

U-Net Models

3 models for the segmentation task:

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U-Net Models

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U-Net Models

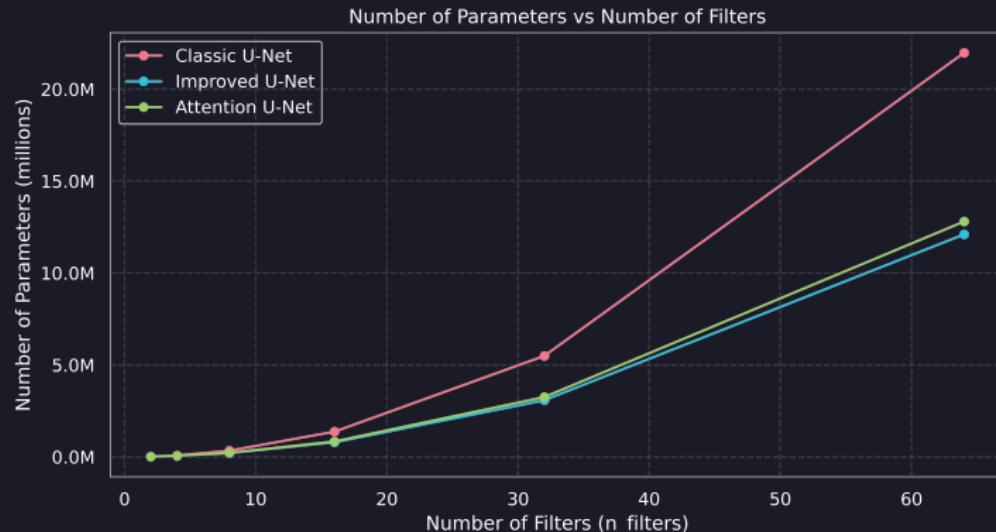
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U-Net Models

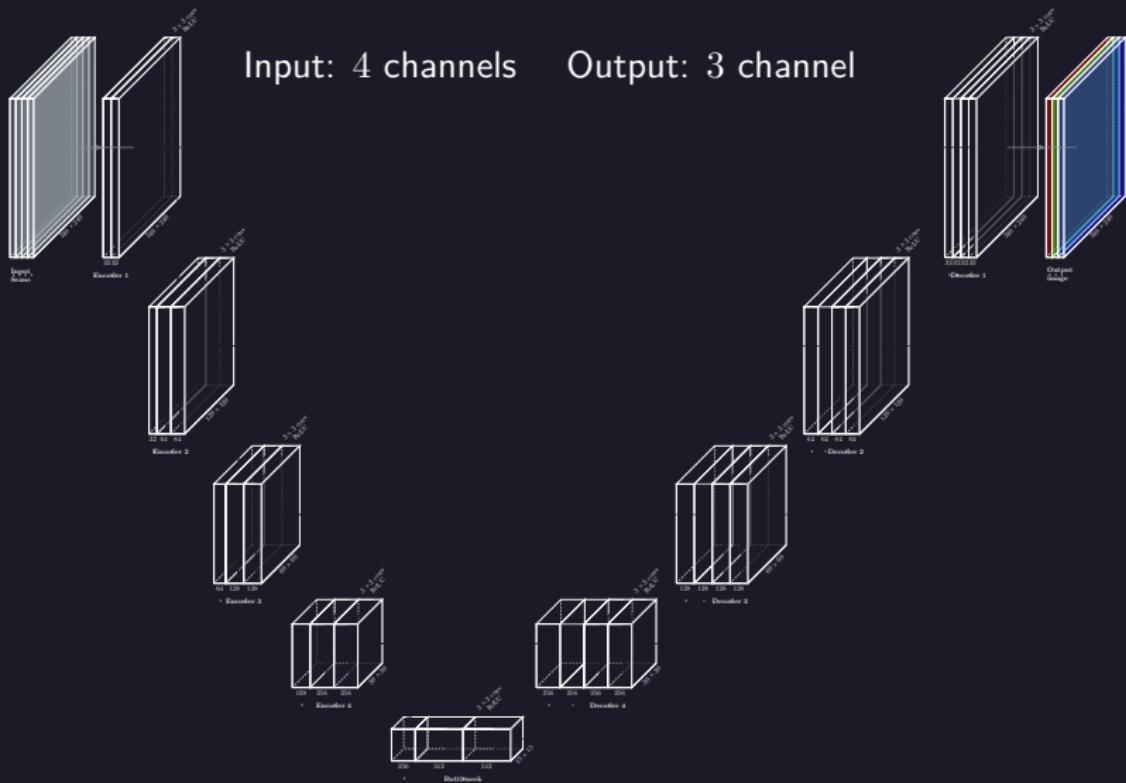
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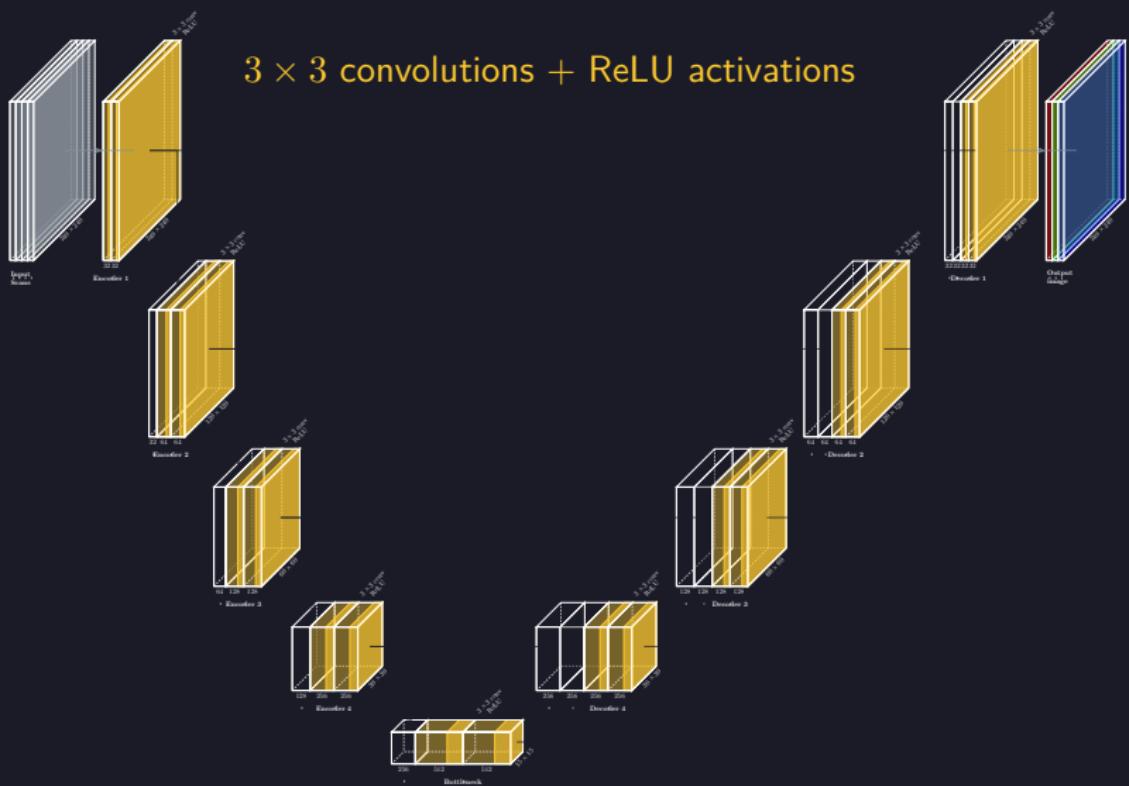
Segmentation Models

