

Jurassic World Remake

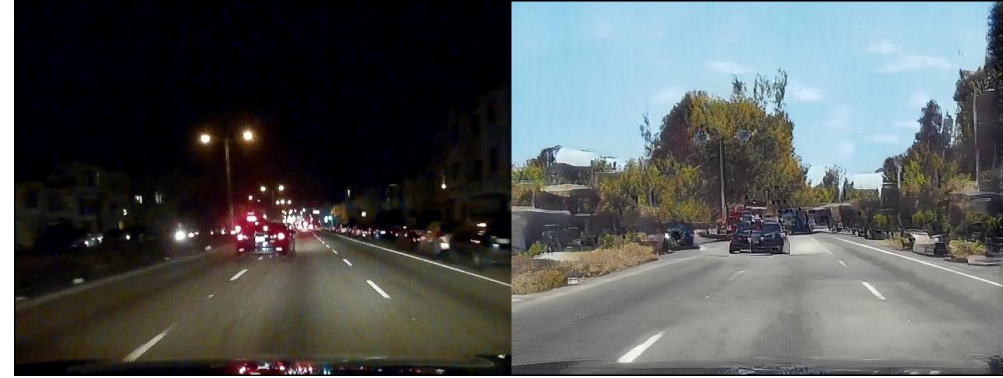
Bringing Ancient Fossils Back to Life Via Zero-Shot Image-to-Image
Translation

Project page: <https://tinyurl.com/skull2animal>

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Department of Computer Science, University of Rochester

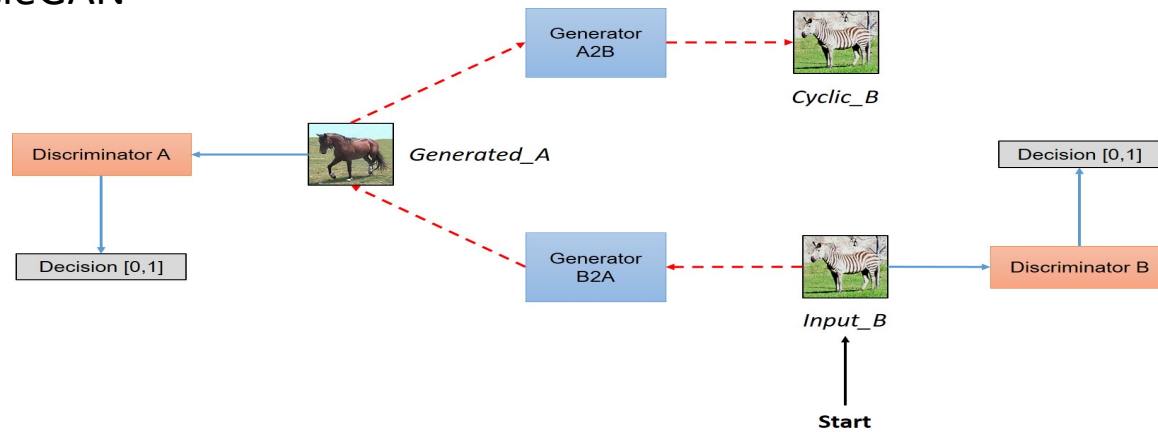
Image-to-Image Translation

- Learn a mapping Domain A \rightarrow Domain B

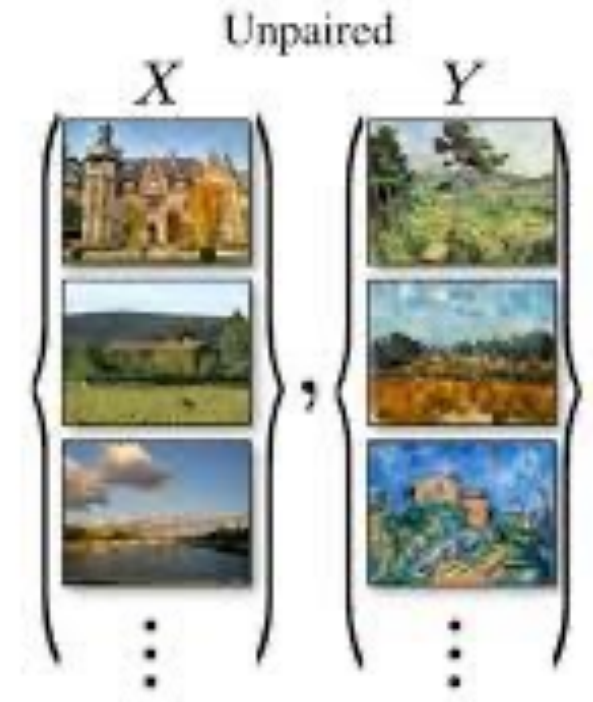
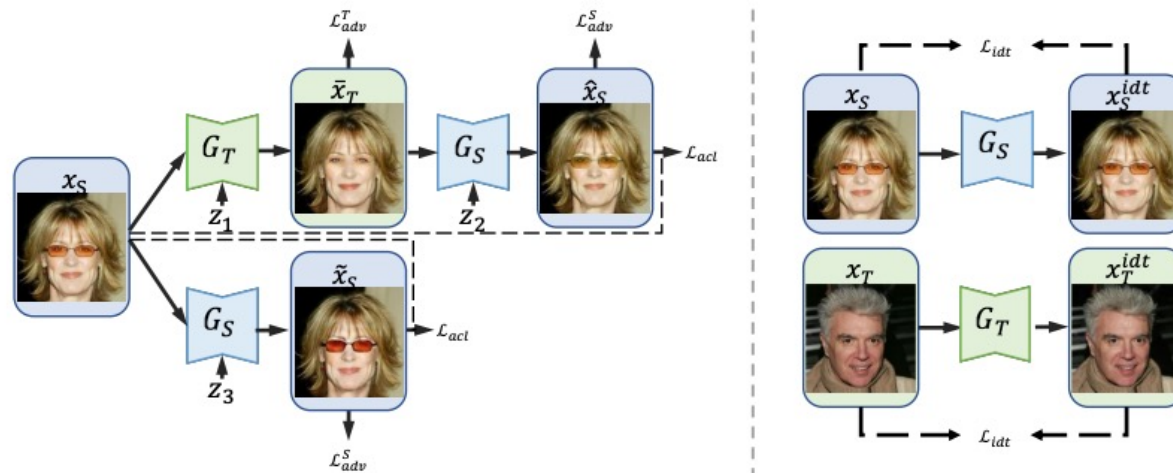


