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(57) Abstract :
 MULTI-MODAL SENSOR FUSION FRAMEWORK FOR ENHANCED AUTONOMOUS VEHICLE NAVIGATION AND SITUATIONAL AWARENESS
 ABSTRACT The invention relates to an advanced multi-modal sensor fusion framework (100) for enhancing autonomous vehicle navigation and situational awareness. The framework comprises a plurality of sensors (102) including LiDAR, radar, cameras, and ultrasonic sensors, configured to capture diverse data from the vehicle's environment. A data fusion module (104) integrates and synchronizes this sensor data in real-time using advanced algorithms to produce a comprehensive environmental representation. A situational awareness engine (106) analyzes the fused data to detect and interpret environmental conditions, obstacles, and dynamic objects, thereby enhancing situational awareness. The decision-making system (108) processes the analyzed data to generate navigation commands or control signals for autonomous guidance. A feedback mechanism (110) continuously monitors and adjusts the system parameters to optimize navigation and situational awareness. This framework improves the accuracy and reliability of autonomous vehicle navigation by leveraging multi-modal sensor data and adaptive processing techniques. FIG. 1

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