Fuzzy-based Collision Avoidance System for Autonomous Driving in Complicated Traffic Scenarios

By: Rashed, AS (Rashed, Almutairi Saleh)1; Faris, W (Faris, Waleed)1; Fatai, S (Fatai, Sado)2

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Abstract
Collision avoidance is an important requirement for safe and autonomous driving in modern transportation systems. In this paper, we present a fuzzy-based control approach for smart and safe obstacle avoidance in complicated traffic scenarios where there are static and dynamic obstacles (e.g., broken-down vehicles, wrong parking vehicles, etc.). The fuzzy system makes an optimal decision to control the car throttle, braking, and steering to avoid collisions using the available information on the road map (i.e., the distance to obstacles, the current traffic in the neighboring lanes, the velocity of the front and rear car, etc.). Simulation results from three different scenarios involving a combination of dynamic and static obstacles or broken-down vehicles show that the fuzzy-controlled car can effectively avoid obstacles or collision in complicated traffic situations.

Keywords
Author Keywords: autonomous vehicle; fuzzy control; traffic; static obstacles; dynamic obstacles

Author Information
Reprint Address: Rashed, AS (reprint author)
Int Islamic Univ Malaysia, Dept Mech Eng, Kuala Lumpur, Malaysia.

Addresses:
[1] Int Islamic Univ Malaysia, Dept Mech Eng, Kuala Lumpur, Malaysia

Email Addresses: S.alobobi@gmail.com; waleed@iium.edu.my; abdfsado1@gmail.com

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