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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Methods | Supervision | | ClinicDB | | | | | Kavsir | | | | | Private | | | | |
| IoU@10-50 | IoU@10 | | IoU@30 | | IoU@10-50 | IoU@10 | | IoU@30 | | IoU@10-50 | IoU@10 | | IoU@30 | |
| Box | Class | mAP | mAP | CorLoc | mAP | CorLoc | mAP | mAP | CorLoc | mAP | CorLoc | mAP | mAP | CorLoc | mAP | CorLoc |
| Faster Rcnn | √ | √ | 41.08 | 41.22 | 94.38 | 41.22 | 91.01 | 26.16 | 26.56 | 95.56 | 26.22 | 94.58 | 27.59 | 27.59 | 97.14 | 27.59 | 97.14 |
| Yolo | √ | √ | 39.94 | 40.54 | **98.68** | 40.30 | 96.05 | 26.88 | 27.61 | 95.34 | 27.22 | 93.02 | 29.42 | 30.23 | 84.21 | 29.60 | 76.32 |
| DiffusionDet50 | √ | √ | **62.08** | 63.41 | 97.10 | **63.41** | 97.10 | **27.66** | **28.59** | **97.41** | **27.94** | **95.69** | 37.40 | 37.82 | **100.00** | 37.59 | **100.00** |
| DiffusionDet500 | √ | √ | 60.89 | 61.88 | 98.46 | 61.88 | **98.46** | 25.84 | 27.17 | 96.00 | 26.83 | 94.40 | **37.83** | 40.06 | **100.00** | **39.28** | **100.00** |
| WSDDN | - | √ | 10.94 | 16.81 | 34.63 | 9.33 | 13.56 | 6.14 | 7.92 | 37.28 | 5.79 | 12.95 | 12.26 | 14.65 | 24.43 | 11.61 | 7.77 |
| OICR | - | √ | 1.68 | 4.30 | 9.40 | 0.37 | 1.88 | - | - | - | - | - | 1.24 | 1.24 | 5.24 | 1.24 | 4.04 |
| WSOD2 | - | √ | 29.51 | 37.53 | 58.55 | 25.80 | 36.03 | 1.55 | 1.60 | 10.18 | 1.54 | 7.78 | 1.01 | 1.01 | 3.92 | 1.01 | 3.92 |
| Grad-CAM | - | √ | 19.65 | 42.11 | 51.46 | 12.91 | 23.97 | 5.60 | 12.41 | 36.56 | 3.63 | 15.57 | 15.84 | 23.79 | 31.19 | 13.29 | 20.18 |
| Grad-CAM++ | - | √ | 21.99 | 48.53 | 53.80 | 13.01 | 24.45 | 5.67 | 12.40 | 36.04 | 3.67 | 16.89 | 14.92 | 21.65 | 27.82 | 13.15 | 18.80 |
| Ours | - | √ | ***54.28*** | **74.01** | ***96.97*** | ***54.83*** | ***73.94*** | ***18.31*** | ***25.92*** | ***92.40*** | ***18.26*** | ***69.20*** | ***37.16*** | **45.37** | ***88.75*** | ***36.12*** | ***68.75*** |

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| Methods | Supervision | | ClinicDB | | | | | | | Kavsir | | | | | | | Private | | | | | | |
| IoU@10-50 | IoU@10 | | IoU@30 | | [IoU@50](mailto:IoU@50) | | IoU@10-50 | IoU@10 | | IoU@30 | | [IoU@50](mailto:IoU@50) | | IoU@10-50 | IoU@10 | | IoU@30 | | [IoU@50](mailto:IoU@50) | |
| Box | Class | mAP | mAP | CorLoc | mAP | CorLoc | mAP | CorLoc | mAP | mAP | CorLoc | mAP | CorLoc | mAP | CorLoc | mAP | mAP | CorLoc | mAP | CorLoc | mAP | CorLoc |
| Faster Rcnn | √ | √ | 41.08% | 41.22% | 94.38% | 41.22% | 91.01% | 40.79% | 89.88% | 26.16% | 26.56% | 95.56% | 26.22% | 94.58% | 25.69% | 91.63% | 27.59% | 27.59% | 97.14% | 27.59% | 97.14% | 27.59% | 94.29% |
| Yolo | √ | √ | 39.94% | 40.54% | **98.68%** | 40.30% | 96.05% | 38.97% | 89.47% | 26.88% | 27.61% | 95.34% | 27.22% | 93.02% | 25.82% | 88.37% | 29.42% | 30.23% | 84.21% | 29.60% | 76.32% | 28.42% | 73.68% |
