PhD Seminar Talk-II

MECSA: A Multi-scale Enhanced Channel and Spatial Attention Module for Robust Pedestrian Detection.

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ABSTRACT

Pedestrian detection is a fundamental yet challenging problem in computer vision, particularly in real-world scenarios characterized by occlusion, scale variation, and low-light conditions. Although modern deep learning-based detectors such as YOLOv7 achieve strong performance, their robustness in complex environments remains limited. In this work, we propose YOLOv7-MECSA, an enhanced pedestrian detection framework that incorporates a novel Multi-scale Enhanced Channel and Spatial Attention (MECSA) module. The proposed attention mechanism improves feature representation by capturing both channel and spatial dependencies across multiple scales, enabling more reliable detection in challenging scenarios. The proposed model is evaluated on multiple benchmark datasets, including WiderPerson, COCO-Person, INRIA, and Enriched CamPed, where it demonstrates consistent improvements over existing methods while maintaining real-time performance. Qualitative results further highlight its robustness under occlusion and low illumination conditions. This seminar presents the design of the MECSA module, its integration into YOLOv7, and its effectiveness in improving real-world pedestrian detection performance.