

Design of Speed Bump Recognition System Integrated with Adjustable Shock Absorber Control

Authors : Ming-Yen Chang, Sheng-Hung Ke

Abstract : This research focuses on the development of a speed bump identification system for real-time control of adjustable shock absorbers in vehicular suspension systems. The study initially involved the collection of images of various speed bumps, and rubber speed bump profiles found on roadways. These images were utilized for training and recognition purposes through the deep learning object detection algorithm YOLOv5. Subsequently, the trained speed bump identification program was integrated with an in-vehicle camera system for live image capture during driving. These images were instantly transmitted to a computer for processing. Using the principles of monocular vision ranging, the distance between the vehicle and an approaching speed bump was determined. The appropriate control distance was established through both practical vehicle measurements and theoretical calculations. Collaboratively, with the electronically adjustable shock absorbers equipped in the vehicle, a shock absorber control system was devised to dynamically adapt the damping force just prior to encountering a speed bump. This system effectively mitigates passenger discomfort and enhances ride quality.

Keywords : adjustable shock absorbers, image recognition, monocular vision ranging, ride

Conference Title : ICAAE 2024 : International Conference on Advanced Automotive Electronics

Conference Location : Vancouver, Canada

Conference Dates : August 05-06, 2024