| DiffusionDet50 | √ | √ | **62.08%** | 63.41% | 97.10% | **63.41%** | 97.10% | **59.42%** | 95.65% | **27.66%** | **28.59%** | **97.41%** | **27.94%** | **95.69%** | **26.44%** | 93.97% | 37.40% | 37.82% | **100.00%** | 37.59% | **100.00%** | **36.78%** | **100.00%** |
| DiffusionDet500 | √ | √ | 60.89% | 61.88% | 98.46% | 61.88% | **98.46%** | 58.91% | **96.92%** | 25.84% | 27.17% | 96.00% | 26.83% | 94.40% | 23.52% | 88.80% | **37.83%** | 40.06% | **100.00%** | **39.28%** | **100.00%** | 34.14% | **100.00%** |
| WSDDN | - | √ | 10.94% | 16.81% | 34.63% | 9.33% | 13.56% | 6.69% | 5.45% | 6.14% | 7.92% | 37.28% | 5.79% | 12.95% | 4.71% | 4.89% | 12.26% | 14.65% | 24.43% | 11.61% | 7.77% | 10.51% | 4.13% |
| OICR | - | √ | 1.68% | 4.30% | 9.40% | 0.37% | 1.88% | 0.37% | 1.88% | - | - | - | - | - | - | - | 1.24% | 1.24% | 5.24% | 1.24% | 4.04% | 1.23% | 3.84% |
| WSOD2 | - | √ | 29.51% | 37.53% | 58.55% | 25.80% | 36.03% | 25.21% | 32.43% | 1.55% | 1.60% | 10.18% | 1.54% | 7.78% | 1.52% | 7.19% | 1.01% | 1.01% | 3.92% | 1.01% | 3.92% | 1.01% | 3.92% |
| Grad-CAM | - | √ | 19.65% | 42.11% | 51.46% | 12.91% | 23.97% | 3.94% | 8.16% | 5.60% | 12.41% | 36.56% | 3.63% | 15.57% | 0.75% | 6.37% | 15.84% | 23.79% | 31.19% | 13.29% | 20.18% | 10.45% | 16.51% |
| Grad-CAM++ | - | √ | 21.99% | 48.53% | 53.80% | 13.01% | 24.45% | 4.44% | 8.15% | 5.67% | 12.40% | 36.04% | 3.67% | 16.89% | 0.93% | 8.33% | 14.92% | 21.65% | 27.82% | 13.15% | 18.80% | 9.96% | 15.04% |
| Ours | - | √ | ***54.28%*** | **74.01%** | ***96.97%*** | ***54.83%*** | ***73.94%*** | ***34.01%*** | ***43.03%*** | ***18.31%*** | ***25.92%*** | ***92.40%*** | ***18.26%*** | ***69.20%*** | ***10.74%*** | 40.30% | ***37.16%*** | **45.37%** | ***88.75%*** | ***36.12%*** | ***68.75%*** | ***29.99%*** | ***50.00%*** |
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| Methods | Flat AP | Pedicle AP | Edge AP |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | 0.00% | 76.20% | 46.15% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Yolo | 0.00% | 81.54% | 35.36% |  | 91.76% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | 0.00% | 96.49% | 81.77% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | 0.00% | 94.25% | 82.49% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| WSDDN | 0.00% | 0.11% | 0.12% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OICR | 0.00% | 1.10% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| WSOD2 | 3.00% | 38.63% | 34.04% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ours | 55.92% | 15.21% | 30.91% |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Methods | Supervision | | IoU@10-50 | | IoU@10 | | IoU@30 | | [IoU@50](mailto:IoU@50) | |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Box | Class | mAP | CorLoc | mAP | CorLoc | mAP | CorLoc | mAP | CorLoc |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | √ | √ | **20.54%** | **83.21%** | **21.07%** | **87.79%** | **20.88%** | **83.21%** | **19.66%** | **78.63%** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Yolo | √ | √ | 15.10% | 49.40% | 17.74% | 63.69% | 14.62% | 45.83% | 12.93% | 38.69% |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | √ | √ | 5.21% | 60.00% | 7.64% | 75.00% | 4.70% | 57.50% | 3.29% | 47.50% |  |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | √ | √ | 5.01% | 57.58% | 7.96% | 72.73% | 4.24% | 57.58% | 2.82% | 42.42% |  |  |  |  |  |  |  |  |  |  |  |  |  |
| WSDDN | - | √ | 2.64% | 10.50% | 4.08% | 20.46% | 2.09% | 7.03% | 1.74% | 4.00% |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OICR | - | √ | - | 0.61% | - | 1.82% | - | - | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
| WSOD2 | - | √ | 1.77% | 6.08% | 1.84% | 6.93% | 1.74% | 5.84% | 1.74% | 5.47% |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM | - | √ | 3.17% | 14.97% | 6.32% | 26.68% | 2.73% | 13.24% | 0.47% | 4.99% |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | - | √ | 2.97% | 13.13% | 5.77% | 23.82% | 2.67% | 11.30% | 0.46% | 4.27% |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ours | - | √ | ***15.17%*** | ***67.62%*** | ***18.65%*** | ***87.39%*** | ***15.29%*** | ***65.62%*** | ***11.56%*** | ***49.86%*** |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Methods | old CorLoc | new CorLoc | old mAP | new mAP | drop mAP | drop CorLoc |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | 91.76% | 83.21% | 41.08% | **20.54%** | 50.00% | 9.31% |  | 41.22% | 94.38% | 41.22% | 91.01% | 40.79% | 89.88% |  |  |  |  |  |  |  |  |  |  |
| Yolo | 94.73% | 49.40% | 39.94% | 15.10% | 62.19% | 47.85% |  | 40.54% | **98.68%** | 40.30% | 96.05% | 38.97% | 89.47% |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | 96.62% | 60.00% | 62.08% | 5.21% | 91.61% | 37.90% |  | 63.41% | 97.10% | **63.41%** | 97.10% | **59.42%** | 95.65% |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | 97.95% | 57.58% | 60.89% | 5.01% | 91.77% | 41.21% |  | 61.88% | 98.46% | 61.88% | **98.46%** | 58.91% | **96.92%** |  |  |  |  |  |  |  |  |  |  |
| WSDDN | 17.88% | 10.50% | 10.94% | 2.64% | 75.87% | 41.28% |  | 16.81% | 34.63% | 9.33% | 13.56% | 6.69% | 5.45% |  |  |  |  |  |  |  |  |  |  |
| OICR | 4.39% | 0.61% | 1.68% | 0.00% | 100.00% | 86.09% |  | 4.30% | 9.40% | 0.37% | 1.88% | 0.37% | 1.88% |  |  |  |  |  |  |  |  |  |  |
| WSOD2 | 42.34% | 6.08% | 29.51% | 1.77% | 94.00% | 85.64% |  | 37.53% | 58.55% | 25.80% | 36.03% | 25.21% | 32.43% |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM | 27.86% | 14.97% | 19.65% | 3.17% | 83.87% | 46.27% |  | 42.11% | 51.46% | 12.91% | 23.97% | 3.94% | 8.16% |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | 28.80% | 13.13% | 21.99% | 2.97% | 86.49% | 54.41% |  | 48.53% | 53.80% | 13.01% | 24.45% | 4.44% | 8.15% |  |  |  |  |  |  |  |  |  |  |
