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Entitled

*REAL TIME OBJECT TRACKING USING YOLO5s AND RECURRENT NETWORK ON A HARDWARE
PLATFORM*

By

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Abstract

The advancement of computer vision, particularly in the domain of object tracking, involves the integration of conventional feature-based approaches with contemporary deep learning methodologies. The initial phase of object detection plays a fundamental role in generating prospective objects for further tracking, and its level of success has a direct influence on the overall effectiveness of the tracking process. Many of the methods used to generate candidate objects start with object detection, and then object tracking algorithms are developed to link the object instances together to create the trajectories.

The primary difficulties in object tracking pertain to the establishment of reliable data associations across consecutive frames. These challenges are particularly pronounced in scenarios involving surveillance and autonomous navigation, when factors like motion blur, variations in lighting, object size, diverse aerial views, and significant obstacles. The integration of multithreading into the YOLOv5s detector which has been trained on the VisDrone2019 dataset, results in a notable reduction in latency. The integrated methodology demonstrates superior performance compared to prior techniques, particularly on edge platforms like Nvidia Jetson AGX ORIN. It attains an F1 score of 93.31% for Intersection over Union (IOU) values greater than 0.5, while achieving a frame rate of 167.147 frames per second within a mere 0.0024 seconds.

The achievements made in this study establish a solid basis for future research, particularly in the areas of adaptive learning, usage of various datasets, and the development of specific tracking evaluation procedures.