Real-Time Object Detection Using Convolutional Neural Networks

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Abstract

We propose a novel real-time object detection framework based on convolutional neural networks. Our approach achieves superior accuracy while maintaining high inference speed, making it suitable for autonomous driving and robotics applications.

Introduction

Object detection is a fundamental computer vision task with applications in autonomous vehicles, surveillance, and robotics. Traditional methods relied on hand-crafted features and sliding window approaches. Modern deep learning methods, particularly CNNs, have dramatically improved detection accuracy. YOLO and Faster R-CNN represent two major paradigms: single-stage and two-stage detectors. Our work builds upon these foundations, introducing architectural improvements that balance speed and accuracy. We demonstrate state-of-the-art performance on COCO and Pascal VOC datasets.