

3D Object Detection for Autonomous Driving: A Comprehensive Review

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Abstract : Accurate perception is a critical component in enabling autonomous vehicles to understand their driving environment. The acquisition of 3D information about objects, including their location and pose, is essential for achieving this understanding. This survey paper presents a comprehensive review of 3D object detection techniques specifically tailored for autonomous vehicles. The survey begins with an introduction to 3D object detection, elucidating the significance of the third dimension in perceiving the driving environment. It explores the types of sensors utilized in this context and the corresponding data extracted from these sensors. Additionally, the survey investigates the different types of datasets employed, including their formats, sizes, and provides a comparative analysis. Furthermore, the paper categorizes and thoroughly examines the perception methods employed for 3D object detection based on the diverse range of sensors utilized. Each method is evaluated based on its effectiveness in accurately detecting objects in a three-dimensional space. Additionally, the evaluation metrics used to assess the performance of these methods are discussed. By offering a comprehensive overview of 3D object detection techniques for autonomous vehicles, this survey aims to advance the field of perception systems. It serves as a valuable resource for researchers and practitioners, providing insights into the techniques, sensors, and evaluation metrics employed in 3D object detection for autonomous vehicles.

Keywords : computer vision, 3D object detection, autonomous vehicles, deep learning

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