Blackout

Augmentation to Handle Occlusion in Pedestrian Detection

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Project Objectives:

The aim of this project is to improve the performance of the **Y**ou **O**nly **L**ive **O**nce e**X**treme **(YOLOX)** in terms of its accuracy by tackling the challenge of **occlusion** amongst pedestrians.

Proposed Augmentation:

*   Blackout is an **enhancement** to the existing augmentation Cutout which randomly covers portions of the image with a black square to tackle occlusion.

*   Blackout is a **strong** augmentation technique that **blacks out** the intersection of overlapping ground truth bounding boxes.

*   It computes the intersection over union **(IoU)** of the ground truth bounding boxes present in an image and blacks out the intersection if the IoU value lies within the threshold range.

*   Ensures that the learning process of the model is focused on the **outlines** of the pedestrians and the **parts that are visible** to allow the model to detect pedestrians even in the case of Occlusion.

Results:

*   Blackout is evaluated on the **Penn Fudan Pedestrian Detection Dataset.**

*   The results show that Blackout works best when it is the only strong augmentation used in larger models such as YOLOX-M.

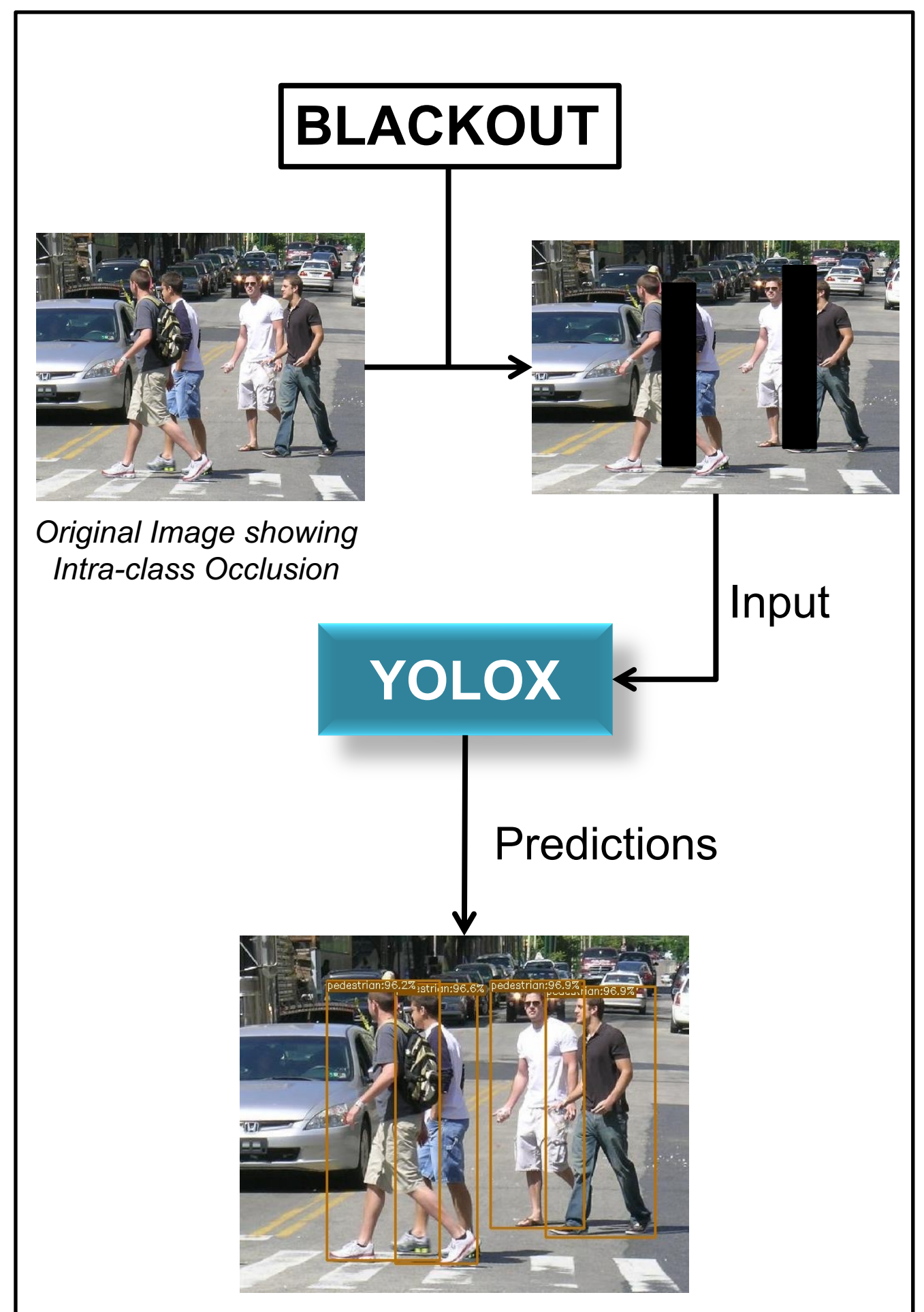*   It results in a whopping **13%** increase in accuracy from 67.44% to 80.45%.

Figure 1: Workflow with Blackout Implemented

Table 1: Results on **YOLOX-S**

Model	Accuracy [0.5:0.95]	Inference Time [ms]
Baseline	**77.81**	172.71
Augmented	77.38	**164.96**

Table 2: Results on **YOLOX-M**

Model	Accuracy [0.5:0.95]	Inference Time [ms]
Baseline	67.44	256.60
Augmented	**80.45**	**251.32**