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Air Pollution: Are We Tech-Equipped To Deal With It?

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- IIT-Kanpur is working on a sensor-based technology to make air quality monitoring cheaper

- Focus also on bringing accuracy
- Pilot network at place in Delhi, Jaipur, Chennai, Kanyakumari, Lucknow and Guwahati
- Artificial Intelligence, Machine Learning, Internet of Things must be used for deeper insight
- In Deep Dive, Sachchida Nand Tripathi, atmospheric scientist at IIT-Kanpur and recipient of Shanti Swarup Bhatnagar Award

Solving the problem of air pollution is not as difficult a task as it is often made out to be. What is needed is to put in place a confluence of various technologies and create a synergy. This is what Sachchida Nand Tripathi, a member of the steering committee of the National Clean Air Programme, firmly believes.

Tripathi, a professor at IIT-Kanpur and recipient of the prestigious Shanti Swaroop Bhatnagar Award, has been working on the project aimed at mitigating air pollution for the past six years.

The way we currently monitor air pollution is expensive. Therefore, cities have only a few monitoring stations and effective monitoring becomes difficult. Tripathi is working on a sensor-based air quality monitoring system that can do hyper-local particulate matter monitoring at a cost that is 20 times less.

The idea is to have 20-25 monitoring stations equipped with sensors that can send data to a single monitoring system. “Technologies such as artificial intelligence and machine learning can then be used to get better and deeper insight into the problem and then better solutions can be devised,” he says.

“We worked extensively on improving the accuracy of these portable sensor devices. We got useful results and now we have set up pilot networks that are already working in Delhi, Jaipur, Chennai, Kanyakumari, Lucknow and Guwahati,” says Tripathi, whose work on discolouration of Taj Mahal had led to policy interventions in Agra.

Work is on to bring accuracy in gas sensors. “We are working on combining sensors such as those that measure Nitrogen Oxide and Ozone to provide source information. It’s called dynamic hyper-source apportionment,” Tripathi says. Once a dense network of these sensors is installed in a particular city, one can get high-resolution information on particulate matter. “We can then apply Machine Learning and Artificial Intelligence to know the contributing pollutants at a particular place in a dynamic way,” he adds.

Traffic can be better managed by installing these sensors at key intersections. If one knows the pollution built-up then traffic can be diverted to other, less polluted, routes.

Tripathi suggests the use of Internet of Things for effective monitoring of air quality at large point

sources such as industries and power plants. “Once you scale up monitoring, combining sensors with Internet of Things, you can use them for a forecasting model. This will help provide accurate information in advance and people, especially school-going children, can then take informed decisions,” he says.

Delhi currently uses two kinds of early warning systems. The first one forecasts air quality six days in advance and gives information on the amount of concentration of particulate matter, the economic sectors that are contributing to it, and from what region it is coming in.

The second system is based on satellite-based remotely-sensed data. This uses the total particulate matter present in an atmospheric column, called aerosol optical depth. The system uses this parameter and converts in into surface particulate matter concentration.

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