Unguided Generative Adversarial Networks

CycleGAN



ACL-GAN



Guided Diffusion Models

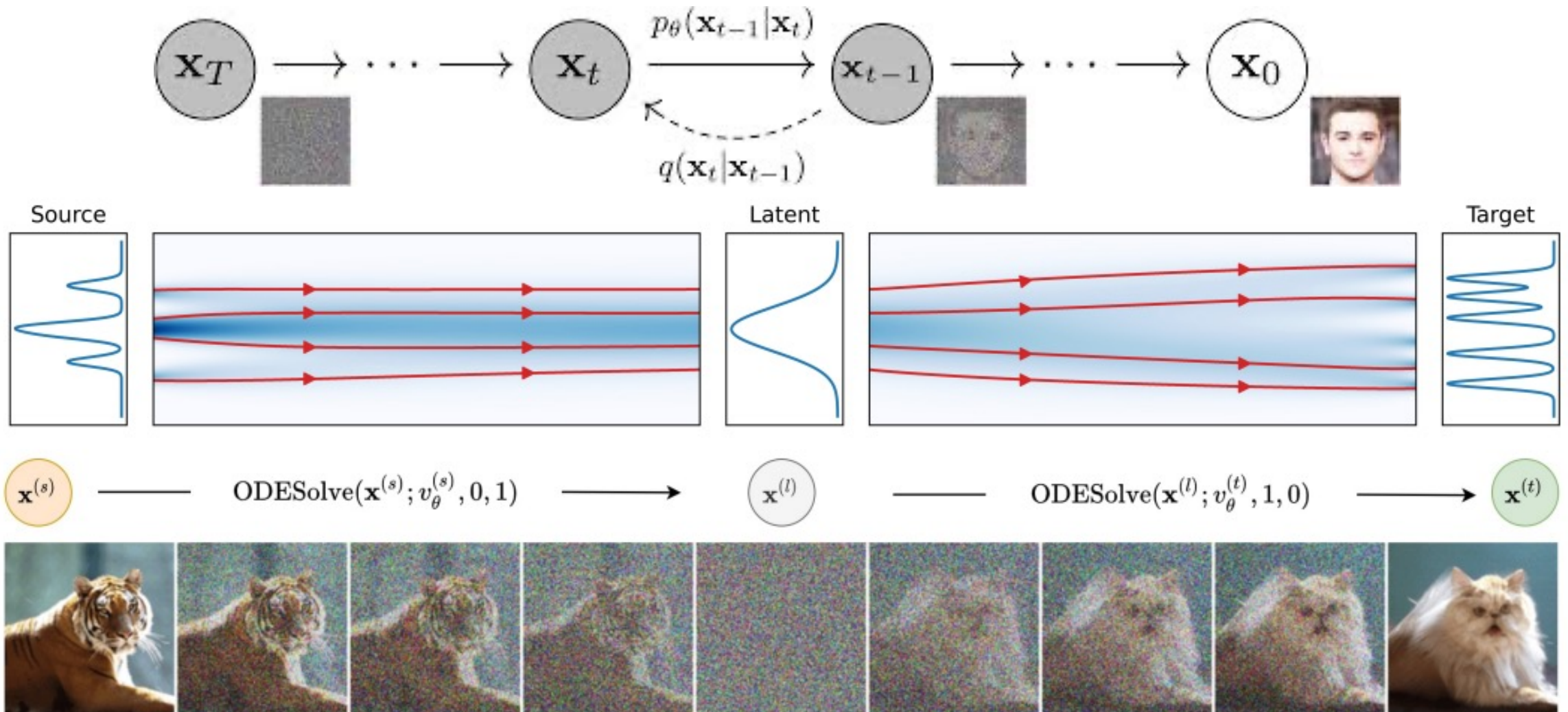
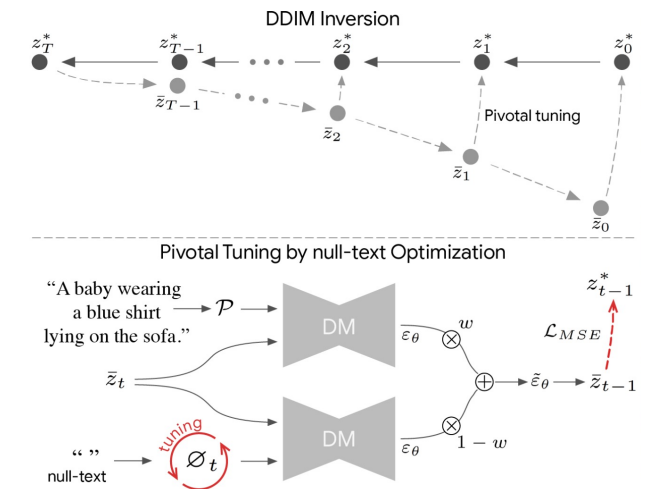
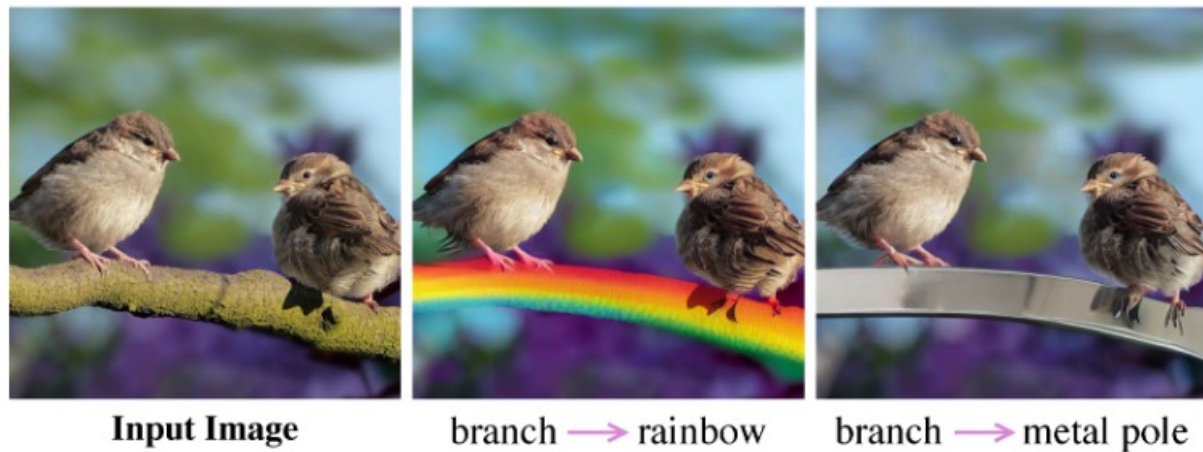
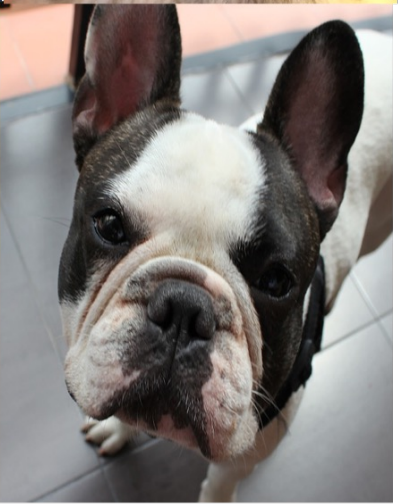
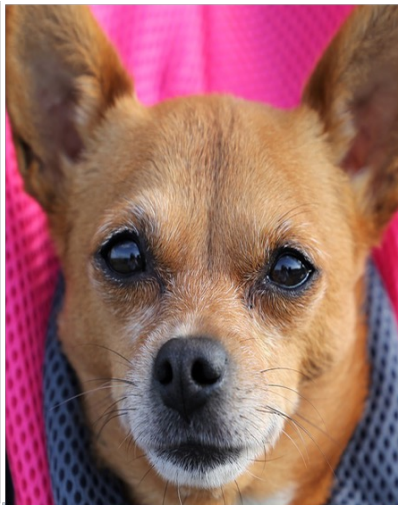