Classic U-Net



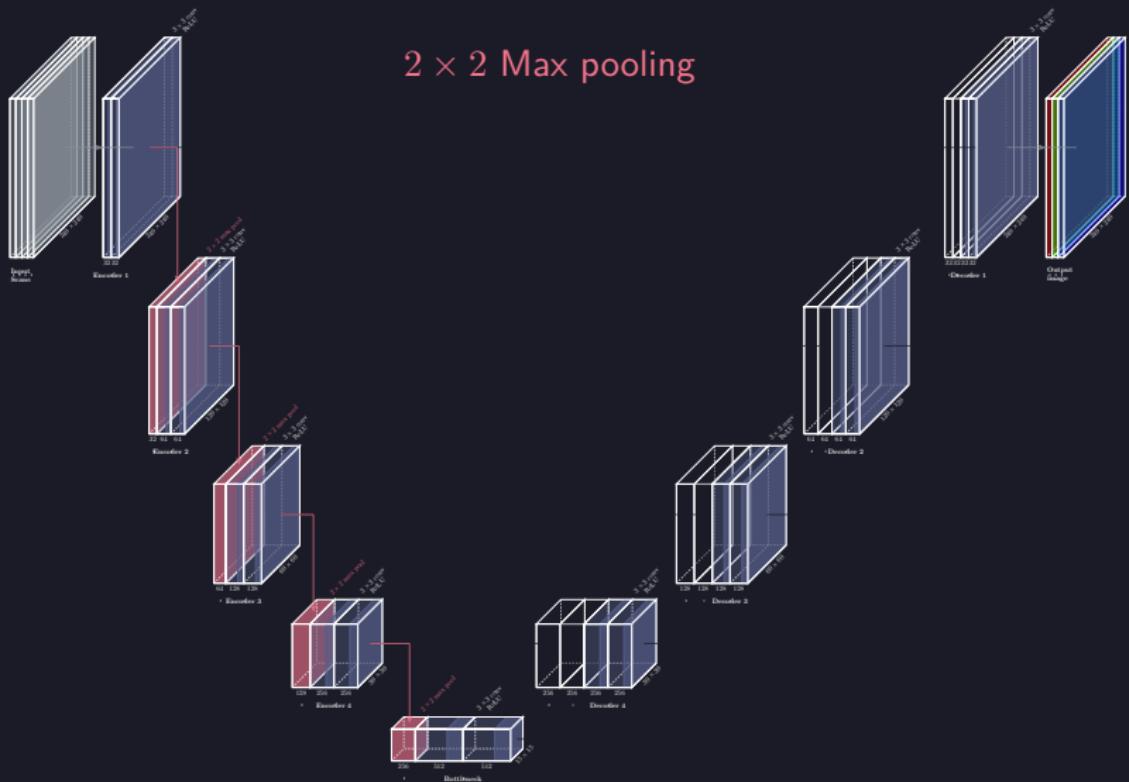
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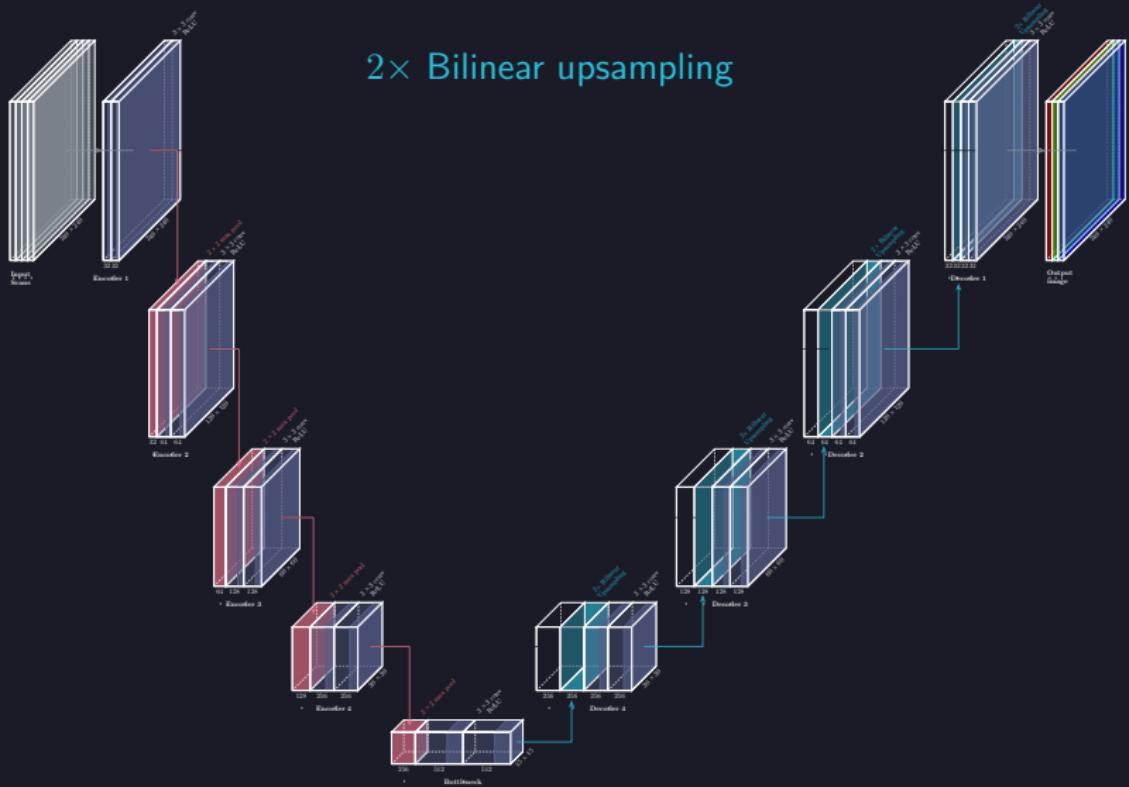
Segmentation Models