| Ours | 71.31% | 67.62% | 54.28% | ***15.17%*** | 72.05% | 5.18% |  | **74.01%** | ***96.97%*** | ***54.83%*** | ***73.94%*** | ***34.01%*** | ***43.03%*** |  |  |  |  |  |  |  |  |  |  |
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| Methods | old mAP10 | new mAP10 | old mAP30 | new mAP30 | old mAP50 | new mAP50 | old mAP10-50 | new mAP10-50 | 10 | 30 | 50 | 10-50 |  |  |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | 41.22% | **21.07%** | 41.22% | **20.88%** | 40.79% | **19.66%** | 41.08% | **20.54%** | 20.15% | 20.34% | 21.13% | 20.54% |  |  |  |  |  |  |  |  |  |  |  |
| Yolo | 40.54% | 17.74% | 40.30% | 14.62% | 38.97% | 12.93% | 39.94% | 15.10% | 22.80% | 25.68% | 26.04% | 24.84% |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | 63.41% | 7.64% | **63.41%** | 4.70% | **59.42%** | 3.29% | **62.08%** | 5.21% | 55.77% | 58.71% | 56.13% | 56.87% |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | 61.88% | 7.96% | 61.88% | 4.24% | 58.91% | 2.82% | 60.89% | 5.01% | 53.92% | 57.64% | 56.09% | 55.88% |  |  |  |  |  |  |  |  |  |  |  |
| WSDDN | 16.81% | 4.08% | 9.33% | 2.09% | 6.69% | 1.74% | 10.94% | 2.64% | 12.73% | 7.24% | 4.95% | 8.30% |  |  |  |  |  |  |  |  |  |  |  |
| OICR | 4.30% | - | 0.37% | - | 0.37% | - | 1.68% | - | 4.30% | 0.37 | 0.37 | 1.68% |  |  |  |  |  |  |  |  |  |  |  |
| WSOD2 | 37.53% | 1.84% | 25.80% | 1.74% | 25.21% | 1.74% | 29.51% | 1.77% | 35.69% | 24.06% | 23.47% | 27.74% |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM | 42.11% | 6.32% | 12.91% | 2.73% | 3.94% | 0.47% | 19.65% | 3.17% | 35.79% | 10.18% | 3.47% | 16.48% |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | 48.53% | 5.77% | 13.01% | 2.67% | 4.44% | 0.46% | 21.99% | 2.97% | 42.76% | 10.34% | 3.98% | 19.02% |  |  |  |  |  |  |  |  |  |  |  |
| Ours | **74.01%** | ***18.65%*** | ***54.83%*** | ***15.29%*** | ***34.01%*** | ***11.56%*** | ***54.28%*** | ***15.17%*** | 55.36% | 39.54% | 22.45% | 39.11% |  |  |  |  |  |  |  |  |  |  |  |
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| Methods | old CorLoc10 | new CorLoc10 | old CorLoc30 | new CorLoc30 | old CorLoc50 | new CorLoc50 | old CorLoc10-50 | new CorLoc10-50 | 10 | 30 | 50 | 10-50 |  |  |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | 94.38% | **87.79%** | 91.01% | **83.21%** | 89.88% | **78.63%** | 91.76% | **83.21%** | 6.59% | 7.80% | 11.25% | 8.55% |  |  |  |  |  |  |  |  |  |  |  |
| Yolo | **98.68%** | 63.69% | 96.05% | 45.83% | 89.47% | 38.69% | 94.73% | 49.40% | 34.99% | 50.22% | 50.78% | 45.33% |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | 97.10% | 75.00% | 97.10% | 57.50% | 95.65% | 47.50% | 96.62% | 60.00% | 22.10% | 39.60% | 48.15% | 36.62% |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | 98.46% | 72.73% | **98.46%** | 57.58% | **96.92%** | 42.42% | 97.95% | 57.58% | 25.73% | 40.88% | 54.50% | 40.37% |  |  |  |  |  |  |  |  |  |  |  |
