Model Summary Report for YOLOv5n Student Model

Knowledge Distillation on Object Detection Task

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Model Type	Model Name	Trainable Parameters
Teacher Model	YOLOv5x	86.7M
Student Model	YOLOv5n	1.9M
Student Model	YOLOv5n_Custom	0.58M

Table 1: Model Information

Model	mAP@0.5	aero	bicycle	bird	boat	bottle	bus	car	cat	chair	cow	table	dog	horse	mbike	person	plant	sheep	sofa	train	tv
Student	0.7077	0.777	0.809	0.627	0.598	0.605	0.783	0.870	0.757	0.559	0.761	0.674	0.694	0.797	0.780	0.821	0.451	0.689	0.560	0.788	0.735

Table 2: Performance of the student model (YOLOv5n) on VOC dataset classes.

Model	Parameters (M)	mAP@50	mAP@50-95
YOLOv7-tiny (SOTA)	6.2	0.644	0.385
YOLOv5n (Student1)	1.9	0.707	0.433
YOLOv5n_Custom (Student2)	0.58	0.550	0.293

Table 3: Comparison of Model Performance on Pascal VOC Dataset

Dataset	P (Precision)	R (Recall)	mAP@50	mAP@50-95
Pascal VOC	0.722	0.644	0.707	0.433
Road	0.791	0.658	0.722	0.412
BCCD	0.873	0.881	0.916	0.628
Lemon Disease	0.928	0.888	0.925	0.693
Incorrect-Mask-2	0.919	0.804	0.877	0.5834

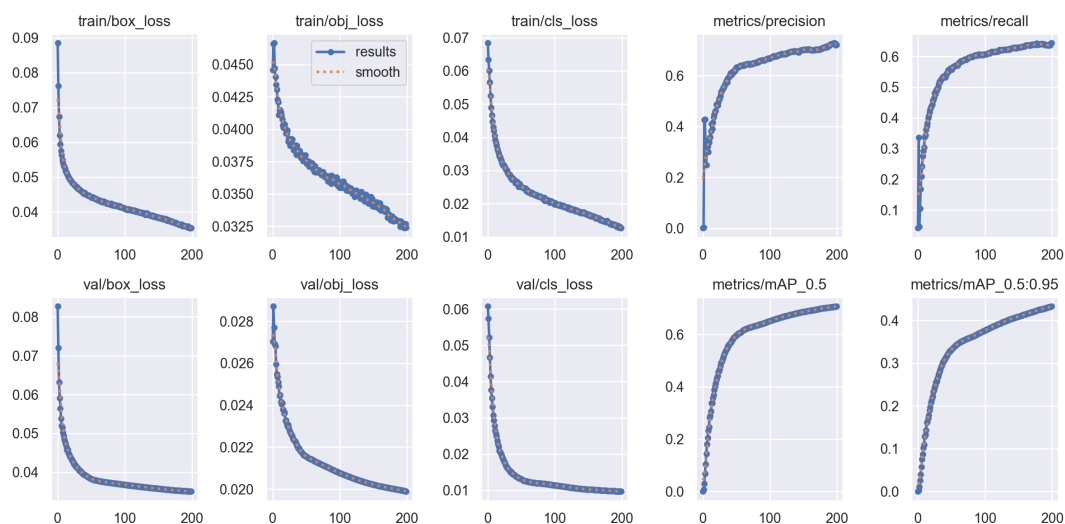Table 4: Performance of the student model (YOLOv5n) on five different datasets.

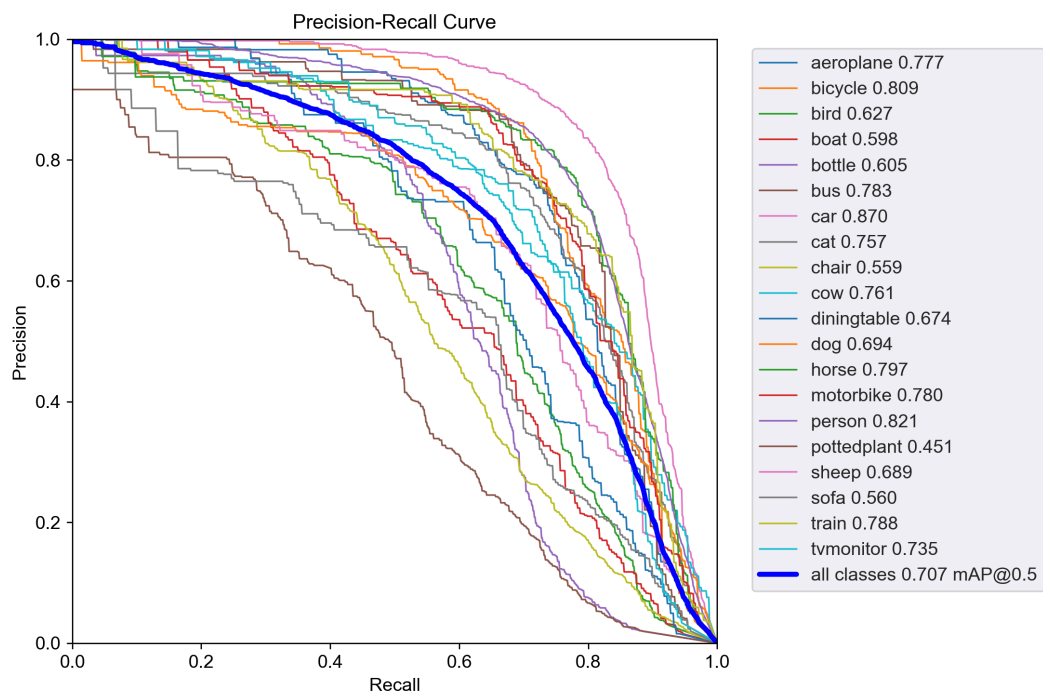Figure 1: Student Model-1 Overall Result on Pascal VOC Dataset

Figure 2: Student Model-1 Precision-Recall Curve on Pascal VOC Dataset