Figure From: Su et al. Dual Diffusion Implicit Bridges for Image-to-Image Translation (<https://arxiv.org/abs/2203.08382>); Song et al, Denoising Diffusion Implicit Models (<https://arxiv.org/pdf/2010.02502.pdf>)

Image Editing





Latent Diffusion Models

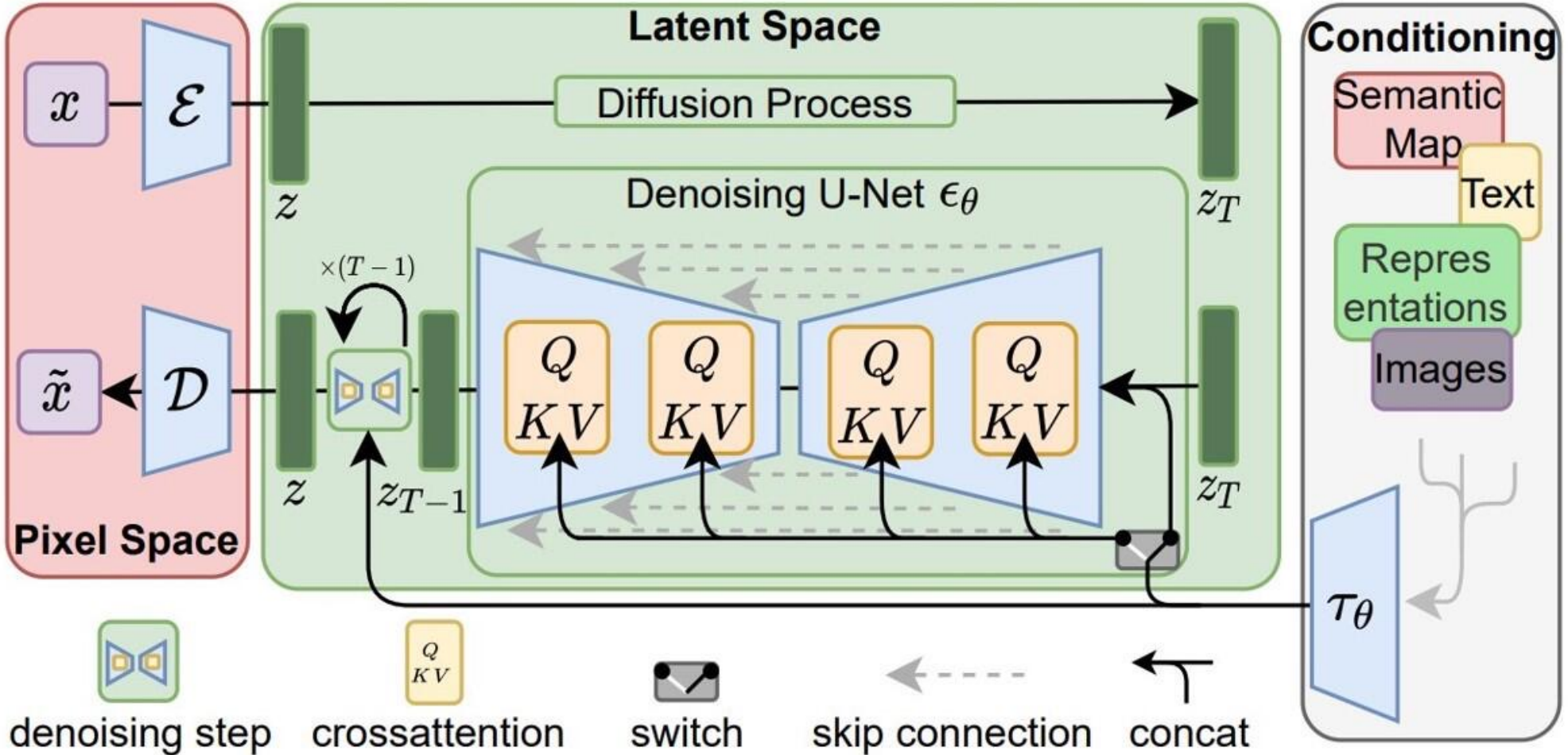
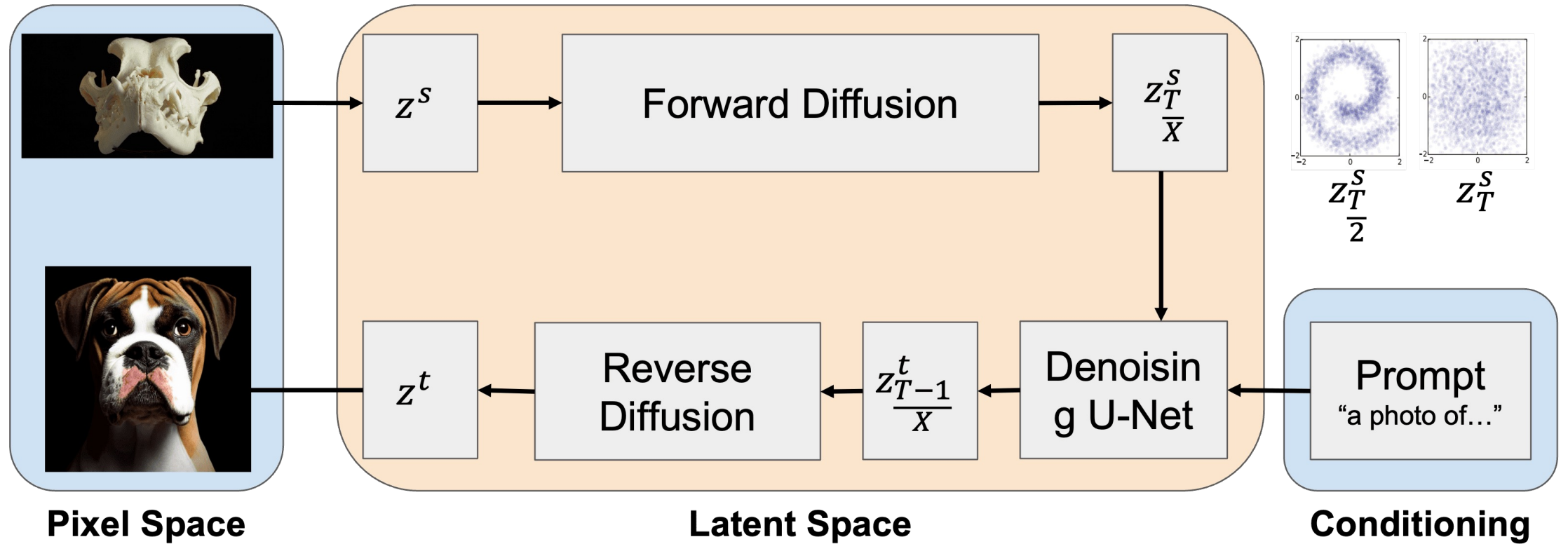