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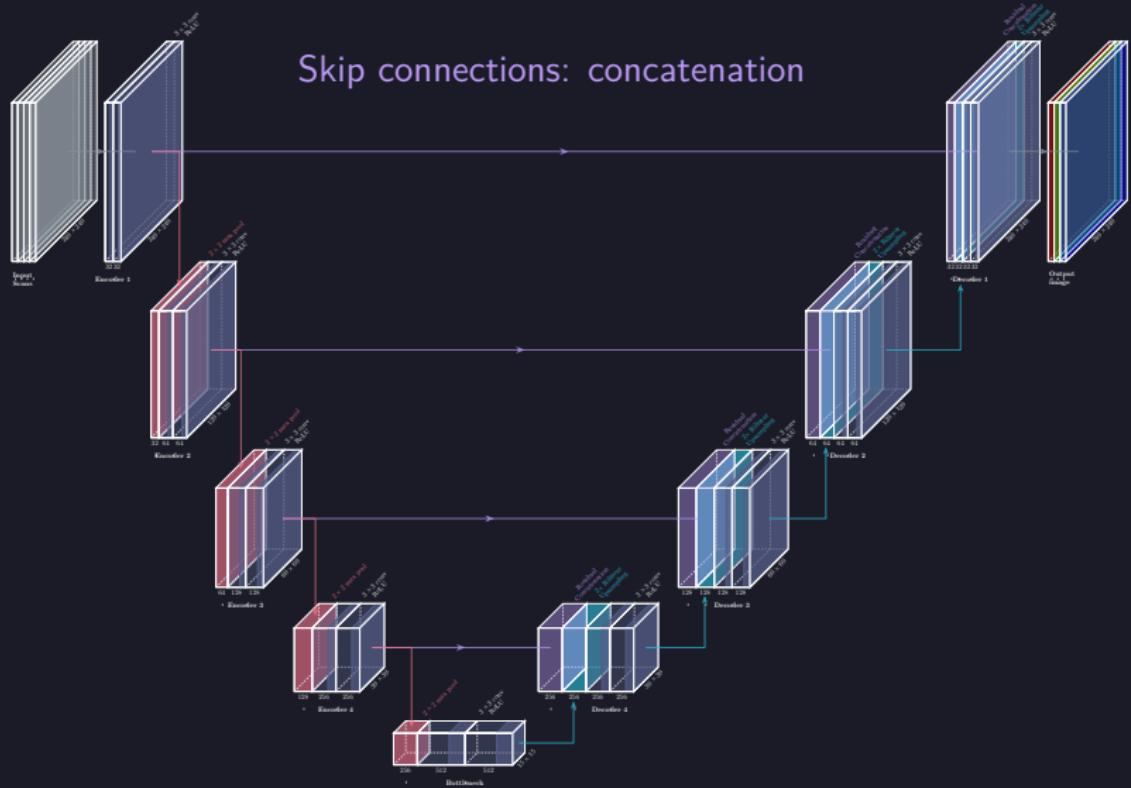
Segmentation Models

