

Object Detection in Satellite Images Using Computer Vision Models

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Abstract: *In recent years, the integration of deep learning techniques into satellite image analysis has revolutionized numerous industries, ranging from urban planning and environmental monitoring to disaster response and agricultural management. These advancements have been driven by the ability of deep learning models to automatically detect and classify objects within vast quantities of satellite imagery data. Object detection, in particular, plays a crucial role in identifying specific features such as buildings, vehicles, vegetation, and infrastructure, facilitating precise spatial mapping and actionable insights. This study addresses the challenge of object detection in satellite images, crucial for various applications such as urban planning, environmental monitoring, and disaster management. The proposed system investigates the effectiveness of YOLOv5 architecture in accurately detecting objects of interest within satellite imagery. The YOLO (You Only Look Once) models are selected for their ability to provide real-time detection while maintaining high accuracy, making them suitable for processing large-scale satellite datasets efficiently. The research involves training YOLOv5 model on annotated satellite image datasets, encompassing diverse object classes and environmental conditions. The performance evaluation includes metrics such as accuracy, precision, recall, and inference speed, providing insights into the capabilities and limitations of each architecture.*

Keywords: Machine learning, Deep learning, Neural Network, YOLOv5