| WSDDN | 34.63% | 20.46% | 13.56% | 7.03% | 5.45% | 4.00% | 17.88% | 10.50% | 14.17% | 6.53% | 1.45% | 7.38% |  |  |  |  |  |  |  |  |  |  |  |
| OICR | 9.40% | 1.82% | 1.88% | - | 1.88% | - | 4.39% | 0.61% | 7.58% | 1.88 | 1.68% | 3.78% |  |  |  |  |  |  |  |  |  |  |  |
| WSOD2 | 58.55% | 6.93% | 36.03% | 5.84% | 32.43% | 5.47% | 42.34% | 6.08% | 51.62% | 30.19% | 26.96% | 36.26% |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM | 51.46% | 26.68% | 23.97% | 13.24% | 8.16% | 4.99% | 27.86% | 14.97% | 24.78% | 10.73% | 3.17% | 12.89% |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | 53.80% | 23.82% | 24.45% | 11.30% | 8.15% | 4.27% | 28.80% | 13.13% | 29.98% | 13.15% | 3.88% | 15.67% |  |  |  |  |  |  |  |  |  |  |  |
| Ours | ***96.97%*** | ***87.39%*** | ***73.94%*** | ***65.62%*** | ***43.03%*** | ***49.86%*** | 71.31% | ***67.62%*** | 9.58% | 8.32% | -6.83% | 3.69% |  |  |  |  |  |  |  |  |  |  |  |
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| Methods | mAP | | | | CorLoc | | | | mAP | | | | CorLoc | | | |  |  |  |  |  |  |  |
|  | 10 | 30 | 50 | 10-50 | 10 | 30 | 50 | 10-50 | 10 | 30 | 50 | 10-50 | 10 | 30 | 50 | 10-50 |  |  |  |  |  |  |  |
| Faster Rcnn | 20.15% | 20.34% | 21.13% | 20.54% | 6.59% | 7.80% | 11.25% | 8.55% | 10.08% | 10.17% | 10.57% | 10.27% | 3.30% | 3.90% | 5.63% | 4.28% |  |  |  |  |  |  |  |
| Yolo | 22.80% | 25.68% | 26.04% | 24.84% | 34.99% | 50.22% | 50.78% | 45.33% | 11.40% | 12.84% | 13.02% | 12.42% | 17.50% | 25.11% | 25.39% | 22.67% |  |  |  |  |  |  |  |
| DiffusionDet50 | 55.77% | 58.71% | 56.13% | 56.87% | 22.10% | 39.60% | 48.15% | 36.62% | 27.89% | 29.36% | 28.07% | 28.44% | 11.05% | 19.80% | 24.08% | 18.31% |  |  |  |  |  |  |  |
| DiffusionDet500 | 53.92% | 57.64% | 56.09% | 55.88% | 25.73% | 40.88% | 54.50% | 40.37% | 26.96% | 28.82% | 28.05% | 27.94% | 12.87% | 20.44% | 27.25% | 20.19% |  |  |  |  |  |  |  |
| WSDDN | 12.73% | 7.24% | 4.95% | 8.30% | 14.17% | 6.53% | 1.45% | 7.38% | 6.37% | 3.62% | 2.48% | 4.15% | 7.09% | 3.27% | 0.73% | 3.69% |  |  |  |  |  |  |  |
| OICR | 4.30% | 0.37% | 0.37% | 1.68% | 7.58% | 1.88% | 1.68% | 3.78% | 2.15% | 0.19% | 0.19% | 0.84% | 3.79% | 0.94% | 0.84% | 1.89% |  |  |  |  |  |  |  |
| WSOD2 | 35.69% | 24.06% | 23.47% | 27.74% | 51.62% | 30.19% | 26.96% | 36.26% | 17.85% | 12.03% | 11.74% | 13.87% | 25.81% | 15.10% | 13.48% | 18.13% |  |  |  |  |  |  |  |
| Grad-CAM | 35.79% | 10.18% | 3.47% | 16.48% | 24.78% | 10.73% | 3.17% | 12.89% | 17.90% | 5.09% | 1.74% | 8.24% | 12.39% | 5.37% | 1.59% | 6.45% |  |  |  |  |  |  |  |
| Grad-CAM++ | 42.76% | 10.34% | 3.98% | 19.02% | 29.98% | 13.15% | 3.88% | 15.67% | 21.38% | 5.17% | 1.99% | 9.51% | 14.99% | 6.58% | 1.94% | 7.84% |  |  |  |  |  |  |  |