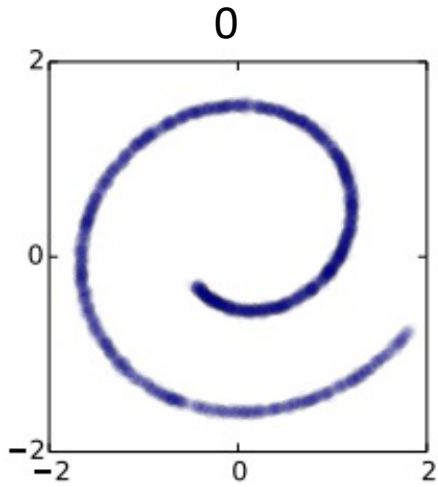
Figure From: Rombach et al, High-Resolution Image Synthesis with Latent Diffusion Models, (<https://arxiv.org/pdf/2112.10752.pdf>)

Full Process



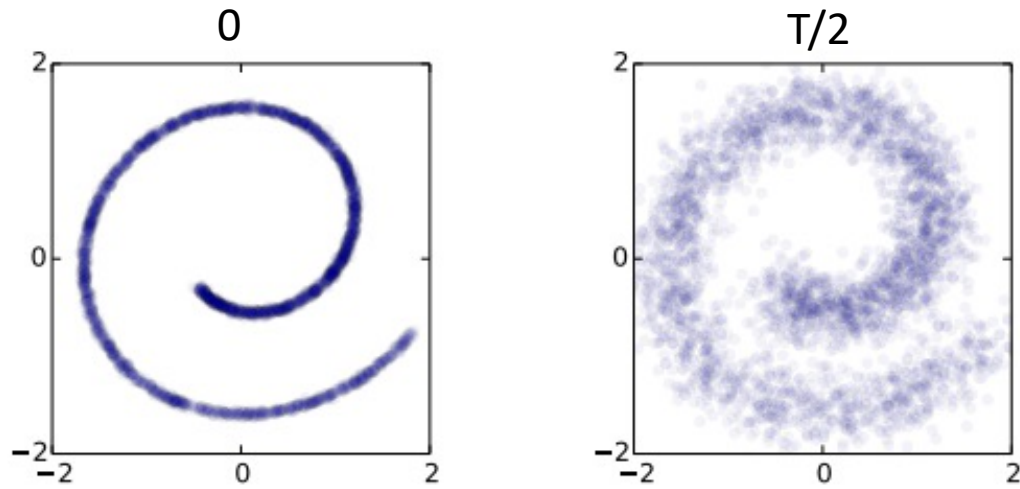
Prompt: "A photo of the head of a <Class Label>"

