

Smart Prediction of Air Pollution for Traffic Control

**AnaliticaLabs.Vis4Q
Smart AirQuality**



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AIR POLLUTION

Air quality has a significant effect on the short-term as well as the long-term health and well-being of a city's population.

According to recent research, long-term exposure to polluted air is causing a significant increase in respiratory diseases, lung cancer, degenerative nerve system diseases and birth defects. The greatest exposure occurs in large cities, where traffic produces a major source of air pollutants. Aside from taking long-term air pollution abatement measures, the problem can be more quickly addressed by introducing proactive traffic limitations and by releasing warnings that residents limit their outdoor activities.

Of all air pollutants, particulate matter (PM2.5), especially black carbon (BC), are the most harmful to public health. Black carbon is mainly formed through the incomplete combustion of fossil fuels in vehicles and from biomass burning. Monitoring black carbon thus facilitates the tracking of the spread and intensity of these two major air pollution sources.



SOLUTION

The Vis4Q Smart AirQuality solution is a powerful tool in the hands of public health and other governmental authorities, as it can be used to limit the exposure of the population to excessive concentrations of fine PM via proactive traffic limitations and timely air pollution alerts warning the sensitive population to limit their outdoor activities.



The solution enables:



the monitoring of black carbon air pollution, with the ability to discriminate between traffic exhaust and other sources



the smart prediction of future black carbon concentrations in city regions within a 0–24 hour time frame



a simulation of the effects of traffic density changes on black carbon concentrations



real-time insights into the gathered data, which can also be disseminated to the general public



The solution can help local authorities to protect human health and the environment. An accurate and timely localized measurement and prediction of air pollution levels can be used for immediate protection (through air pollution alerts) and in the application of traffic control measures, as well as for making long-term strategic decisions on the mitigation of high pollution areas through city infrastructure planning and the implementation of environmental measures.

ARCHITECTURE

The solution consists of several components:

- ✓ A **grid of measurement devices** placed within the city which continuously measure black carbon concentrations and micro-meteorological data and store the measured data in the cloud. The devices included in the solution are Aethalometers® AE33 for black carbon measurement and AMS meteorological stations for micro-meteorological data measurement. .
- ✓ A **smart AI-based predictive model** analyzes the data and predicts future pollution concentrations in the city by combining the measured data with meteorological forecasts and available traffic density patterns.
- ✓ A **web-based interface** enables city planners to visualize and analyze the measurements and predictions, and to conduct simulations by changing the traffic density at selected points. It also generates an interface for informing the public about city air quality.

The solution supports interfaces for additional data sources and permits integration with other city management systems.



MAIN FEATURES

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| ✓ enables real time traffic management in order to prevent black carbon concentration excesses | ✓ predicts future black carbon concentration levels with an AI-based smart model | ✓ simulates the effects of traffic density changes on black carbon concentrations | ✓ displays a real time overview of the current state of BC concentrations | ✓ measures the effectiveness of fine PM air pollution mitigation measures |
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Analitica Labs

info@analitica-labs.com
www.analitica-labs.com



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