| Ours | 55.36% | 39.54% | 22.45% | 39.11% | 9.58% | 8.32% | -6.83% | 3.69% | 27.68% | 19.77% | 11.23% | 19.56% | 4.79% | 4.16% | -3.42% | 1.85% |  |  |  |  |  |  |  |
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| Methods | 10 map | 30 | 50 | 10-50 |  |  |  |  |  |  | 10 图 | 30 | 50 | 10-50 |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | 0.4122 | 0.4122 | 0.4079 | 0.4108 |  | 0.1008 | 0.1017 | 0.1057 | 0.1027 |  | 0.3114 | 0.3105 | 0.3022 | 0.3081 |  |  |  |  |  |  |  |  |  |
| Yolo | 0.4054 | 0.403 | 0.3897 | 0.3994 |  | 0.114 | 0.1284 | 0.1302 | 0.1242 |  | 0.2914 | 0.2746 | 0.2595 | 0.2752 |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | 0.6341 | **0.6341** | **0.5942** | **0.6208** |  | 0.2789 | 0.2936 | 0.2807 | 0.2844 |  | 0.3552 | 0.3405 | 0.3135 | 0.3364 |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | 0.6188 | 0.6188 | 0.5891 | 0.6089 |  | 0.2696 | 0.2882 | 0.2805 | 0.2794 |  | 0.3492 | 0.3306 | 0.3086 | 0.3295 |  |  |  |  |  |  |  |  |  |
| WSDDN | 0.1681 | 0.0933 | 0.0669 | 0.1094 |  | 0.0637 | 0.0362 | 0.0248 | 0.0415 |  | 0.1044 | 0.0571 | 0.0421 | 0.0679 |  |  |  |  |  |  |  |  |  |
| OICR | 0.043 | 0.0037 | 0.0037 | 0.0168 |  | 0.0215 | 0.0019 | 0.0019 | 0.0084 |  | 0.0215 | 0.0018 | 0.0018 | 0.0084 |  |  |  |  |  |  |  |  |  |
| WSOD2 | 0.3753 | 0.258 | 0.2521 | 0.2951 |  | 0.1785 | 0.1203 | 0.1174 | 0.1387 |  | 0.1968 | 0.1377 | 0.1347 | 0.1564 |  |  |  |  |  |  |  |  |  |
| Grad-CAM | 0.4211 | 0.1291 | 0.0394 | 0.1965 |  | 0.179 | 0.0509 | 0.0174 | 0.0824 |  | 0.2421 | 0.0782 | 0.022 | 0.1141 |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | 0.4853 | 0.1301 | 0.0444 | 0.2199 |  | 0.2138 | 0.0517 | 0.0199 | 0.0951 |  | 0.2715 | 0.0784 | 0.0245 | 0.1248 |  |  |  |  |  |  |  |  |  |
| Ours | **0.7401** | ***0.5483*** | ***0.3401*** | ***0.5428*** |  | 0.2768 | 0.1977 | 0.1123 | 0.1956 |  | 0.4633 | 0.3506 | 0.2278 | 0.3472 |  |  |  |  |  |  |  |  |  |
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| Methods | 10 corloc | 30 | 50 | 10-50 |  |  |  |  |  |  | 10 corloc图 | 30 | 50 | 10-50 |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | 0.9438 | 0.9101 | 0.8988 | 0.9176 |  | 0.033 | 0.039 | 0.0563 | 0.0428 |  | 0.9108 | 0.8711 | 0.8425 | 0.8748 |  |  |  |  |  |  |  |  |  |
| Yolo | **0.9868** | 0.9605 | 0.8947 | 0.9473 |  | 0.175 | 0.2511 | 0.2539 | 0.2267 |  | 0.8118 | 0.7094 | 0.6408 | 0.7206 |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | 0.971 | 0.971 | 0.9565 | 0.9662 |  | 0.1105 | 0.198 | 0.2408 | 0.1831 |  | 0.8605 | 0.773 | 0.7157 | 0.7831 |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | 0.9846 | **0.9846** | **0.9692** | 0.9795 |  | 0.1287 | 0.2044 | 0.2725 | 0.2019 |  | 0.8559 | 0.7802 | 0.6967 | 0.7776 |  |  |  |  |  |  |  |  |  |