Partial Diffusion

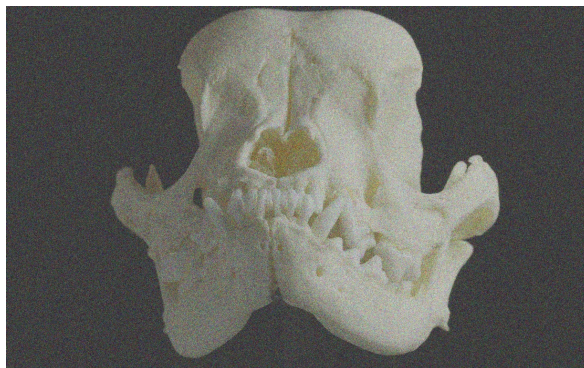


0

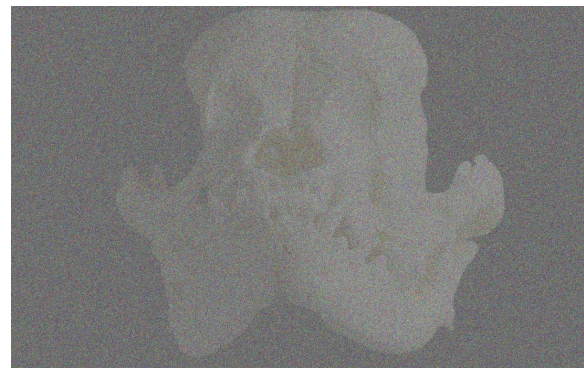
Partial Diffusion



0

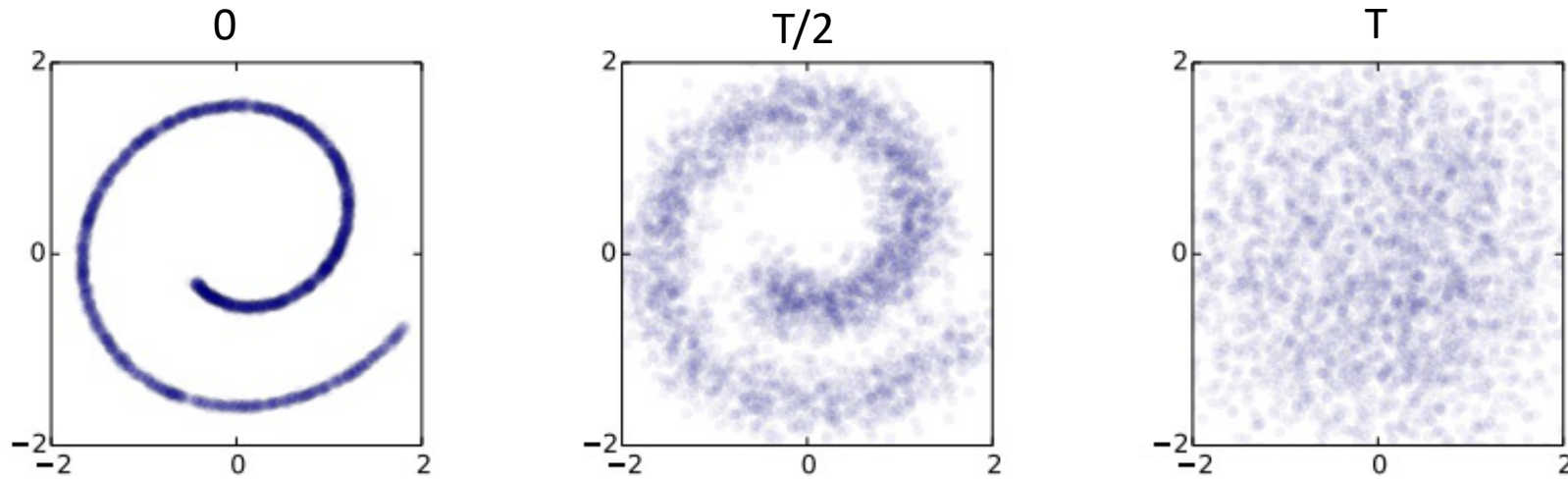


$T/4$



$3T/4$

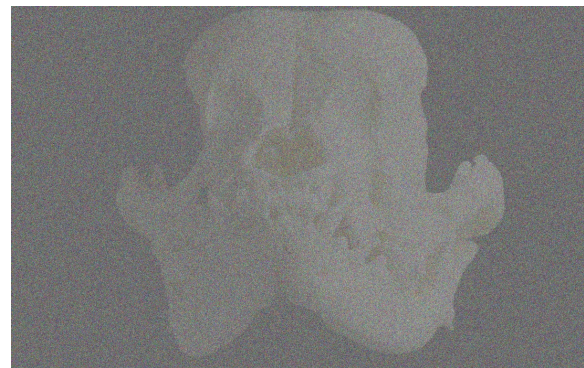
Partial Diffusion



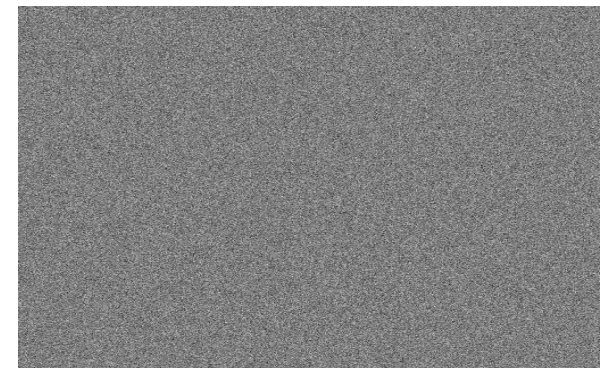
0



$T/4$

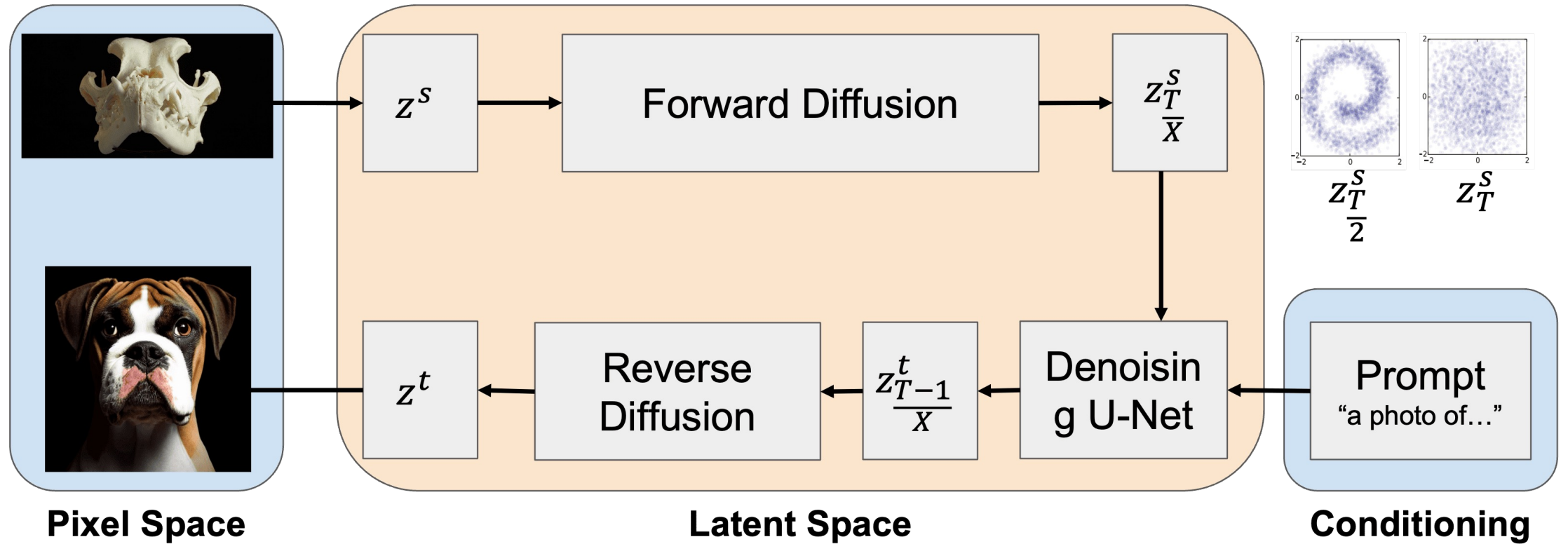


$3T/4$



T

Full Process



Prompt: "A photo of the head of a <Class Label>"

