International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 10 Special Issue: | Apr 2023 www.irjet.net p-ISSN: 2395-0072

International Conference on Recent Trends in Engineering & Technology- 2023 (ICRTET-3)
Organised by: VSM College of Engineering, Ramachandrapuram

Prediction of Air pollution by using Machine learning algorithm

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Abstract: - In our country population is a big problem as day-by-day population is increasing, so the rapid increasing in population and economic upswing is leading environment problems in city like air pollution, water pollution etc. In some of air pollution is direct impact on human body. As we know that major pollutants are arising from Nitrogen Oxide, Carbon Monoxide & Particulate matter (PM), SO2 etc. This paper presents a study on using machine learning algorithms such as SVM, KNN, Decision tree classifier, and logistic regression for air pollution prediction. The aim of this study is to evaluate the performance of these algorithms and to determine which algorithm is most suitable for predicting air pollution levels. The paper also presents on overview of existing air pollution prediction systems and proposes a new system that uses machine learning algorithms.

Key words: Machine learning, air pollution prediction, logistic regression, Decision tree Classifiers, KNN, SVM, Air pollutants

1. INTRODUCTION:

The Environment describe about the thing which is everything happening in encircles the Environment is polluted by human daily activities which include like air pollution, noise pollution. If humidity is increasing more than automatically environment is going hotter. Major cause of increasing pollution is increasing day by day transport and industries there are 75 % NO orother gas like CO, SO2 and another particle is existedin environment.

Air pollution has become a major concern in many parts of the world. It can lead to serious health problems and can also have a negative impact on the environment. In recent years, there has been a growing interest in using machine learning algorithms to predict air pollution levels. In this paper, we will explore how SVM, KNN, Decision tree classifier, and logistic regression algorithms can be used for air pollution prediction. Sulphur Dioxide is agas Present in air.

Some popular machine learning algorithms used in prediction of air pollution include Support Vector Machines (SVM), Logistic Regression, Decision tree Classifier, K-Nearest Neighbors (KNN).

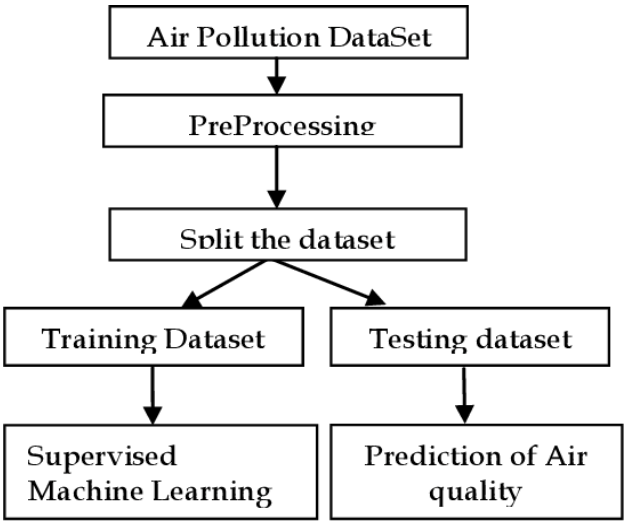

Fig – 1: System Architecture

2. IDENTIFY, RESEARCH AND COLLECT IDEA:

In [1There are several existing systems for air pollution prediction. One such system is the Air quality Index (AQI) system, which is used by many countries to measure and report air quality. The AQI system uses a set of predefined thresholds to classify an air qualityinto different categories. However, the AQI system does not take into account the complex interplay of various air quality parameter and their impact onhuman health.

In a similar manner, [2] AQI used by governmentagencies to communicate to the public how polluted the air currently is or how polluted it is forecast to became. AQI information is obtained by averaging readings from an air quality sensor, which can increase due to vehicle traffic, forest fires or anythingthat can increase air pollution. Pollutants tested included Particulates matters, Ozone, Nitrogen dioxide, Carbon Monoxide, Sulphur dioxide and others.

Numerous Many air quality forecast models exist to assess and prognosticate pollutant concentrations inmetropolitan cities. Traditionally analytical models and statistical models include synthetic variation models and atmospheric dispersal models were applied for prognostication. Recently machine learning techniques have appeared as

the outstanding methods used in air quality prognostication models.

An air quality index (AQI) is used by government agencies to communicate to the public how polluted the air currently is or how polluted it is forecast to become. Public health risks increase as the AQI rises. Different countries have their own air quality indices, corresponding to different national air quality standards. We here focus on formula which use to calculate AQI in India

3. PROPOSED APPROACH:

- To address the limitations of existing systems, we propose a new system that uses machine learning algorithms for air pollution prediction. The system will collect the data on various air quality parameters such as PM2.5, PM10, NOx, SO2, CO, O3, etc. and use this data to train machine learning models such as SVM, KNN, Decision tree Classifier, and logistic regression.
- The proposed system will be able to capture the complex relationships between different air quality parameters and provide accurate predictions of air pollution levels. The system will also be able to adapt to changing environmental conditions.
- Data curation phase: Collecting datasets from the websites which are best suitable for our project.
- Data preprocessing: Data cleaning should be done here by removing null and invalid entries in the dataset and prioritize units andmetrics.
- Data labelling: Data should be labelled based on calculated AQI and air pollutants values.
- Training phase: The labelled data is passed through ML models to train and test the data.
- Feature extraction: Determine the most significant features used for the classification and retrain the data for improving the accuracy.

4. FUTURE WORK:

The proposed work in this paper discusses about the Prediction of air pollution by using machine learning algorithms such as Decision tree classifier,SVM, KNN, R Logistic Regression. In this, we worked on limited number of datasets, but in we will work on real time AQI and air pollutant values.

5. CONCLUSION:

Machine learning algorithms have been shown to be effective in predicting air pollution levels based on data on air quality, weather, emissions, and traffic. In this paper, we evaluated the performances of four popular machine learning algorithms, namely KNN, SVM, Decision tree classifier, and logistic regression, for air pollution prediction. The results indicate that SVM out performs the other algorithms in terms of accuracy and reliability. The proposed system can be used to predict air pollution levels in real-time, providing valuable information for public health and environmental management.

ACKNOWLEDEMENT:

We are appreciative to our Division of Computer Science Engineering for their help and giving us a chance to make things simpler. While looking about this point, we found out about different significant andfascinating realities. The tools and the web services provided are of much help.

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