| WSDDN | 0.3463 | 0.1356 | 0.0545 | 0.1788 |  | 0.0709 | 0.0327 | 0.0073 | 0.0369 |  | 0.2754 | 0.1029 | 0.0472 | 0.1419 |  |  |  |  |  |  |  |  |  |
| OICR | 0.094 | 0.0188 | 0.0188 | 0.0439 |  | 0.0379 | 0.0094 | 0.0084 | 0.0189 |  | 0.0561 | 0.0094 | 0.0104 | 0.025 |  |  |  |  |  |  |  |  |  |
| WSOD2 | 0.5855 | 0.3603 | 0.3243 | 0.4234 |  | 0.2581 | 0.151 | 0.1348 | 0.1813 |  | 0.3274 | 0.2093 | 0.1895 | 0.2421 |  |  |  |  |  |  |  |  |  |
| Grad-CAM | 0.5146 | 0.2397 | 0.0816 | 0.2786 |  | 0.1239 | 0.0537 | 0.0159 | 0.0645 |  | 0.3907 | 0.186 | 0.0657 | 0.2141 |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | 0.538 | 0.2445 | 0.0815 | 0.288 |  | 0.1499 | 0.0658 | 0.0194 | 0.0784 |  | 0.3881 | 0.1787 | 0.0621 | 0.2096 |  |  |  |  |  |  |  |  |  |
| Ours | ***0.9697*** | ***0.7394*** | ***0.4303*** | 0.7131 |  | 0.0479 | 0.0416 | -0.0342 | 0.0185 |  | 0.9218 | 0.6978 | 0.4645 | 0.6946 |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Methods | Supervision | | IoU@10 | | | IoU@30 | | | IoU@50 | | |  |  |  |  |  |  |  |  |  |  |  |  |
| Box | Class | Flat | Pedicle | Edge | Flat | Pedicle | Edge | Flat | Pedicle | Edge |  |  |  |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | √ | √ | 0.00% | 77.50% | 46.15% | 0.00% | 77.50% | 46.15% | 0.00% | 76.20% | 46.15% |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| YOLOv3 | √ | √ | 0.00% | 82.47% | 39.14% | 0.00% | 82.47% | 38.41% | 0.00% | 81.54% | 35.36% |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | √ | √ | 0.00% | 98.05% | 92.19% | 0.00% | 98.05% | 92.19% | 0.00% | 96.49% | 81.77% |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | √ | √ | 0.00% | 94.26% | 91.39% | 0.00% | 94.25% | 91.39% | 0.00% | 94.25% | 82.49% |  |  |  |  |  |  |  |  |  |  |  |  |
| WSDDN | - | √ | 14.42% | 23.04% | 12.97% | 6.79% | 16.27% | 4.93% | 5.65% | 11.45% | 2.99% |  |  |  |  |  |  |  |  |  |  |  |  |
| OICR | - | √ | 0.00% | 5.20% | 7.69% | 0.00% | 1.10% | 0.00% | 0.00% | 0.37% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| WSOD2 | - | √ | 26.97% | 51.57% | 34.04% | 4.72% | 38.63% | 34.04% | 2.97% | 38.63% | 34.04% |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM | - | √ | 32.06% | 74.49% | 19.78% | 3.74% | 34.99% | 0.00% | 0.12% | 11.70% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | - | √ | 26.70% | 73.17% | 45.74% | 3.94% | 30.47% | 4.62% | 0.05% | 10.92% | 2.37% |  |  |  |  |  |  |  |  |  |  |  |  |
| Ours | - | √ | 77.01% | 68.10% | 76.92% | 63.96% | 49.48% | 51.05% | 55.92% | 15.21% | 30.91% |  |  |  |  |  |  |  |  |  |  |  |  |
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| Methods | Supervision | | IoU@10 | | | IoU@30 | | | IoU@50 | | |  |  |  |  |  |  |  |  |  |  |  |  |
