

Rathmalana, Sri Lanka | 12<sup>th</sup>. December 2024

## DESIGN AND IMPLEMENTATION OF SMART SHOCK ABSORBER INTEGRATED WITH GPS-BASED ROAD CONDITION ANALYSIS

**C. M. S. Madushan and M. Barathy**

*Department of Electro-Mechanical Technology, University of Vocational Technology, Sri Lanka*  
*barathy@uovt.ac.lk*

**Abstract:** This research presents the design of a smart shock absorber system integrated with GPS-based road condition analysis for optimizing vehicle suspension and implementation of a performance. The aim is to enhance ride comfort, stability, and safety by dynamically adjusting shock absorber characteristics in response to varying road conditions. The proposed system leverages real-time data from GPS navigation systems to analyze road conditions such as surface roughness, potholes, and bumps. Through advanced algorithms, the shock absorbers adapt their damping properties accordingly to mitigate the effects of road disturbances on the vehicle. The integration of GPS-based road condition analysis provides a proactive approach to suspension control, enabling precise and timely adjustments to optimize ride quality and handling. Experimental validation of the system demonstrates its effectiveness in improving overall vehicle dynamics and passenger comfort, highlighting its potential for integration into future automotive platforms.

**Keywords:** shock absorber, suspension control, GPS-based analysis