



**Chettinad**

College of Engineering & Technology

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Domain Name : Data Analytics with Cognos**

**Project Title : Air Quality Analysis in Tamil Nadu**

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## **PROBLEM DEFINITION :**

Air quality analysis in Tamil Nadu is the process of monitoring and assessing the quality of the air in the state. This is done by collecting and analyzing data on air pollutants such as particulate matter (PM), sulfure dioxide (SO<sub>2</sub>), and nitrogen dioxide (NO<sub>2</sub>).

Air quality analysis in Tamil Nadu is important because air pollution can have a significant impact on human health and the environment. Air pollution can cause respiratory problems, heart disease, and cancer. It can also damage plants and animals , and contribute to climate change.

The Tamil Nadu Pollution Control Board (TNPCB) is responsible for monitoring and assessing air quality in the state. The TNPCB operates a network of air quality monitoring stations across Tamil Nadu. These stations collect data on air pollutants on a continuous basis.

The TNPCB uses the data collected from its air quality monitoring stations to calculate the Air Quality Index (AQI). The AQI is a measure of the overall air quality in a particular area. It is calculated using a formula that takes into account the concentrations of different air pollutants.

The AQI is divided into six categories: good, satisfactory, moderate, poor, very poor, and severe. The higher the AQI, the worse the air quality.

## **DESIGN THINKING :**

Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems, and create innovative solutions to prototype and test. Design

thinking is a human-centered approach to design that focuses on the needs and wants of the users.

Design thinking can be applied to air quality analysis in data analysis in the following ways:

1. **Empathize with the users.** Who are the users of the air quality analysis? What are their needs and concerns? What do they hope to achieve by using the data?
2. **Define the problem.** What is the specific problem that the air quality analysis is trying to solve? What are the key factors that contribute to the problem?
3. **Ideate.** Brainstorm a variety of possible solutions to the problem. Be creative and don't be afraid to think outside the box.
4. **Prototype.** Build prototypes of the different solutions and test them with users. Get feedback from users and refine the prototypes as needed.
5. **Test and implement.** Once the prototype has been refined, test it in a real-world setting. Collect data and feedback from users, and make further adjustments as needed.

Here are some specific examples of how design thinking can be applied to air quality analysis in data analysis:

- **Developing a new air quality monitoring system.** A team could use design thinking to develop a new air quality monitoring system that is more accurate, affordable, and easier to use than existing systems.

- **Creating a data visualization tool for air quality data.** A team could use design thinking to develop a data visualization tool that makes it easy for users to understand and interpret air quality data.
- **Designing a public awareness campaign about air quality.** A team could use design thinking to develop a public awareness campaign that educates people about the importance of air quality and the steps they can take to improve it.

Design thinking is a powerful tool that can be used to develop innovative and effective solutions to air quality problems. By focusing on the needs of the users and iteratively developing and testing solutions, design teams can create solutions that have a real impact on people's lives.

## DATA SOURCE :

Stn Code	Sampling Date	State	City/Town	Location of Monitoring Agency	Type of Location	SO2	NO2	RSPM/PM 2.5
38	01-02-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	11	17	55 NA
38	01-07-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	13	17	45 NA
38	21-01-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	12	18	50 NA
38	23-01-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	15	16	46 NA
38	28-01-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	13	14	42 NA
38	30-01-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	14	18	43 NA
38	02-04-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	12	17	51 NA
38	02-06-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	13	16	46 NA
38	02-11-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	10	19	50 NA
38	13-02-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	15	14	48 NA
38	18-02-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	14	16	32 NA
38	20-02-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	14	14	29 NA
38	25-02-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	13	17	17 NA
38	27-02-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	15	16	44 NA
38	03-04-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	12	17	25 NA
38	03-06-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	13	16	29 NA
38	03-11-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	11	18	29 NA
38	13-03-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	15	16	41 NA
38	18-03-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	14	17	43 NA
38	20-03-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	14	14	42 NA
38	25-03-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	14	17	54 NA
38	27-03-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	15	19	62 NA
38	04-01-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	14	15	66 NA
38	04-03-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	11	16	40 NA
38	04-08-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	14	17	56 NA
38	04-10-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	15	17	50 NA
38	15-04-2014	Tamil Nadu	Chennai	Kathivakkam, Municipality	Tamilnadu State Industrial Area	12	14	49 NA

## **BENEFITS OF DATA ANALYTICS ENABLED AIR QUALITY ANALYSIS IN TAMIL NADU:**

Data analytics enabled air quality analysis can provide a number of benefits to the state of Tamil Nadu, including:

- **Improved understanding of air quality:** Data analytics can be used to identify trends and patterns in air quality data, which can help to improve our understanding of the factors that contribute to air pollution and the impact that it is having on human health and the environment.
- **More effective air quality management:** Data analytics can be used to develop and implement more effective air quality management strategies. For example, data can be used to identify areas where air pollution is highest and to target interventions to those areas.
- **Better informed decision-making:** Data analytics can help policymakers to make better informed decisions about air quality management. For example, data can be used to assess the impact of different air quality policies and to identify the most effective ways to reduce air pollution.

Here are some specific examples of how data analytics enabled air quality analysis has been used in Tamil Nadu:

- The Tamil Nadu Pollution Control Board (TNPCB) is using data analytics to track air quality data from across the state. This data is being used to identify areas where

air pollution is highest and to develop targeted interventions.

- The Indian Institute of Technology Madras (IIT Madras) is developing a data analytics platform for air quality analysis. This platform will be used to collect and analyze air quality data from a variety of sources, including ground-based monitoring stations, satellite data, and social media. The platform will be used to generate real-time air quality maps and forecasts, and to identify air pollution hotspots.
- The Chennai Metropolitan Development Authority (CMDA) is using data analytics to develop a traffic management plan that aims to reduce air pollution in the city. The plan uses data from traffic sensors and air quality monitoring stations to identify congested areas and to develop strategies to improve traffic flow.

These are just a few examples of how data analytics enabled air quality analysis is being used in Tamil Nadu to improve air quality and protect public health. As data analytics technologies continue to develop, we can expect to see even more innovative and effective ways to use data to improve air quality in the state.

In addition to the benefits listed above, data analytics enabled air quality analysis can also help to:

- **Reduce the cost of air quality management:** By using data to identify and target interventions, air quality managers can reduce the cost of managing air pollution.

- **Improve public awareness of air quality:** Data analytics can be used to generate real-time air quality maps and forecasts, which can help to raise public awareness of air quality and the steps that people can take to protect themselves from air pollution.
- **Promote sustainable development:** By improving air quality, data analytics can help to promote sustainable development in Tamil Nadu.