visualizations to present air quality data to the public and stakeholders.
11. Policy Recommendations: Based on analysis, propose policy changes to reduce air pollution.