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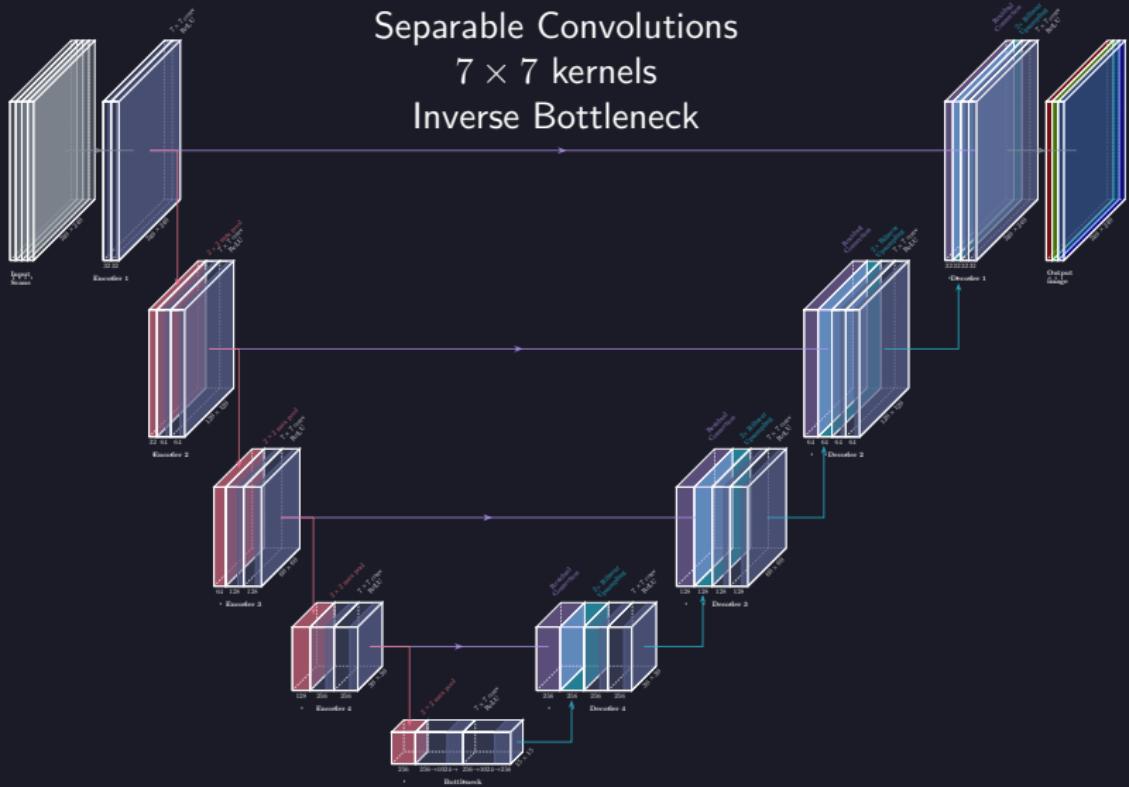
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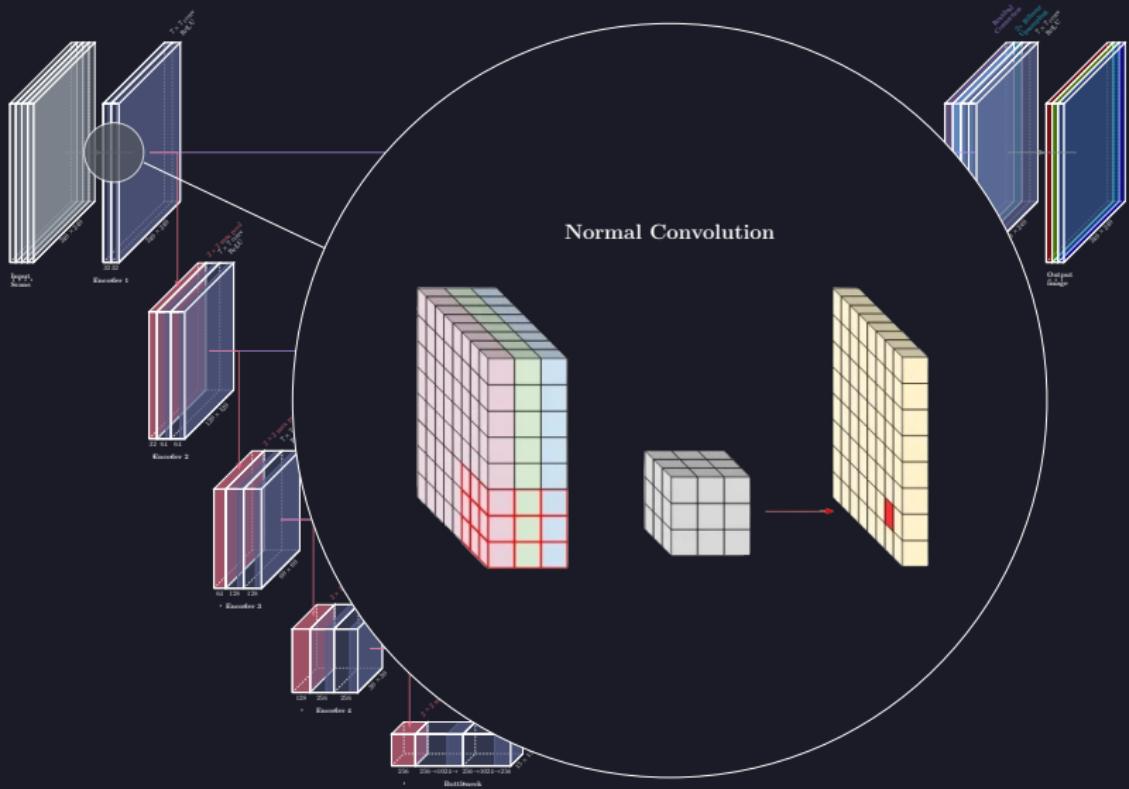
Segmentation Models

