IJIREEICE ISSN (O) 2321-2004, ISSN (P) 2321-5526

International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.021 ⁜ Peer-reviewed / Refereed journal ⁜ Vol. 11, Issue 7, July 2023

DOI: 10.17148/IJIREEICE.2023.11709

Automatic wheel Alignment Detector with Alarm System

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Abstract: This review paper provides a comprehensive analysis of automatic wheel alignment detectors, emphasizing their principles, advancements, and applications. It discusses the limitations of traditional methods and the need for automated systems. The paper categorizes detectors based on technologies used (optical, laser, and sensor-based) and examines their working principles, advantages, and limitations. Additionally, it explores the integration of AI and machine learning in automatic wheel alignment detectors. The paper highlights the benefits ofthese detectors, including reduced manual labor and improved accuracy, while also addressingchallenges like cost and compatibility. Overall, it serves as a valuable resource for researchers and practitioners in the field

I. INTRODUCTION

Wheel Alignment should be checked whenever a new tire is installed, suspension component installed, when the vehicle has encountered a major road hazard any time unusual tire wear patterns may appear.The state-of-the-art techniques and advancements in dynamic alignment control for automated wheel assembly, focusing on the utilization of depth imagery to improveaccuracy and efficiency in the alignment process(1) . The comprehensive analysis and synthesisof the existing literature on machine vision systems for automatic vehicle wheel alignment, highlighting the advancements, challenges, and potential applications in automotive maintenance and repair(2).wheel alignments will change during usage, thus many problems could be caused, such as steering wheel vibrations, decreasing stability, rapid tire wear etc(3).Rash driving also cause wheel alignment varition there by increase the tire wear and tear(4).wheel alignment provide safety on the road SO it should be property maaintained (5).

Safety should also be increased along with the increase in travelling speed(6) .By maintaining proper tire pressure wheel stability lose sue to tire pressure can be minimized (7). By utilizing vehicle imagery datasheet can be used to improve wheel detector (8). Due to the increasing infuel price tires should be properly checked(10).

II. METHODOLOGY

By using an infrared light depth imagery to enable automated wheel loading operation wheel alignmentcan be maintained (1).By 3D scanner wheel geometry can be reconstructed with a particular plane refered to global coordinate sysy wheel angles can be deteced (2). We can use the accelerometer for the measurement of automobile wheel parameters, such as camber and toe(3). By using Raspberry Pi and python and python as implementation language wheel alignment detection can be done(4).By usingcommunication protocols between sensors,microcontroller and mobile application smaller and portablewheel alignment monitoring system can be introduced(5).

Alignment measurement can be done by stimullations carried out by Infrared by converting voltage intosoftware using arduino board(6,7). By using deep neural networks and a vehicle-specific post processingalgorithm to eliminate false detectons and enable accurate recentering vehicle image on wheel coordinates (8). By using a framework which contains customizable wheel stand,sensors, microcontroller, rechargeable DC battery charging circuit wheel alignment can be easily monitored in anLCD display(9).IOT based wheel alignment gives better result (10).

III. RESULT

By maintaining proper wheel alignment tire wear can be reduced and there by decrease the change of accidents due to misalignment.By using modern technologies wheel alignment can be detected easily without going to workshops. One among them is using Infrared light depth image proper wheel angle can be monitored properly. 3D scannera and IOT play's a major role in detecting wheel alignment. We can easily monitor wheel alignment by using a sensors with microcontroller which can be connected toLCD display of car dashboard.

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Detection using Raspberry Pi with python gives a better results. Some ot the techniques used here arecostly. But proper results can be obtained by following this techniques. Wheel alignment should be mainted properly in vehicles for assuring the total milage of vehicle.

IV. CONCLUSION

This review paper discusses the diverse applications of automatic wheel alignment detectors, including automotive industry, transportation, and manufacturing sectors. The studies emphasize the benefits of these detectors in terms of time savings, cost-effectiveness, and enhanced vehicle performance. The ability to detect misalignments early can contribute to improved safety, fuel efficiency, and overall vehicle maintenance. The analysis of the reviewed literature also underscores the challenges and limitations associated with automatic wheel alignment detectors. Factors such as sensor accuracy, environmental conditions, and calibration procedures emerge as critical considerations that impact the performance of these systems. Additionally, the need for regular maintenance and proper training for operators are important factors to ensure the long-term effectiveness of these detectors.

In conclusion, this review paper provides a comprehensive overview of automatic wheel alignment detectors, their development, applications, and performance. It offers valuable insights for researchers,engineers, and professionals involved in the design, implementation, and use of these systems. By summarizing the key findings and highlighting the areas for improvement, this paper serves as a valuable resource for advancing the field of automatic wheel alignment detection and its practical implications.

Wheel alignment should be properly maintained in every vehicles for assuring saftey while driving. By regularly checking the alignments can assure the total milage of the vehicle. Improper tire alignment cancause tires to undergo wear before time. Misaligned tires can cause the direction of motion of tires different from that of vehicle direction

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