

Home » Economy » Logistics

# Smart road-signs. AI-assisted safety on the speedways

Updated - July 07, 2024 at 08:52 PM.

Highways authority, IIIT-Delhi to build data-driven dynamic road-signs for smooth, secure traffic management

BY RISHI RANJAN KALA

COMMENTS SHARE

READ LATER



Smart signs can readjust messages in real-time, helping avert traffic congestion, accidents

As the government explores ways to achieve its goal of halving road accident fatalities by 2030, an emerging solution is the use of **artificial intelligence (AI)** technology for effective monitoring of traffic patterns and smart road signages to guide motorists.

The National Highways Authority of India recently signed a memorandum of understanding with Indraprastha Institute of Information Technology (IIIT), Delhi, for a project involving the use of AI to enhance the number and quality of highway road-signs for improved safety and real-time traffic management.

IIIT-Delhi will conduct surveys to collect imagery and other related data on the availability and condition of road signages on select **national highway** (NH) stretches, cumulatively measuring about 25,000 km. The data will be processed through AI for the identification and classification of road signs. The survey report will include a geo-stamped inventory of existing signs with categorisation, broad details on their structural condition, and other details.

There will also be a 'gap study' to assess the mismatch between the survey findings and the road sign requirement stipulated under the contract agreements for road development. It will also map the requirements, as per the latest codal provisions for high-speed corridors, for enhanced safety.

## Intelligent signages

Adequate availability of road signs enhances safety on highways by providing clear, consistent and timely information to drivers. They serve as vital communication tools, informing drivers about road conditions, guiding them through route changes, and alerting them to potential hazards.

Road signs, as a part of intelligent transportation systems, can continuously monitor the driver, vehicle, and road. This, in turn, can aid the smooth movement of vehicles and goods, especially given India's rapidly expanding road network and vehicle count.

Road signs reduce accidents by providing advance warnings about curves, intersections, pedestrian crossings, speed limits and other critical aspects, explains Prajwal Misra, Director, Rudrabhishek Infosystem, a company that provides end-to-end consultancy for a range of urban development and infrastructure projects.

Secondly, it helps in managing traffic efficiently. Moreover, standardised road signs ensure uniformity across the highway network, which is especially beneficial for drivers travelling long distances across state lines, he says.

He explains that AI and geographic information systems (GIS) can help improve road traffic-related services by analysing vast amounts of traffic data collected from cameras, sensors, and GPS devices. Machine learning algorithms can predict traffic patterns, identify high-risk areas, and recommend the most effective locations for road signs.

"For instance, AI can detect accident-prone areas and suggest placing warning signs or speed limit indicators in those areas. Additionally, AI-driven systems can continuously monitor the condition of road signs using image recognition technology, automatically identifying signs that are damaged, obscured, or missing, and generate maintenance alerts," he says.

GIS, on the other hand, provides a spatial dimension to traffic management by mapping the entire highway network and integrating various data layers such as traffic flow, accident hotspots and road infrastructure.

"Spatial analysis provides a comprehensive understanding of where road signs are needed the most and how to maximise their impact. GIS can also facilitate the simulation of traffic scenarios, helping authorities anticipate the effect of new road signs on traffic dynamics," he says.

## AI and road safety

Highlighting AI's role in predictive analytics for road safety, Misra says that by analysing historical data on traffic patterns, weather conditions, and accident reports, AI can identify high-risk areas and the various times at which accidents are more likely to occur.

"This information enables authorities to implement targeted safety measures, such as installing additional signage, enhancing road lighting, or increasing patrol presence in those areas. Predictive analytics can also help generate proactive maintenance schedules for road infrastructure, ensuring that potential hazards like potholes or worn-out road markings are addressed before they can lead to accidents," he says.

## Smart signs

Smart traffic management systems on NHs can create an interconnected mechanism where road signs, traffic signals, and real-time data analytics work together to manage traffic more effectively.

"One of the primary ways in which smart traffic signs reduce congestion is by optimising traffic flow. Traditional static signs offer fixed information that may not always be relevant to the current traffic situation. In contrast, smart signs can readjust their messages in real-time, directing drivers to alternative routes when there is congestion, roadwork, or an accident ahead. This helps distribute traffic more evenly across the network, preventing bottlenecks and reducing overall travel time," Misra says.