Improved U-Net



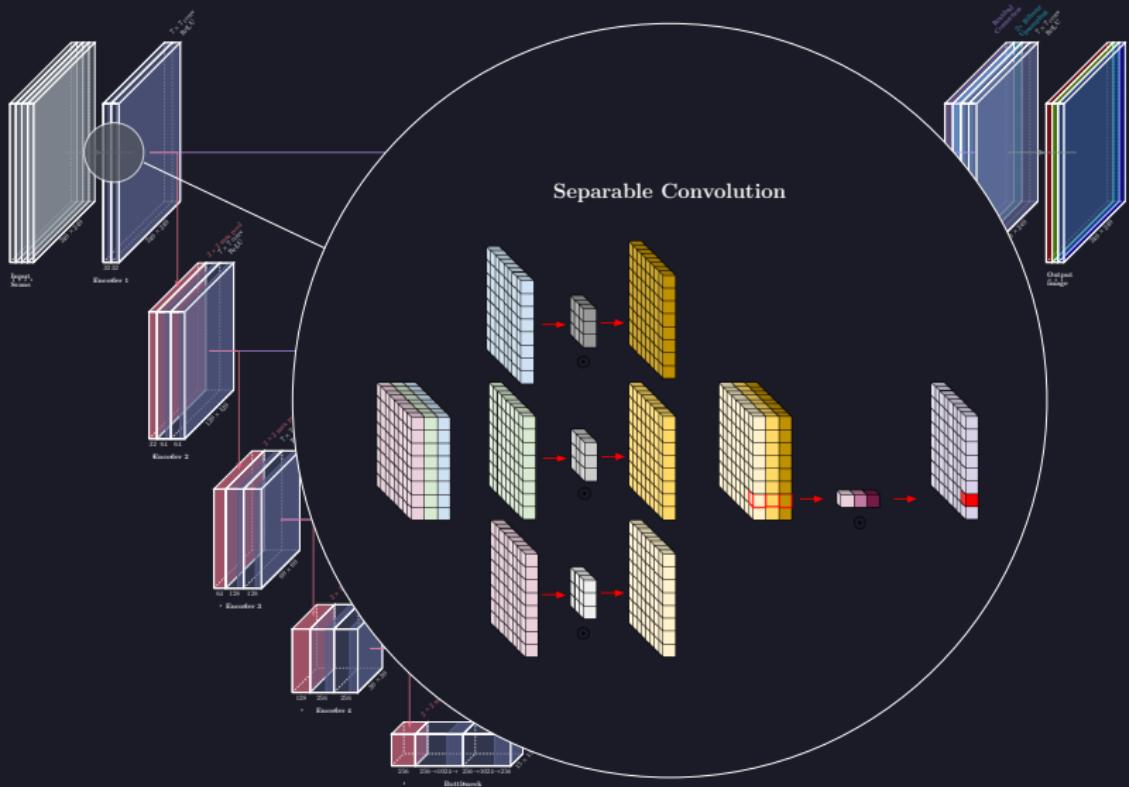
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Improved U-Net



