STEM 101
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RESEARCH ARTICLES

ARTICLE 1 — "HOW AUTONOMOUS CARS DETECT OBSTACLES"

Author: Dr. Elaine Porter, Robotics Institute
Published: 2023

Autonomous vehicles use a combination of cameras, ultrasonic sensors, and LiDAR to detect objects around them. LiDAR creates a 3D map of the environment by bouncing laser light off nearby surfaces. Researchers have found that combining multiple sensors—called **sensor fusion**—improves accuracy compared to using a single sensor type.

A recent study tested autonomous cars in different lighting conditions. Results showed that LiDAR performed well at night, while cameras worked better during the day. By merging data from both sensors, vehicles identified obstacles 28% more accurately. This research suggests that sensor fusion may be essential for improving safety in self-driving vehicles.

ARTICLE 2 — "NAVIGATION ALGORITHMS AND ROAD SAFETY IN SELF-DRIVING VEHICLES"

Author: Transportation Technology Research Group
Published: 2022

Navigation algorithms allow autonomous vehicles to plan paths, avoid collisions, and adjust speed based on real-time data. One algorithm, called **A* path planning**, calculates the shortest and safest route by constantly updating information from the car's sensors.

In a 2022 experiment, researchers compared traditional navigation methods with AI-based algorithms. Vehicles using AI navigation avoided sudden braking, maintained smoother turns, and reduced potential collision points by 42%. The findings indicate that algorithm improvement is a major step toward reducing accidents caused by human error.