Results of Partial Diffusions

Input



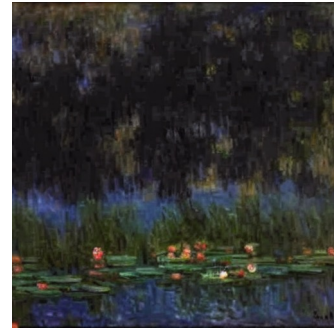
25%



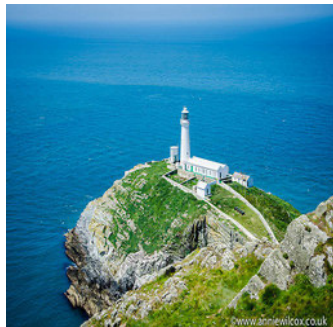
50%



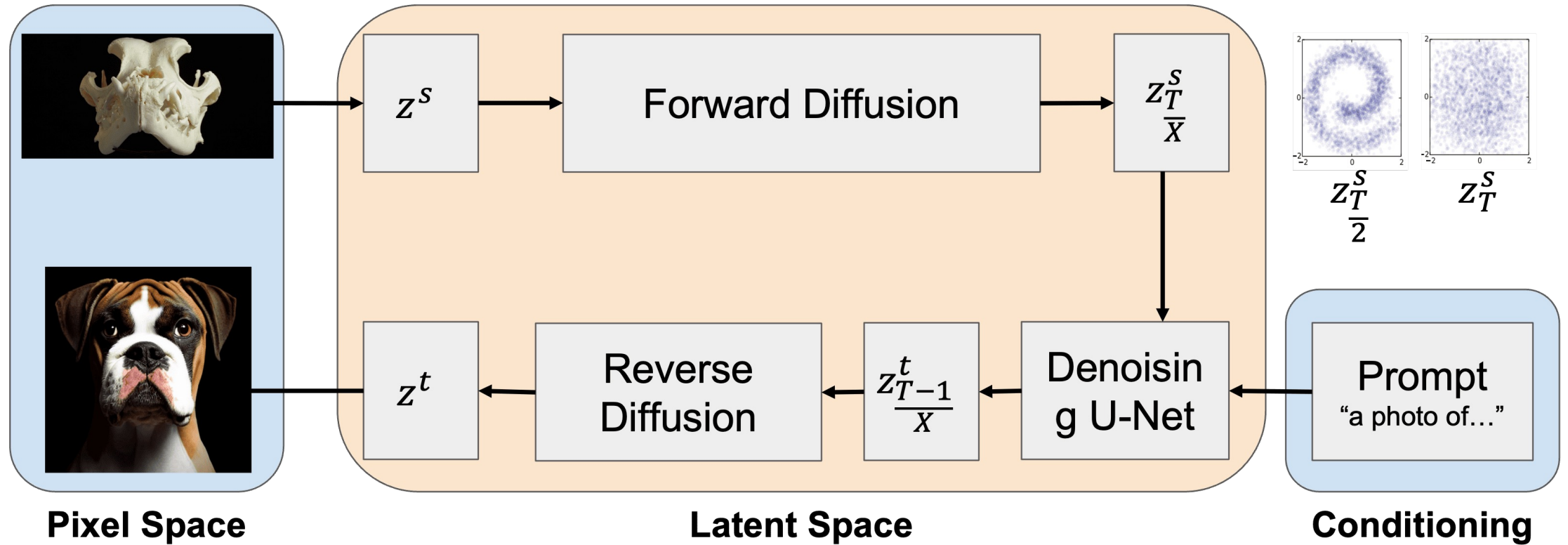
75%



100%



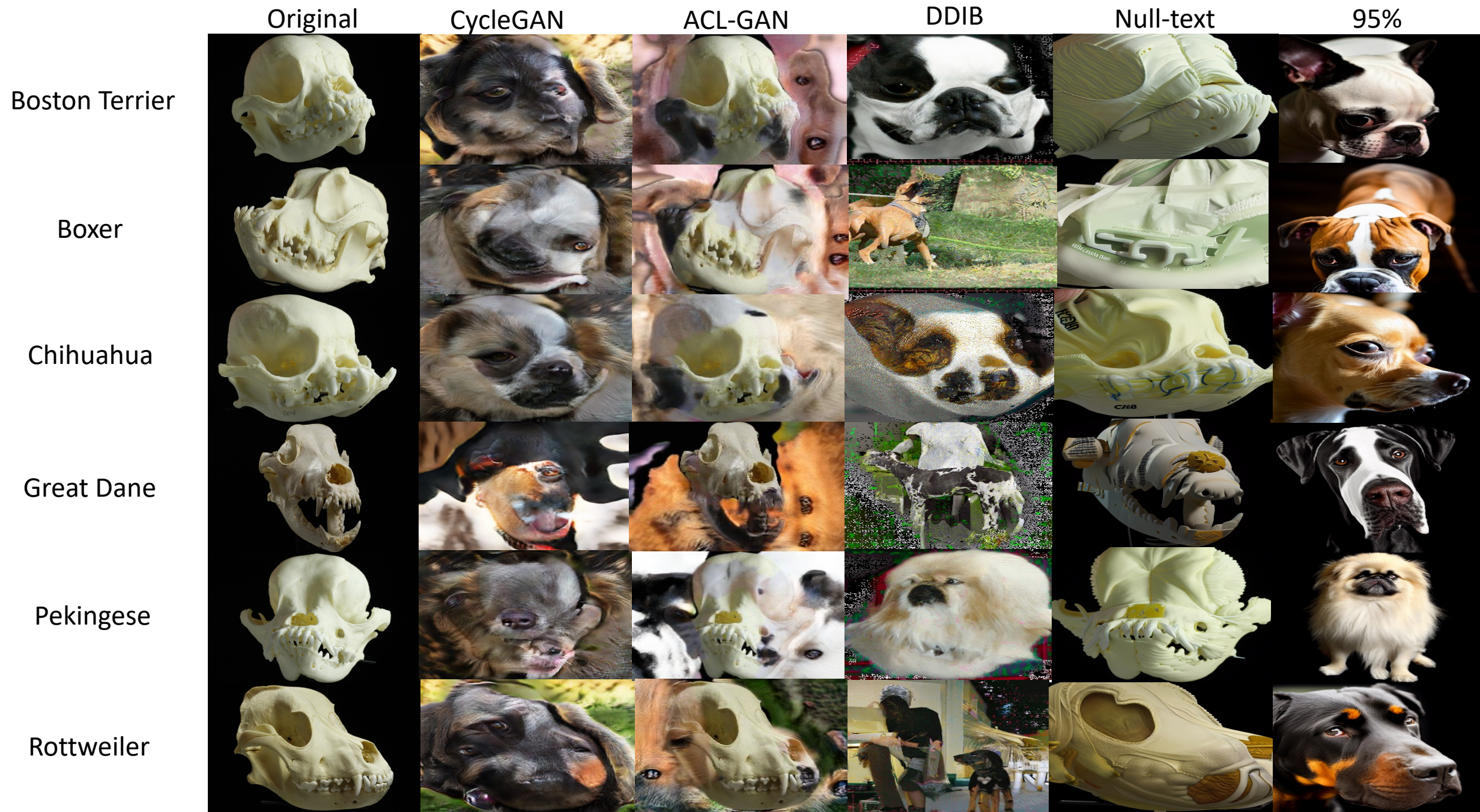
Full Process



Prompt: "A photo of the head of a <Class Label>"

Table 1: Quantitative evaluation on Skull2Dog. Lower scores are better for metrics with down arrows (\downarrow), and vice versa.