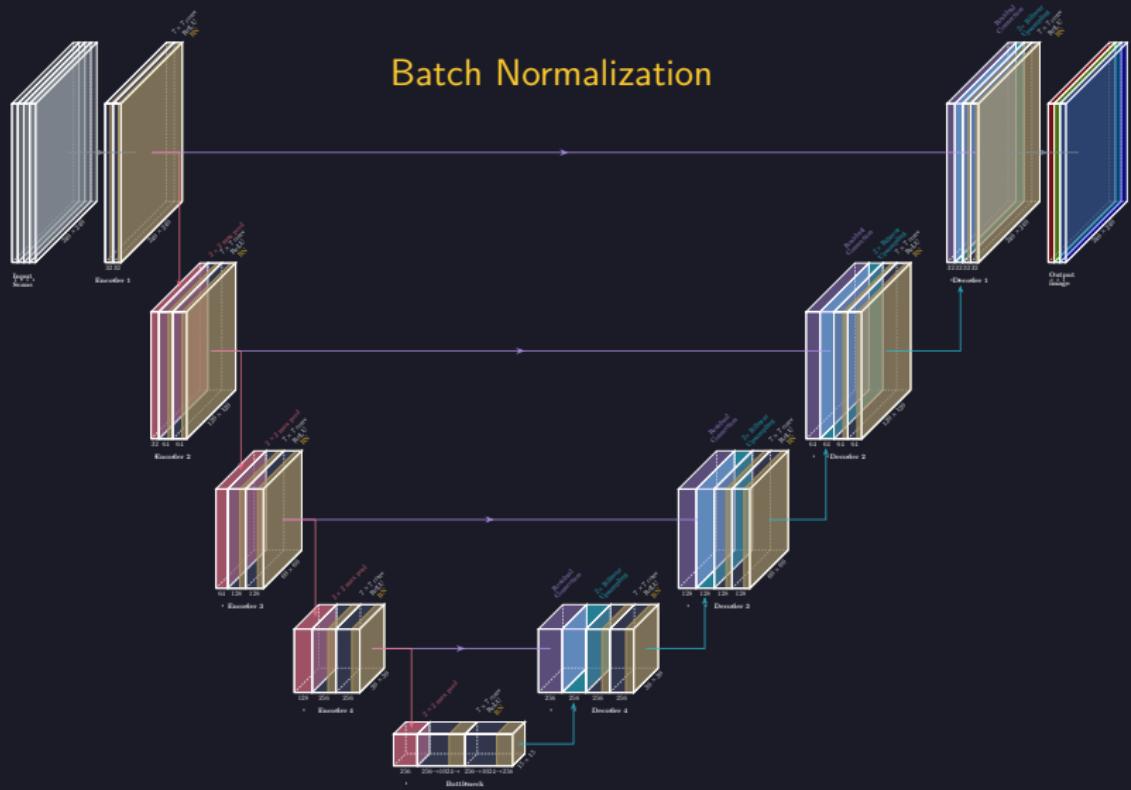
Segmentation Models

Improved U-Net



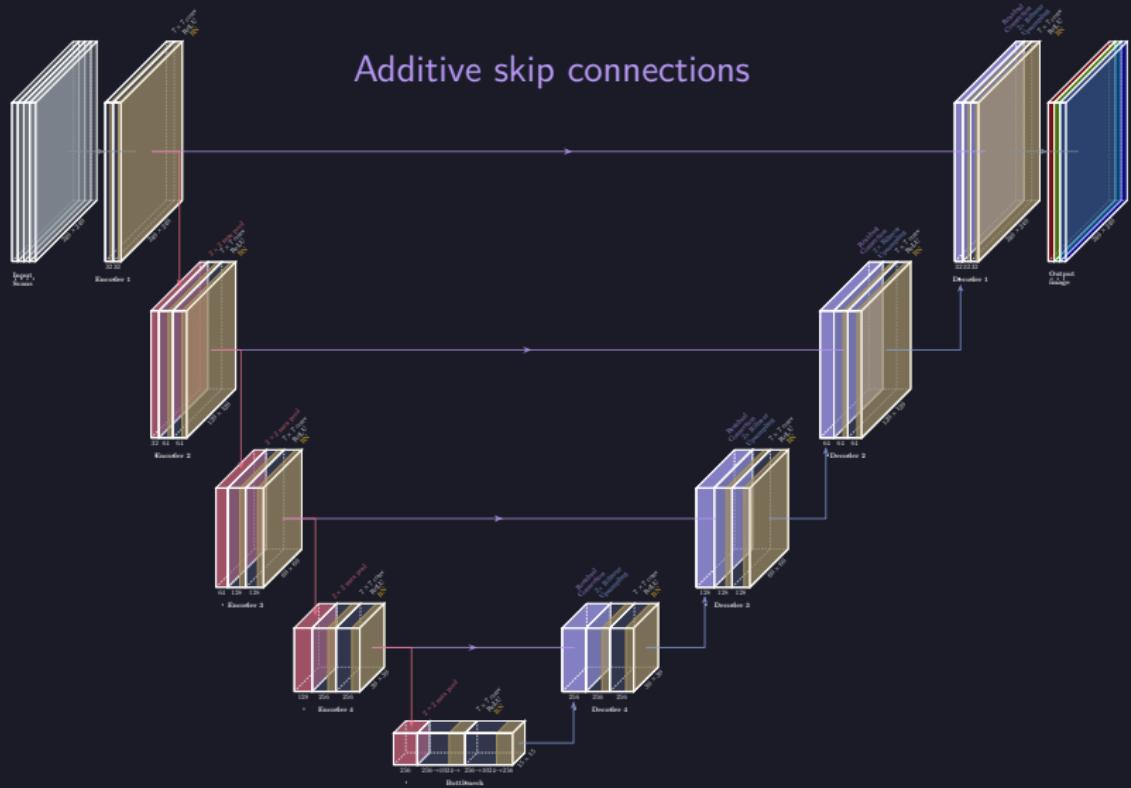
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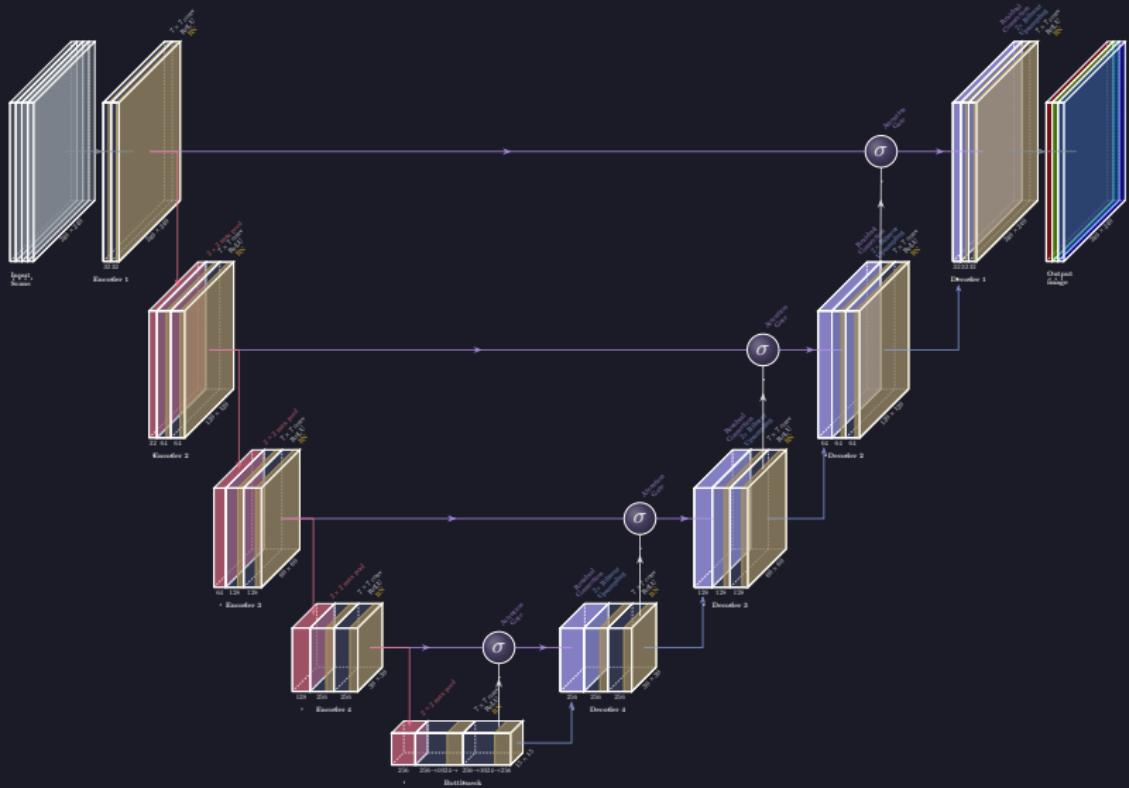
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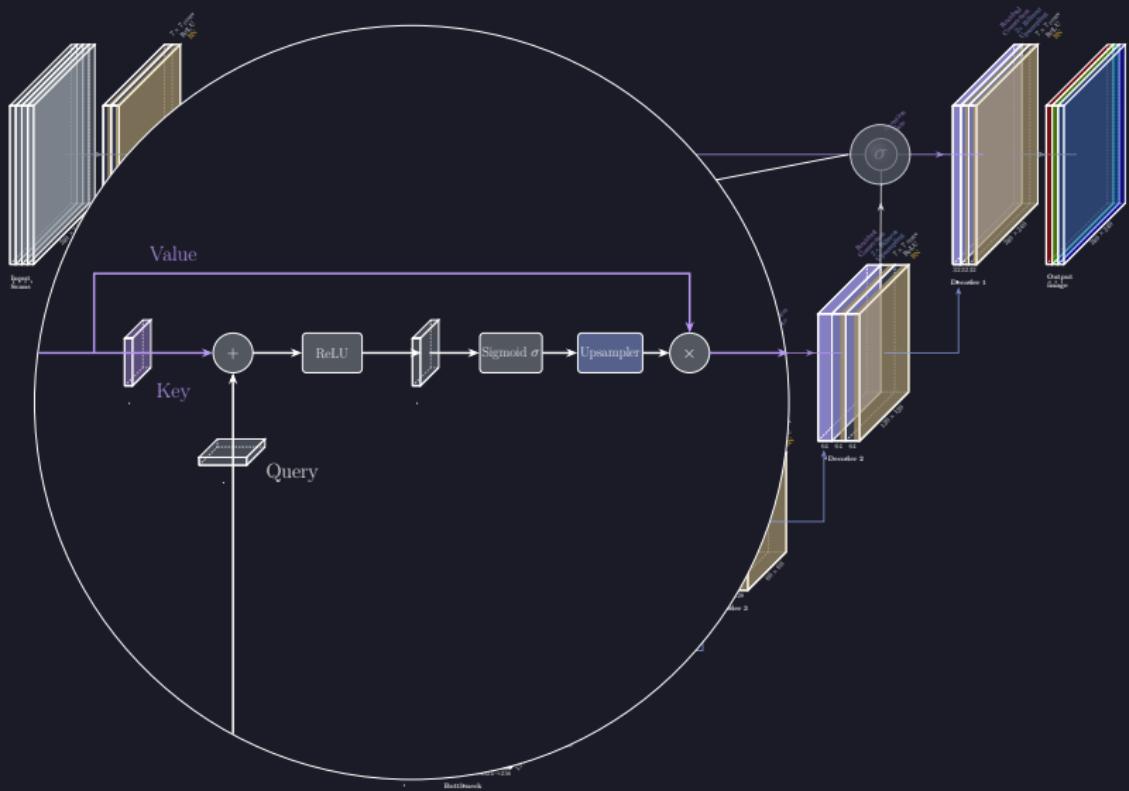
Segmentation Models

