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Deep Reinforcement Learning Model for Autonomous Driving

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Abstract : The development of intelligent transportation systems (ITS) and artificial intelligence (AI) are spurring us to pave the way for the widespread adoption of autonomous vehicles (AVs). This is open again opportunities for smart roads, smart traffic safety, and mobility comfort. A highly intelligent decision-making system is essential for autonomous driving around dense, dynamic objects. It must be able to handle complex road geometry and topology, as well as complex multiagent interactions, and closely follow higher-level commands such as routing information. Autonomous vehicles have become a very hot research topic in recent years due to their significant ability to reduce traffic accidents and personal injuries. Using new artificial intelligence-based technologies handles important functions in scene understanding, motion planning, decision making, vehicle control, social behavior, and communication for AV. This paper focuses only on deep reinforcement learning-based methods; it does not include traditional (flat) planar techniques, which have been the subject of extensive research in the past because reinforcement learning (RL) has become a powerful learning framework now capable of learning complex policies in high dimensional environments. The DRL algorithm used so far found solutions to the four main problems of autonomous driving; in our paper, we highlight the challenges and point to possible future research directions.

Keywords : deep reinforcement learning, autonomous driving, deep deterministic policy gradient, deep Q-learning
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