**Abstract**

Steering control systems are crucial for vehicle dynamics, providing stability and maneuverability. With advancements in microcontroller technology, it is possible to develop sophisticated and reliable systems. This paper explores the roles and applications of 8-bit and 32-bit microcontrollers in steering control, emphasizing their differences and suitability for various vehicle types.

The automotive industry demands precise, adaptive, and cost-effective steering control systems. Traditional mechanical and hydraulic steering mechanisms have limitations that modern microcontrollers can overcome. The objectives include designing a comprehensive steering control system, optimizing cost and performance, ensuring reliability, and meeting automotive safety standards.

The methodology encompasses defining system requirements, selecting appropriate microcontrollers, designing system architecture, integrating sensors and actuators, developing control algorithms, prototyping, and extensive testing. The approach emphasizes modularity, scalability, and compliance with industry standards.

The performance evaluation shows that 8-bit microcontrollers are suitable for basic, cost-sensitive applications, while 32-bit microcontrollers excel in complex, real-time processing tasks. The modular system design facilitates integration and scalability, balancing cost and performance. Testing under various conditions confirms the system's reliability and compliance with safety standards.

The study concludes that 8-bit microcontrollers are suitable for basic, cost-effective steering control in budget vehicles, while 32-bit microcontrollers are crucial for advanced systems needing high precision and adaptability. The modular design ensures flexibility and scalability, allowing the system to be customized for different vehicle models and future technological advancements.