Attention U-Net



Segmentation Models

Attention U-Net



Training Details

U-Net Models training parameters:

- **epochs:** 20
- **Optimizer:** Adam (with weight decay (1×10^{-2}))
- **Scheduler:** Exponential Decay ($\gamma = 0.9$)
- **Loss Function:** BCE with Logits Loss
- **learning rate:** 2×10^{-3}
- **batch size:** 32 (both training and validation)
- **image size:** 240×240
- **first encoder filters:** 32

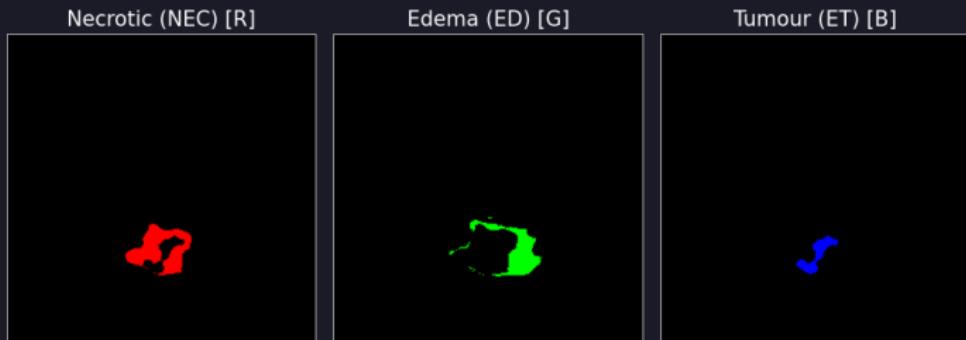
Segmentation Models

Visualizing a prediction

Predicted Mask Channels [RGB]



Ground Truth Mask Channels [RGB]



Segmentation Models

Visualizing a prediction

Binarized Predicted Mask Channels [RGB]



Ground Truth Mask Channels [RGB]



