**MINI PROJECT – II**

**(2019-20)**

## ****Air Pollution Estimation Using Machine Learning****

## 

**SYNOPSIS**



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**About the Project:**

The objective of our project is to monitor the pollution using image processing technology. Image processing obtains the polluted parts of the image using edge detection and depth estimation technique. Thus air pollution monitoring is done through the image processing.

It detects and quantifies PM pollution by extracting a combination of image features, including transmission, depth, RGB channel, local image contrast, and image entropy.

We further consider the time, date and weather condition of each photo, to determine the correlation between PM level and various factors. Based on these features, we build a regression model to predict PM level using photos collected.

Air pollution has become an alarming environmental issue globally due to rapid urbanization and industrialization. Monitoring urban air quality is therefore required by municipalities and by the civil society.

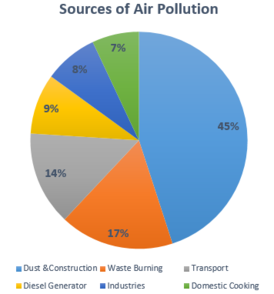
Among different air pollutants, airborne particulate matter (PM) with diameters less than 2.5 micro meters (PM2.5) has significant harmful effects on the human body. Therefore, PM2.5 concentration has been used as a worldwide major air quality metric.

Currently, air quality monitoring methods are mainly based on monitoring stations, which are not available to the majority of regions because of the high setup cost and expensive sophisticated sensors.

In this project, we study image-based air quality analysis, in particular, the concentration estimation of particulate matter with diameters less than 2.5 micro meters (PM2.5). For example, Smartphone users can take photos and estimate the real-time local air quality by themselves.

The proposed method uses Regression model to classify natural images into different categories based on their PM2.5 concentrations. In order to evaluate the proposed method, we created a dataset that contains images taken from smartphones with corresponding PM2.5 concentrations. The experimental results demonstrate that our methods are valid for image-based PM2.5 concentration estimation.

**Motivation:**



**Figure: 1 Sources of Air Pollution**

How good or bad is the air we breathe is known through monitoring and interpretation of data. It is an important need for present as well as for future of our planet. Inspired by the related works and considering human visual perception, we designed a simple but efficient algorithm for air quality evaluation from daily photos captured by mobile phones or digital cameras.

This project can further also help us in prediction of highly polluted areas which are unfit for staying and it can also help us to apply pollution control measures to the areas which are highly polluted.

**EXISTING METHODS OF SOLVING THIS PROBLEM:**

* + - Regression Model
    - Artificial neural network (ANN)
    - Convolutional neural network (CNN)

**Requirements:**

1. **Hardware:**

Personal Computer 4GbRam, i3 processor.

1. **Software:**

* Browser: Mozilla Firefox(Quantum) version 67.0.4 or Google Chrome version 69.0.3497.92
* Anaconda 3.0 version