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| Table 0. YOLO training dataset. | | | |
|  | Train | Validation | Test |
| Data Augmentation | 417 | 78 | 78 |

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| Precision | Recall | mAP50 | mAP50-95 |
| 0.978 | 0.982 | 0.994 | 0.855 |

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| Table 1. Local Structural Pruning、GroupNormImportance、GroupNormPruner  iterative-steps = 3, sp=0.2, pr-batch=1, ft-epoch = 10, ft-batch=16 | | | | | |
|  | Params(M) | MACs(G) | GFLOPs | mAP50-95 | Speed up(%) |
| Before Pruning | 3.01104 | 4.07054 | 8.1 | 0.85503 | - |
| After pruning 1 | 2.63312 | 3.58708 | 7.1 | 0.00231 | 1.13477 |
| Fine tuning 1 | - | - | - | 0.85669 | - |
| After pruning 2 | 2.30853 | 3.15502 | 6.3 | 0.00008 | 1.29018 |
| Fine tuning 2 | - | - | - | 0.84659 | - |
| After pruning 3 | 2.04553 | 2.84735 | 5.7 | 0.00077 | 1.42959 |
| Fine tuning 3 | - | - | - | 0.85052 | - |

2.04553 / 3.01104 = 0.6793

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| Table 2. Local Structural Pruning、GroupNormImportance、GroupNormPruner  iterative-steps = 5, sp=0.3, pr-batch=1, ft-epoch = 20, ft-batch=32 | | | | | |
|  | Params(M) | MACs(G) | GFLOPs | mAP50-95 | Speed up(%) |
| Before Pruning | 3.01104 | 4.07054 | 8.1 | 0.85503 | - |
| After pruning 1 | 2.65679 | 3.60022 | 7.1 | 0.00087 | 1.13064 |
| Fine tuning 1 | - | - | - | 0.85967 | - |
| After pruning 2 | 2.33581 | 3.22285 | 6.4 | 0.00060 | 1.26302 |
| Fine tuning 2 | - | - | - | 0.85107 | - |
| After pruning 3 | 2.07098 | 2.91045 | 5.8 | 0.09790 | 1.39859 |
| Fine tuning 3 | - | - | - | 0.86112 | - |
| After pruning 4 | 1.82725 | 2.61924 | 5.2 | 0.00000 | 1.55409 |
| Fine tuning 4 | - | - | - | 0.85159 | - |
| After pruning 5 | 1.61863 | 2.35769 | 4.7 | 0.00000 | 1.72649 |
| Fine tuning 5 | - | - | - | 0.84571 | - |

1.61863 / 3.01104 = 0.5376

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| Table 3. Local Structural Pruning、GroupNormImportance、GroupNormPruner  iterative-steps = 5, sp=0.4, pr-batch=1, ft-epoch = 20, ft-batch=32 | | | | | |
|  | Params(M) | MACs(G) | GFLOPs | mAP50-95 | Speed up(%) |
| Before Pruning | 3.01104 | 4.07054 | 8.1 | 0.85503 | - |
| After pruning 1 | 2.51670 | 3.44522 | 6.8 | 0.00113 | 1.181503 |
| Fine tuning 1 | - | - | - | 0.86692 | - |
| After pruning 2 | 2.11227 | 2.95417 | 5.9 | 0.00000 | 1.377895 |
| Fine tuning 2 | - | - | - | 0.85767 | - |
| After pruning 3 | 1.78107 | 2.54857 | 5.1 | 0.00000 | 1.597185 |
| Fine tuning 3 | - | - | - | 0.85017 | - |
| After pruning 4 | 1.51662 | 2.22003 | 4.4 | 0.00001 | 1.833553 |
| Fine tuning 4 | - | - | - | 0.85308 | - |
| After pruning 5 | 1.29511 | 1.96790 | 3.9 | 0.00225 | 2.06847 |
| Fine tuning 5 | - | - | - | 0.84066 | - |

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| Table 4. Local Structural Pruning、GroupNormImportance、GroupNormPruner  iterative-steps = 5, sp=0.5, pr-batch=1, ft-epoch = 20, ft-batch=32 | | | | | |
|  | Params(M) | MACs(G) | GFLOPs | mAP50-95 | Speed up(%) |
| Before Pruning | 3.01104 | 4.07054 | 8.1 | 0.85507 | - |
| After pruning 1 | 2.37201 | 3.26575 | 6.5 | 0.00000 | 1.24643 |
| Fine tuning 1 | - | - | - | 0.85549 | - |
| After pruning 2 | 1.88180 | 2.66985 | 5.3 | 0.00000 | 1.52463 |
| Fine tuning 2 | - | - | - | 0.85805 | - |
| After pruning 3 | 1.50914 | 2.21863 | 4.4 | 0.00000 | 1.83470 |
| Fine tuning 3 | - | - | - | 0.84266 | - |
| After pruning 4 | 1.22596 | 1.86258 | 3.7 | 0.00000 | 2.18542 |
| Fine tuning 4 | - | - | - | 0.83654 | - |
| After pruning 5 | 1.00493 | 1.59416 | 3.2 | 0.00000 | 2.55340 |
| Fine tuning 5 | - | - | - | 0.83284 | - |

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| Table 5. Global Structural Pruning、GroupNormImportance、GroupNormPruner  iterative-steps = 5, sp=0.5, pr-batch=1, ft-epoch = 20, ft-batch=32 | | | | | |
|  | Params(M) | MACs(G) | GFLOPs | mAP50-95 | Speed up(%) |
| Before Pruning | 3.01104 | 4.07054 | 8.1 | 0.85507 | - |
| After pruning 1 | 2.67191 | 3.59120 | 7.1 | 0.00000 | 1.13347 |
| Fine tuning 1 | - | - | - | 0.86306 | - |
| After pruning 2 | 2.39898 | 3.16893 | 6.3 | 0.00000 | 1.28451 |
| Fine tuning 2 | - | - | - | 0.81008 | - |
| After pruning 3 | 2.14784 | 2.85534 | 5.7 | 0.00000 | 1.42558 |
| Fine tuning 3 | - | - | - | 0.80962 | - |
| After pruning 4 | 1.92239 | 2.59847 | 5.2 | 0.00138 | 1.56651 |
| Fine tuning 4 | - | - | - | 0.82519 | - |
| After pruning 5 | 1.73054 | 2.37488 | 4.7 | 0.00000 | 1.71399 |
| Fine tuning 5 | - | - | - | 0.63836 | - |

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| Table 6. Global Structural Pruning、GroupNormImportance、GroupNormPruner  iterative-steps = 5, sp=0.5, pr-batch=1, ft-epoch = 20, ft-batch=32 | | | | | |
|  | Params(M) | MACs(G) | GFLOPs | mAP50-95 | Speed up(%) |
| Before Pruning | 3.01104 | 4.07054 | 8.1 | 0.85507 | - |
| After pruning 1 | 2.39279 | 3.27565 | 6.5 | 0.00000 | 1.24266 |
| Fine tuning 1 | - | - | - | 0.85625 | - |
| After pruning 2 | 1.91797 | 2.68029 | 5.3 | 0.00000 | 1.51868 |
| Fine tuning 2 | - | - | - | 0.69359 | - |
| After pruning 3 | 1.54873 | 2.27405 | 4.5 | 0.00000 | 1.78998 |
| Fine tuning 3 | - | - | - | 0.53508 | - |