

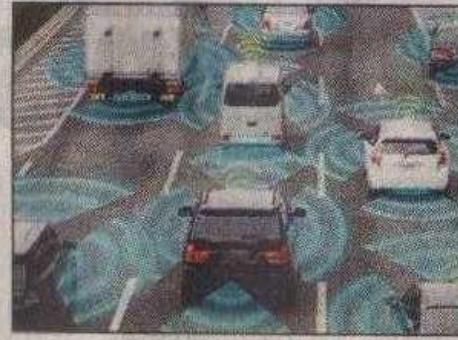
Next-gen IIT-I tech alerts drivers on blind spots, sudden braking

Indore: A car warning its driver about sudden braking of vehicles ahead, or alerting about an accident just beyond a blind turn, could soon become part of everyday driving. Such real-time alerts, which can give motorists those crucial extra seconds to react, are at the centre of new research at the Indian Institute of Technology (IIT) Indore that aims to make Indian roads safer and traffic movement smarter.

Researchers at IIT Indore's department of electrical engineering, led by Prof Prabhat Kumar Upadhyay, are working

on next-generation intelligent transportation systems using Cellular Vehicle-to-Everything (C-V2X) communication technology. Prof Upadhyay explained that the framework enables vehicles to exchange information with other vehicles, road infrastructure, pedestrians and cloud-based systems, creating a connected and responsive road environment.

According to Prof Upadhyay, the core objective is to improve road safety, traffic efficiency and overall mobility through real-time information sharing. "With C-V2X, ve-



hicles can automatically alert one another about accidents ahead, sudden braking, poor road conditions or traffic congestion, often before a driver can visually detect the danger," he said, adding that the system relies on high-speed 4G LTE and upcoming 5G

networks to transmit safety-critical messages with minimal delay.

He said a key challenge addressed by the team is the efficient sharing of limited wireless communication resources between regular cellular users, such as smartphones and infotainment systems, and vehicles that need instant, safety-related communication. "We developed intelligent resource allocation algorithms that dynamically prioritise safety messages based on traffic conditions, network load and signal quality, ensuring reliable and low-latency

communication," Prof Upadhyay said.

The research also considers high vehicle speeds and rapidly changing wireless conditions caused by obstacles and dense traffic. Prof Upadhyay said the solutions are tested using realistic traffic models and simulations to ensure they remain robust in real-world scenarios.

Highlighting the significance of the work, IIT Indore director Prof Suhas Joshi said, "Road safety and sustainable mobility are among the most pressing challenges of our time. Research in connected and

intelligent transportation systems such as C-V2X represents a transformative step towards safer roads and smarter cities. The work at IIT Indore shows how advanced communication technologies can deliver solutions that save lives, reduce congestion and strengthen India's readiness for future mobility." Prof Upadhyay said the long-term vision is to help road users anticipate hazards rather than react after they appear, paving the way for connected and autonomous vehicles in India while improving everyday travel for citizens. TNN