# An Effective Decision-Making Strategy Based on Multi-Objective Optimization for Commercial Vehicles in Highway Scenarios

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**Abstract :** Maneuver decision-making plays a critical role in high-performance intelligent driving. This paper proposes a risk assessment-based decision-making network (RADMN) to address the problem of driving strategy for the commercial vehicle. RADMN integrates two networks, aiming at identifying the risk degree of collision and rollover and providing decisions to ensure the effectiveness and reliability of driving strategy. In the risk assessment module, risk degrees of the backward collision, forward collision and rollover are quantified for hazard recognition. In the decision module, a deep reinforcement learning based on multi-objective optimization (DRL-MOO) algorithm is designed, which comprehensively considers the risk degree and motion states of each traffic participant. To evaluate the performance of the proposed framework, Prescan/Simulink joint simulation was conducted in highway scenarios. Experimental results validate the effectiveness and reliability of the proposed RADMN. The output driving strategy can guarantee the safety and provide key technical support for the realization of autonomous driving of commercial vehicles.

**Keywords :** decision-making strategy, risk assessment, multi-objective optimization, commercial vehicle