

Detection of Different Traffic Objects at Road Intersections using YOLOv4 and YOLOv4 Tiny algorithms in day and night conditions

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ABSTRACT

Traffic congestion in major Indonesian cities carries severe consequences, including decreased productivity, increased levels of air pollution, and detrimental impacts on public health. Consequently, well-planned and systematic measures are essential to address the traffic issues in these metropolitan areas to improve the quality of life and overall economic productivity. Amidst these challenges, one notable solution is the integration of Artificial Intelligence (AI) within smart city frameworks, particularly in managing urban traffic. This approach can enhance traffic efficiency and safety, fostering a better urban environment through smart technology and control. The study deployed the YOLOv4 algorithm to detect objects such as motorcycles, cars, buses, trucks, and pedestrians at intersections. Testing for these five classes was conducted in daylight and nighttime conditions at one location in Simpang Tugu and ten other intersections in DIY. Based on classification results, the system successfully detected all these objects for both daytime and nighttime conditions. In addition to object classification outcomes, the research also compared the performance of YOLOv4 and YOLOv4-Tiny. The results showed a significant performance discrepancy between the standard YOLOv4 and YOLOv4-Tiny, indicating that YOLOv4-Tiny offers a much lighter version, making it feasible to run on the Jetson Nano platform.

Kata Kunci: *YOLOv4, YOLOv4-Tiny, object detection, smart city*