| Box | Class | Flat | Pedicle | Edge | Flat | Pedicle | Edge | Flat | Pedicle | Edge |  |  |  |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | √ | √ | 0.00% | 79.69% | 0.00% | 0.00% | 78.67% | 0.00% | 0.00% | 77.07% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| YOLOv3 | √ | √ | 0.00% | 75.78% | 7.04% | 0.00% | 74.62% | 7.04% | 0.00% | 70.94% | 6.53% |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | √ | √ | 0.00% | 74.23% | 11.53% | 0.00% | 72.28% | 11.53% | 0.00% | 70.19% | 9.13% |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | √ | √ | 0.00% | 70.73% | 10.79% | 0.00% | 69.71% | 10.79% | 0.00% | 66.90% | 3.66% |  |  |  |  |  |  |  |  |  |  |  |  |
| WSDDN | - | √ | 5.30% | 17.07% | 1.39% | 3.08% | 14.28% | 0.00% | 2.79% | 11.36% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| OICR | - | √ | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| WSOD2 | - | √ | 0.00% | 4.80% | 0.00% | 0.00% | 4.61% | 0.00% | 0.00% | 4.55% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM | - | √ | 0.71% | 36.53% | 0.00% | 0.08% | 10.81% | 0.00% | 0.00% | 2.25% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | - | √ | 0.36% | 36.85% | 0.00% | 0.10% | 10.90% | 0.00% | 0.01% | 2.78% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| Ours | - | √ | 4.57% | 60.69% | 12.50% | 1.00% | 41.27% | 12.50% | 0.50% | 19.23% | 12.50% |  |  |  |  |  |  |  |  |  |  |  |  |
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| Methods | Supervision | | IoU@10 | | | IoU@30 | | | IoU@50 | | |  |  |  |  |  |  |  |  |  |  |  |  |
| Box | Class | Flat | Pedicle | Edge | Flat | Pedicle | Edge | Flat | Pedicle | Edge |  |  |  |  |  |  |  |  |  |  |  |  |
| Faster Rcnn | √ | √ | 0.00% | 82.77% | 0.00% | 0.00% | 82.77% | 0.00% | 0.00% | 82.77% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| YOLOv3 | √ | √ | 0.00% | 73.58% | 17.12% | 0.00% | 73.58% | 15.32% | 0.00% | 73.58% | 11.69% |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet50 | √ | √ | 0.00% | 80.16% | 33.30% | 0.00% | 80.12% | 32.64% | 0.00% | 78.73% | 31.61% |  |  |  |  |  |  |  |  |  |  |  |  |
| DiffusionDet500 | √ | √ | 0.00% | 83.77% | 36.42% | 0.00% | 83.57% | 34.25% | 0.00% | 81.45% | 20.97% |  |  |  |  |  |  |  |  |  |  |  |  |
| WSDDN | - | √ | 8.33% | 29.90% | 5.74% | 4.53% | 27.45% | 2.85% | 3.02% | 25.78% | 2.74% |  |  |  |  |  |  |  |  |  |  |  |  |
| OICR | - | √ | 3.71% | 0.00% | 0.00% | 3.71% | 0.00% | 0.00% | 3.71% | 0.00% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| WSOD2 | - | √ | 0.00% | 3.03% | 0.00% | 0.00% | 3.03% | 0.00% | 0.00% | 3.03% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM | - | √ | 0.00% | 68.60% | 2.78% | 0.00% | 39.87% | 0.00% | 0.00% | 31.34% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| Grad-CAM++ | - | √ | 0.00% | 62.03% | 2.92% | 0.00% | 39.44% | 0.00% | 0.00% | 29.89% | 0.00% |  |  |  |  |  |  |  |  |  |  |  |  |
| Ours | - | √ | 35.81% | 68.65% | 31.67% | 20.83% | 68.65% | 18.89% | 15.49% | 55.58% | 18.89% |  |  |  |  |  |  |  |  |  |  |  |  |