Segmentation Models

Performance Assessment

$$\text{Dice} = \frac{2 \times |X \cap Y|}{|X| + |Y|}$$

Dice Coefficient

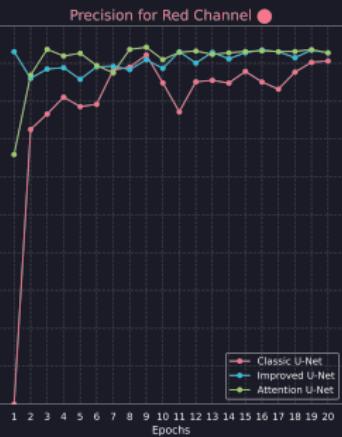
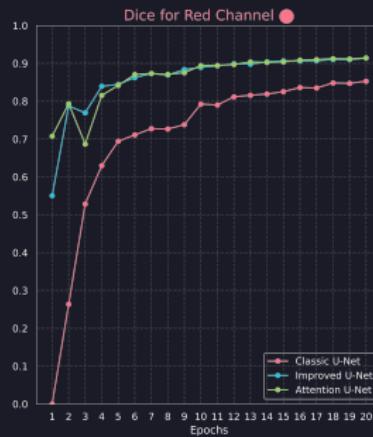
"overlap" metric

$$\text{Precision} = \frac{TP}{TP + FP}$$

Precision
prediction quality

$$\text{Recall} = \frac{TP}{TP + FN}$$

Recall
prediction quantity



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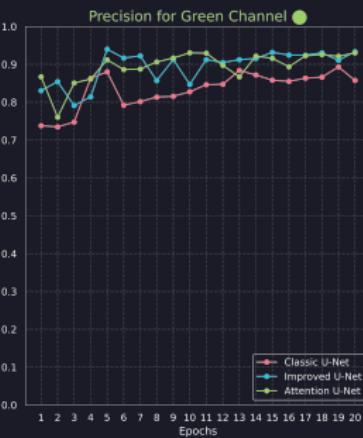
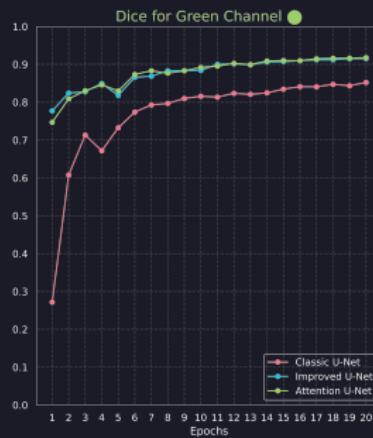
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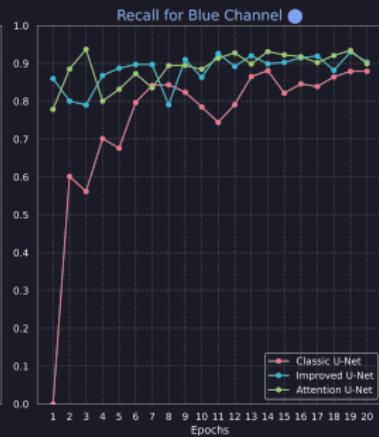
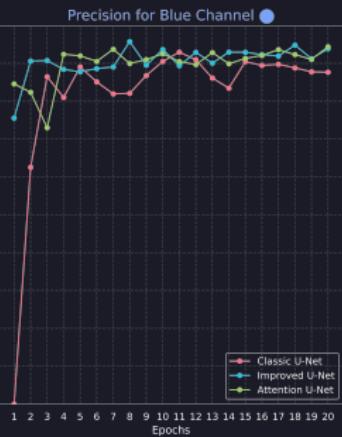
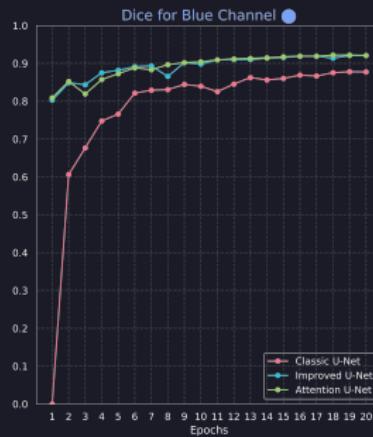
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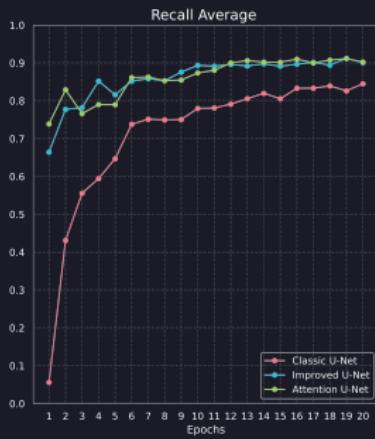
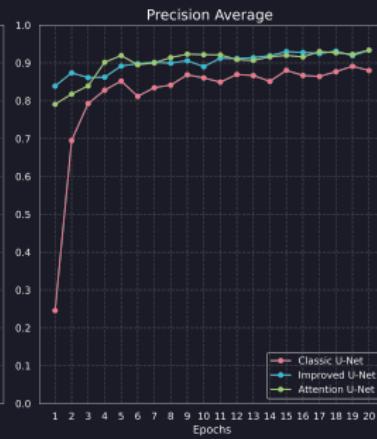
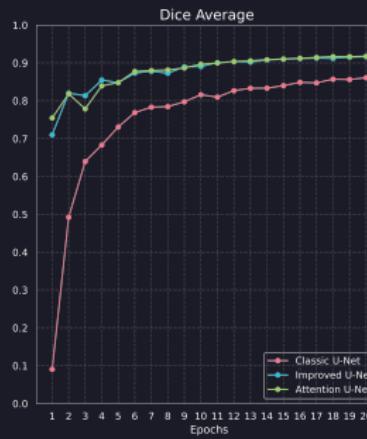
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Segmentation Models

Visualizing Attention Maps

