Blind Spot Detection on Vehicles Using a Distance Sensor with Fuzzy Logic Sugeno Method

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I. INTRODUCTION

Motorists, especially cars, must feel the blind spot when driving. The blind spot area is a blind area or an area that cannot be seen while driving. This blind spot is a very dangerous area and can cause someone to be in an accident because the area is out of reach of the driver's supervision. This area is usually found in front, rear, and side positions, especially in vehicles where the mirror cannot reach the driver's view [1].

Blind spots in driving are a leading cause of accidents, prompting automakers to develop technologies to address this issue. One such technology involves the use of object detection sensors that enable communication between drivers in blind spots by providing warnings in two directions. The alarming increase in traffic accidents in Indonesia, as reported by Korlantas Polri data from the Ministry of Transportation, underscores the urgency of finding effective solutions. The statistics reveal that in 2021, there were 103,645 traffic accidents, an increase from the previous year's count of 100,028, resulting in the loss of 25,266 lives and property damage worth IDR 246 billion.

Motorcycles constitute the highest proportion of vehicles involved in accidents, accounting for 73%, while freight transport ranks second at 12%. This highlights the importance of maintaining a safe distance, especially in areas challenging for drivers of larger vehicles to navigate [1]. To gain deeper insights into the challenges faced by truck drivers, interviews were conducted with experienced drivers, who highlighted the difficulties posed by blind spots due to the absence of advanced equipment, such as object-detection sensors, in trucks due to budget constraints. This research aims to address this issue by providing an affordable and effectiveblind spot object detection system, benefiting drivers [2].

The use of the Sugeno method in various fields has shown promising results. In the assessment of teacher performance, the Sugeno method [3] applied to evaluate pedagogic, personality, social, and professional variables yielded excellent performance assessments [2]. Additionally, the Sugeno method has been employed in distance measurement systems, traffic light control, and stage-discharge regulation, all of which have demonstrated improved accuracy and performance [4], [5], [6],

The proposed blind spot object detection system, incorporating fuzzy logic with the Sugeno method, offers an effective solution to detect and alert drivers about potential hazards in blind spots. The system's accurate performance, as validated through rigorous testing, promises to reduce accident rates and foster safety awareness among drivers, thereby contributing to a safer driving environment. The success of the Sugeno method in various applications further strengthens the feasibility and reliability of its implementation in blind spot detection systems.