Model Summary Report for YOLOv5n Student Model

Knowledge Distillation on Object Detection Task

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Course: CSE465.1

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Model Type	Model Name	Trainable Parameters
Teacher Model	YOLOv5x	86.7M
Student Model	YOLOv5n	1.78M
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
Our-YOLOv5n (Student1)	1.79	0.708	0.435
Our-YOLOv5n_Custom (Student2)	0.58	0.550	0.293

Table 3: Comparison of Model Performance on Pascal VOC Dataset

KD Loss Function	mAP@50	mAP@50-95
Combined Loss (a=0.75)	0.704	0.435
Combined Loss (a=0.5)	0.709	0.435
Combined Loss (a=0.25)	0.705	0.428
Attention Transfer Loss	0.708	0.435
Smooth L1 Loss	0.701	0.430
Smooth MSE Loss	0.707	0.433

Table 4: Performance of the student model (ours-YOLOv5n) on four different KD Loss function.

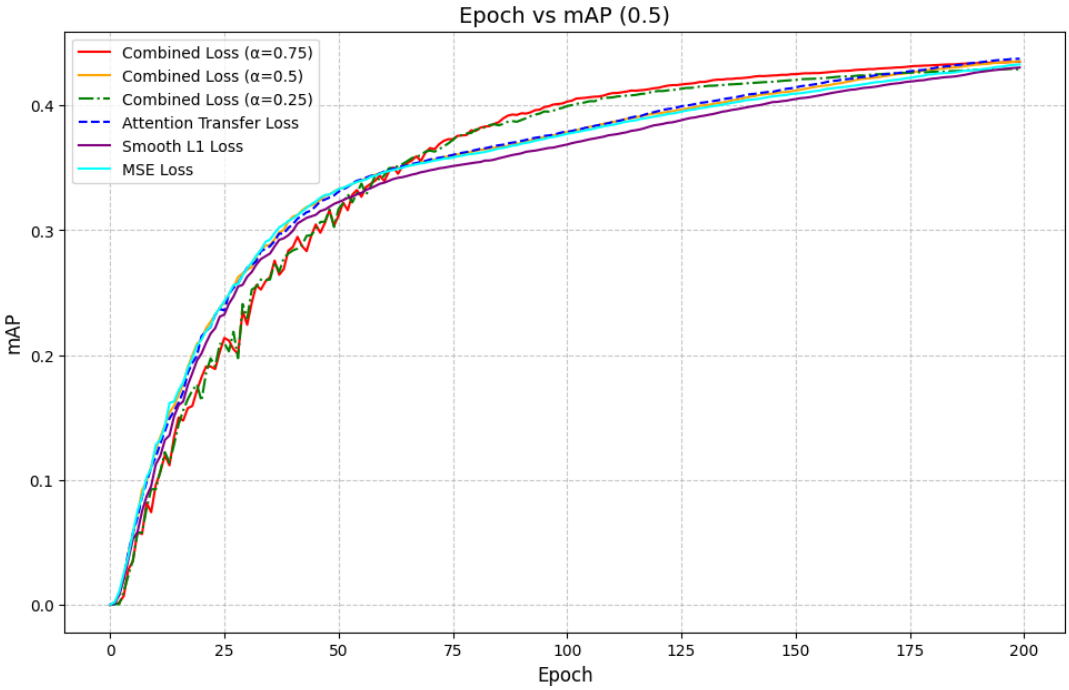

Figure 1: our-Student Model-1 Overall Result(mAP 0.5) on Pascal VOC Dataset

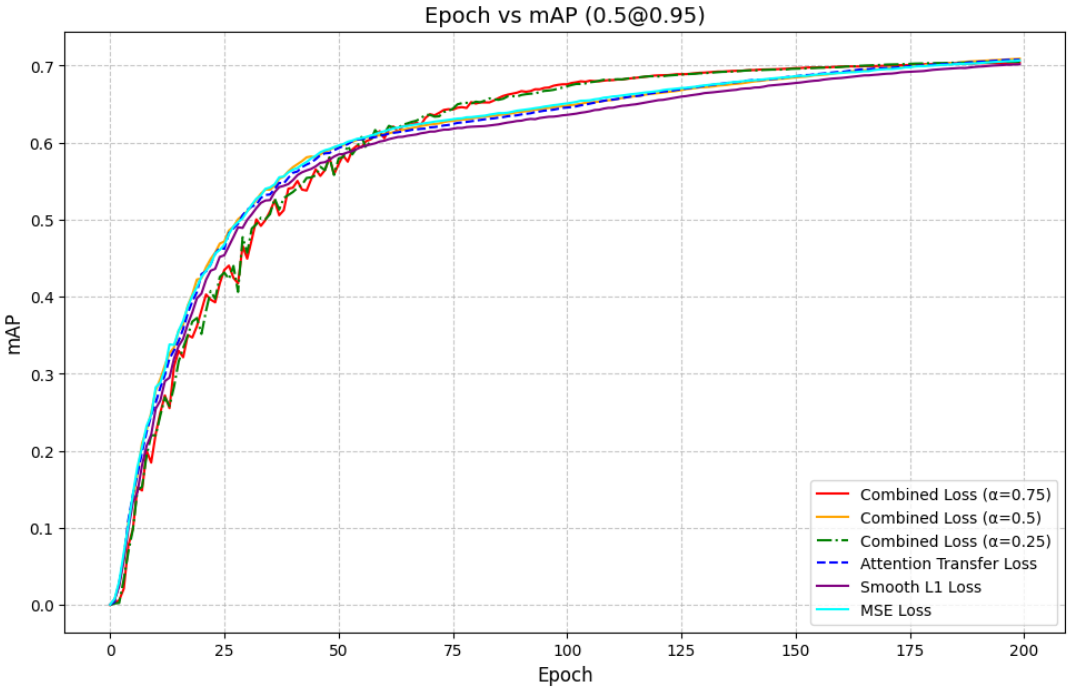

Figure 2: our-Student Model-1 Overall Result(mAP(0.5@0.95) Curve on Pascal VOC Dataset