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Deep Reinforcement Learning for Autonomous Driving

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Abstract: *The use of Deep Reinforcement Learning (DRL) in autonomous driving is examined in this work, with an emphasis on how it might improve decision-making in challenging situations. While highlighting significant developments and difficulties, we examine important DRL algorithms and their function in trajectory planning, vehicle control, and motion planning. We also go over important topics like domain adaptation, safety validation, and multi-agent reinforcement learning (MARL) for traffic coordination. We also provide a thorough examination of simulation frameworks that are frequently used to train and verify DRL-based autonomous driving strategies, including CARLA, AirSim, and SUMO. The study also looks at the hierarchical DRL strategy, which combines low-level controllers (DDPG-based) and high-level planners (DQN-based) to provide safe and effective driving behaviour. Furthermore, we talk about real-world deployment issues including adversarial robustness, latency, and interpretability, highlighting the significance of hybrid learning methodologies (combining DRL with Imitation Learning) and safety validation techniques. Lastly, we offer a research roadmap for future studies that will enhance the interpretability, robustness, and practicality of DRL-based autonomous cars. For academics and practitioners interested in using DRL for autonomous driving applications, this work provides a thorough overview of the technology's advantages and disadvantages*

Keywords: Cyber security, Internet of Things (IoT), Block chain, Security, privacy's

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