

● Air Quality Analysis in Tamil Nadu

◆ Problem Statement:

Air quality is measured with the Air Quality Index, or AQI. The AQI works like a thermometer that runs from 0 to 500 degrees. However, instead of showing changes in the temperature, the AQI is a way of showing changes in the amount of pollution in the air.

◆ Problem Definition:

Air quality is assessed based on a banding system which measures the levels of pollutants, namely Ozone (O₃), Nitrogen dioxide (NO₂) and Particulate matter - PM₁₀ and PM_{2.5}. The overall air quality index at any particular time is given as the maximum band for any pollutant. PM_{2.5} is fine.

◆ This project involves a multifaceted analysis approach:

1. chromatography:

Scientists use gas chromatography to analyse and quantify specific chemicals released into the air, so manufacturers can minimise or even remove them from their products. For example, gas chromatography helps monitor and regulate the amount of volatile organic compounds (VOCs) in the air.

2. infrared spectroscopy:

Infrared spectroscopy is a rapid and nondestructive technology for monitoring atmospheric quality. The identification of each component from the FTIR spectra is a prerequisite for the accurate quantitative analysis of gaseous pollutants.

3. fluorometry:

The purpose of the examination of the data is to give an estimation of current air quality with respect to fluoride content. The samples are extracted with pure boiling water, and the fluoride concentration of the extracts measured using a fluoride-ion selective electrode.

4. spectrophotometry:

Infrared spectroscopy is one of many common analytical methods used for the detection and measurement of atmospheric pollution. Much of the fundamental research on atmospheric pollution used spectroscopic techniques, as this technology helps us to comprehend various threats to both public health and the environment.

5. atomic absorption spectroscopy:

Atomic absorption spectrometry (AAS) is an easy, high-throughput, and inexpensive technology used primarily to analyze elements in solution. As such, AAS is used in food and beverage, water, clinical research, and pharmaceutical analysis.

