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Enhancing Public Transportation Detection using YOLOv5
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Abstract
In the current context of urbanization and transportation expansion, the need for accurate and efficient detection systems for public transportation has become of the utmost importance. The paper presents a novel strategy to establish new standards in transportation detection systems. Using the power of the YOLOv5 deep learning algorithm, the dataset is divided into training, testing, and validation segments to ensure a thorough evaluation. With a training dataset size of 75% and a test-validation split of 25%, our methodology showcases a compelling mean Average Precision (mAP) value of 0.973. Our findings highlight a precision of 0.971, pointing to accurate predictions in approximately 97.1% of cases, and a recall of 0.953, underscoring the model's efficiency in capturing around 95.3% of relevant objects. Such results, particularly the distinguishable taxi class among similar objects, represent significant improvements over previous benchmarks. The model's prowess is evident in its ability to distinguish even in situations involving entities that closely resemble one another, such as taxis and police cars. Our proposed system excels with increased accuracy, precision, and F1 scores compared to a standard study. This paper concludes that with the strategic application of YOLOv5, the future of public transportation detection systems is bright and on the cusp of a new era of efficiency and precision. © 2023 IEEE.

Author Keywords
computer vision; deep learning; object detection; public transportation; YOLOv5

Index Keywords
Computer vision, Deep learning, Efficiency, Learning algorithms, Statistical tests, Taxicabs; 'current, Deep learning, Detection system, Efficient detection, Novel strategies, Objects detection, Power, Public transportation, Training dataset, YOLOv5; Object detection

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