Research and Development of a Rain Wiper and Windshield Washer System for the Toyota Vios 2018

Hà Văn Mạnh
Thai Nguyen University of Information and Communication Technology
Thai Nguyen University, Thai Nguyen, Vietnam
student414@ictu.edu.vn

***Abstract*—This thesis explores the development of a rain wiper and windshield washer system for the Toyota Vios 2018. The author delves into the historical evolution of the system, its components, and operational principles. The study focuses on identifying and testing control signals for the wiper and washer motors, and constructing a model system for educational purposes. The author successfully identified and tested the control signals for the wiper and washer motors, but exact performance metrics are not provided. The model system was constructed and tested, and the author suggests it could be used as a teaching aid for students in the field of automotive electronics.**

***Index Terms*—rain wiper, windshield washer, automotive system, control signals, model system, teaching aid**

I. Introduction

The thesis provides an overview of the rain wiper and windshield washer system on automobiles, tracing its historical development and explaining its functions. The author aims to develop a model system for educational use, focusing on the identification and testing of control signals for the wiper and washer motors. The study also highlights the importance of understanding the rain wiper and windshield washer system in automotive engineering. The author suggests that the developed model system could be used as a teaching aid for students in the field of automotive electronics [1]. Published articles on the methods and subject of this project provide context for this English summary [2], [3], [4], [5].

II. Methods

The author describes the process of identifying and testing the control signals for the wiper and washer motors. This includes measuring electrical signals, testing the motors, and adjusting the system to ensure proper operation. The study also involves constructing a model system for educational purposes. The author followed a systematic approach, starting with the identification of control signals, followed by testing and adjustment of the motors, and finally the construction of a model system [1].

Supervisor: Trần Xuân Trọng, Thai Nguyen University of Information and Communication Technology (txtrong@ictu.edu.vn).

III. Results

The author successfully identified and tested the control signals for the wiper and washer motors. The model system was constructed and tested, but the exact performance metrics are not provided. The author documented the process of identifying and testing the control signals, and the construction of the model system. The model system was tested for basic functionality, but no specific performance metrics such as speed, accuracy, or efficiency were measured [1].

IV. Discussion

The study highlights the importance of understanding the rain wiper and windshield washer system in automotive engineering. The author suggests that the developed model system could be used as a teaching aid for students in the field of automotive electronics. The model system, while not deployed in a real-world setting, provides a valuable educational tool for students to learn about the system's components and operational principles. The limitations of the study include the lack of performance metrics and the absence of practical deployment in a real vehicle [1].

V. Conclusion

The author concludes that the rain wiper and windshield washer system is a crucial component of modern automobiles. Despite limitations due to limited knowledge, the author successfully completed the project and hopes for further improvements through feedback from educators and peers. The model system, while not fully tested for practical effectiveness, provides a valuable educational tool for students in the field of automotive electronics [1].

References

[1] Hà Văn Mạnh, "Research and Development of a Rain Wiper and Windshield Washer System for the Toyota Vios 2018," internal undergraduate thesis (original in Vietnamese), Thai Nguyen University of Information and Communication Technology, 2021.

[2] Joon Woo Son, Seon Bong Lee, Man Ho Kim, Suk Lee, Kyung Chang Lee, "Intelligent rain sensing and fuzzy wiper control algorithm for vision-based smart windshield wiper system," Journal of Mechanical Science and Technology, vol. 20, no. 9, pp. 1418-1427, 2006. DOI: 10.1007/bf02915965.

[3] Petre Cristian Copilusi, Viorica Velișcu, "An Approach Regarding Windshield Wiper Mechanism Design," Applied Mechanics and Materials, vol. 822, pp. 112-117, 2016. DOI: 10.4028/www.scientific.net/amm.822.112.

[4] James R. Sayer, Jacob M. Wetzel, Dillon Funkhouser, "An examination of naturalistic windshield wiper usage," International Journal of Heavy Vehicle Systems, vol. 16, no. 3, pp. 328, 2009. DOI: 10.1504/ijhvs.2009.027136.

[5] M Ghannam, M Schumack, ”A Model for Automotive Windshield Washer Spray Delivered by a Fluidic Nozzle,” Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering, vol. 210, no. 4, pp. 327-333, 1996. DOI: 10.1243/pime_proc_1996_210_279_02.