

CSIR-NEERI develops AI tool to analyse vehicular emission hotspots

■ Staff Reporter

CSIR-NATIONAL Environmental Engineering Research Institute (CSIR-NEERI) has developed an artificial intelligence-based dashboard to analyse vehicular emission in cities. The AI-Integrated Line Source Emission Inventory (AI-LSEI) dashboard is capable to detect and count vehicles passing through roads using CCTV cameras and instantly estimates pollution generated by them. The dashboard is capable to calculate the emission load of all type of vehicles every hour.

The dashboard was developed by a team of scientists from the air quality management division at CSIR-NEERI, comprising senior scientist Rahul Vyawahare, chief scientist KV George, Jay Singh Rajput, Atharva Malode, Raj Sonarghare, and Pranav V Nair, under the guidance of CSIR-NEERI Director S Venkata Mohan. "Air pollution is a concerning factor for every city in the country. This tool will help detect emission level by vehicles running on the city roads," informed a scientist on condition of anonymity to 'The Hitavada'.

"CSIR-NEERI has installed AI-LSEI in 12-13 cities in the country, including Delhi, Mumbai, Hyderabad and it is successfully gathering daily emission status of all these cities," said the senior scientist.

NEERI is analysing CCTV footage to gather emission data of all these cities. As per



AI-LSEI dashboard, developed by CSIR-NEERI, is capable of detecting and counting vehicles passing through roads using CCTV cameras and instantly estimates pollution caused by them

information, NEERI approached Nagpur Municipal Corporation (NMC) for this and currently it is analysing CCTV data of six different locations in Nagpur.

"We are planning to approach Maharashtra Government to get access of all CCTV footages of Nagpur city to identify vehicular pollution hotspots in the city in real time with the help of the dashboard," said the scientist.

As per information, NEERI is working to create initial inventory of pollution hotspots

in Nagpur city which was also analysed by the team.

"In Nagpur, vehicular emission is just a small contributor of air pollution. Construction dust, open burning, and industrial smoke are the major contributors. Authorities should work to mitigate these factors also along with vehicular emission," said the scientist.

According to the scientist, the dashboard uses scientifically established emission factors to estimate pollutants such as particulate matter (PM), nitrogen oxide (NO_x), carbon monoxide (CO), and hydrocarbon (HC). The results are displayed on a GIS-based map that highlights areas with high vehicular emission loads.

The system was tested using CCTV footage recordings received from multiple cities as part of earlier studies on air pollution. The footage was analysed to determine traffic movement and estimate the emission load generated by vehicles across different locations.

The system records how traffic volume changes throughout the day and correlates it with emissions. For example, vehicle movement starts rising sharply from early morning, with two-wheelers and cars forming largest share in most urban corridors. The dashboard uses the data available on fuel and engine technology from the Parivahan portal to estimate vehicular emission load.