	FID \downarrow	KID \downarrow	All @1 \uparrow	Class @1 \uparrow
CycleGAN [48]	212.66	0.1325	77.00	5.70
ACL-GAN [45]	342.16	0.3134	38.84	1.65
DDIB [38]	204.42	0.0698	73.68	56.14
Null-text [26]	308.19	0.1559	1.79	1.79
Revive-2I_{95%}	143.29	0.0345	100	92.56



	FID ↓	KID↓	All @1↑	Class @1↑
Revive-2I _{50%}	236.59	0.118	43.80	20.66
Revive-2I _{60%}	177.30	0.0584	70.25	34.70
Revive-2I _{70%}	155.066	0.0437	93.89	59.50
Revive-2I _{80%}	147.85	0.0368	100	67.77
Revive-2I _{90%}	149.42	0.0365	100	89.26
Revive-2I_{95%}	143.29	0.0345	100	92.56
Revive-2I _{100%}	155.9	0.0391	100	92.56

Original

50%

70%

90%

95%

100%

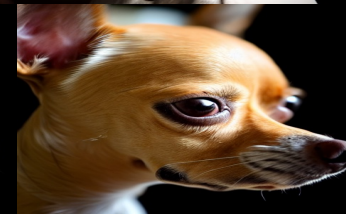
Boston Terrier



Boxer



Chihuahua



Great Dane



Pekingese



Rottweiler





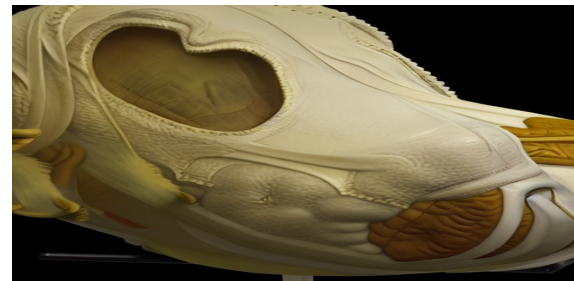
Constraining the Output



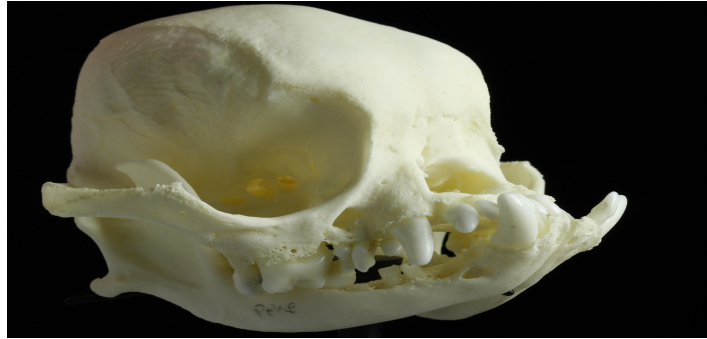
Constraining the Output



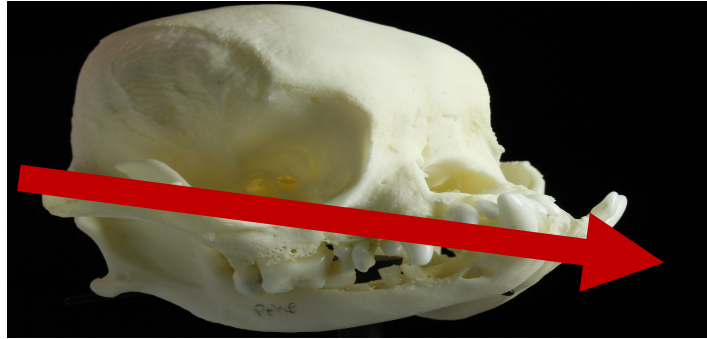
Constraining the Output



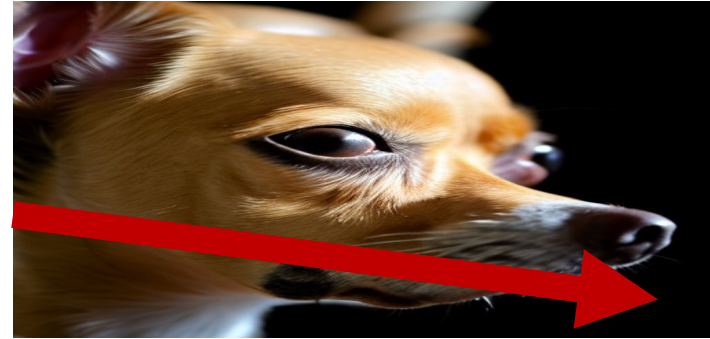
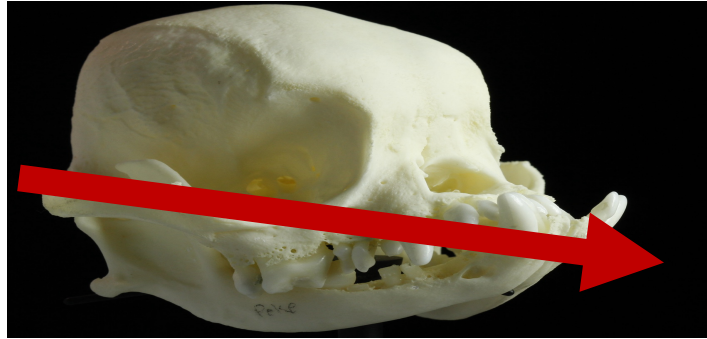
Faithfulness to the Source



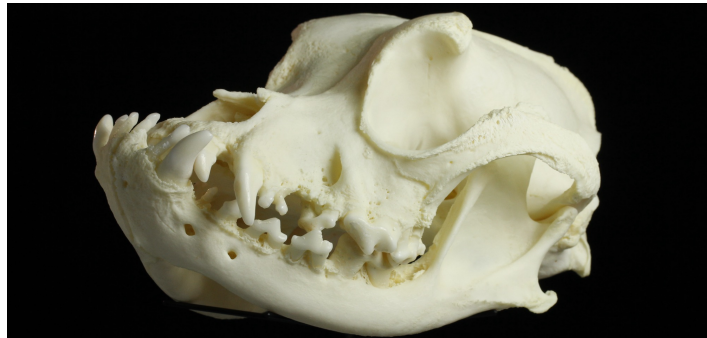
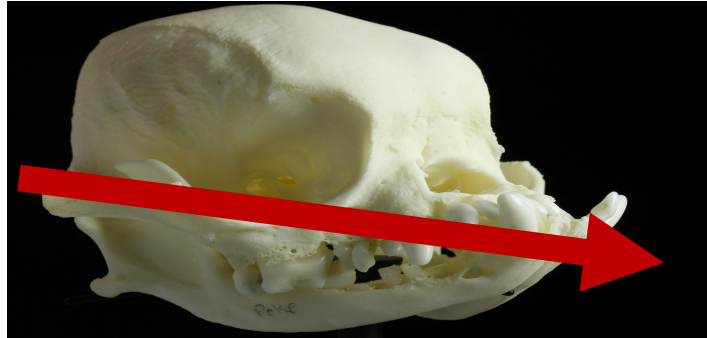
Faithfulness to the Source



