AIR QUALITY ANALYSIS AND PREDICTION

IN TAMILNADU

Problem Statements:-

* Tamil Nadu faces significant challenges related to

air quality ,with various regions

experiencing high levels of pollution due to

industrial activities , vehicular emissions and

natural factors.

* This document presents a multifacted

strategy combining technology,data science,

and community engagement to tackle this

problem.

Innovative Solutions:-

* AirQuality Montoring Solutions
* Machine Learning Models
* Satelliate Data Integration
* Mobile Apps for Citizen Engagement
* Air Quality Index (AQI) Alerts

Dataset Link:“https://tn.data.gov.in/resource/location-wise-daily-ambient-air-quality-tamil-nadu-year-2014”

Columns Details:-

* Stn Code
* State
* City/Down/village
* Location of Monitoring Station
* Agency
* Type of Location
* SO2

NO2

RSPM/PM10

SPM

**Details about column details:**

* **Std Code:STD stands for Subscriber Trunk Dialling.To find STD code of any city from drop down select box.**
* **State:In this dataset we use the state TamilNadu.In That state We find the air quality analysis and prediction.**
* **City/Town/Village:In the dataset we use the city, town,villages like chennai,coimbatore,madurai,salem,thoothukudi.**
* **Location of Montoring Station: The location of montoring station in the dataset is Kathivakkam,Govt.High Secondary School,Thiruvottiyur,Madras Medical,etc...**
* **Agency:The agency we use in the datasets is TamilNadu,Thiruvottiyur Municipal Office, Chennai etc..**
* **Type of Location:In this datasets we use the location likes Industries Area,National Environmental Engineering Research Institute,Tamilnadu State Pollution Control Board etc..**

Libraries Used :

In this we use a libraries like Numpy,Pandas,Matplotlib,Seaborn and import the packages like warnings and fliters.

Way to install the libraries:

* Make sure Python and pip is preinstalled on your system.
* To check python version: “python --version”
* To check pip:”pip -V”
* Numpy:It is a python library,used to solve numerical problems.It stands for NumericalPython.It can be installed as follows “pip install numpy”.
* Matplotlib:Is a python library that helps to plot graphs.It used in data visualizations and graphical plotting.It can be installed as “pip install matplotlib”
* Pandas:Pandas is a python package that is used for data analysis and manipulation.Is a open source libaries that is built over numpy. It can be installed as “pip install pandas”

Train and test :

Now we train and test our dataset as follow:

* Data collection:Gather historical air quality data for various locations in Tamil Nadu. This data should include information on pollutants such as PM2.5, PM10, NO2, SO2, CO, O3, and meteorological data like temperature, humidity, wind speed, and direction.
* Model Evaluation:Evaluate the model's performance on the test set using appropriate evaluation metrics like Mean Absolute Error (MAE), Mean Squared Error (MSE), Root Mean Squared Error (RMSE), or R-squared (R2) score.Use time series-specific evaluation techniques if applicable, such as time-series cross-validation or rolling origin validation.
* Model Deployment:Once you have a satisfactory model, deploy it to make real-time air quality predictions. This could involve creating a web-based dashboard or integrating it into existing monitoring systems.
* Ethical considerations:Be mindful of the ethical considerations surrounding data collection, privacy, and transparency in your project.

Rest of Explanation:

* Engage local communities in monitoring air quality. Provide them with low-cost air quality monitoring kits and training to collect data in their neighborhoods. This grassroots approach can supplement official monitoring efforts.
* Accuracy:
* From sklearn import the metrics ad mean square error.
* Mean squared error (MSE): MSE is a measure of the average squared difference between the predicted and actual values.