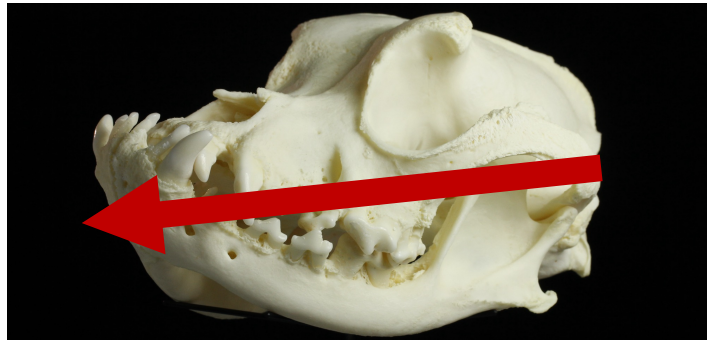
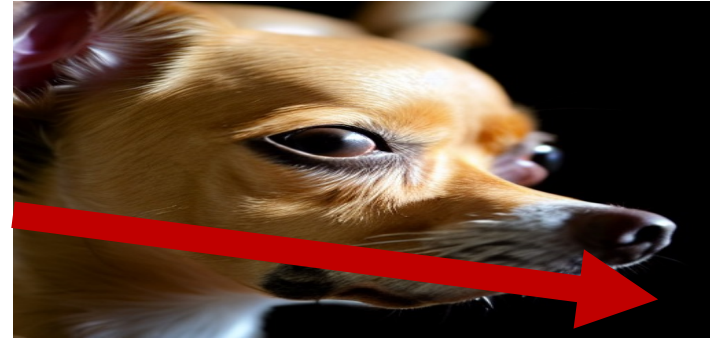
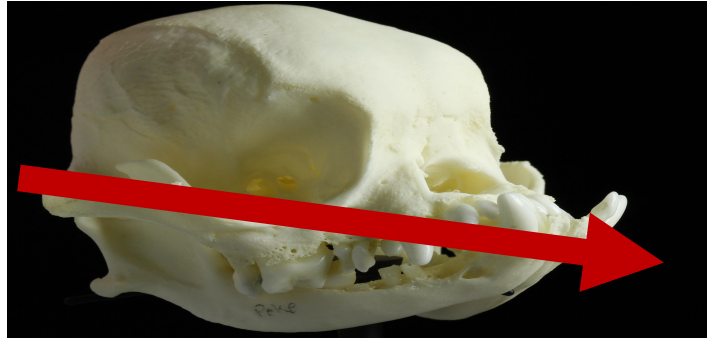
Faithfulness to the Source



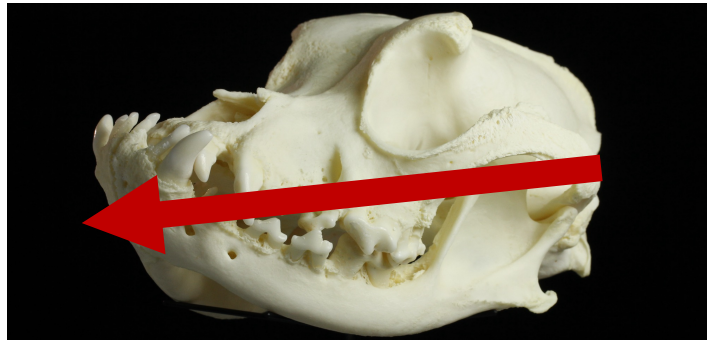
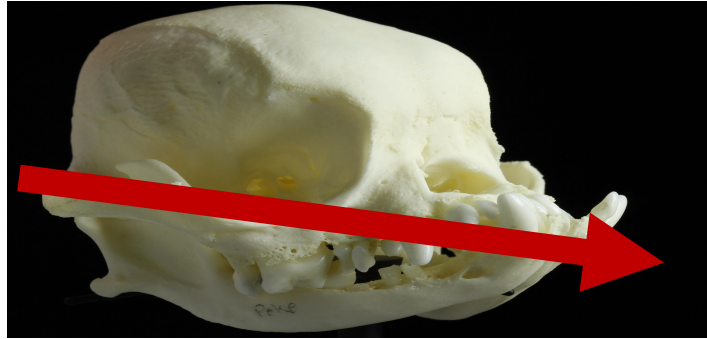
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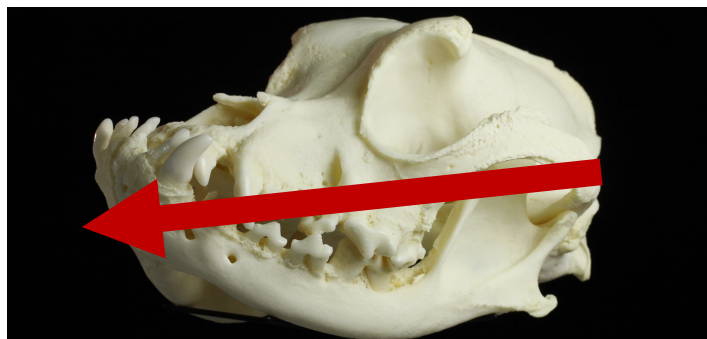
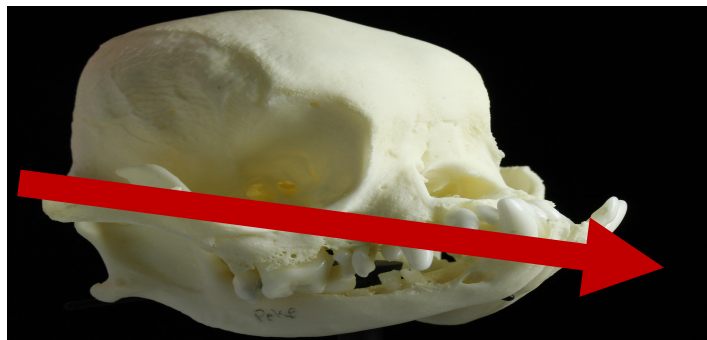
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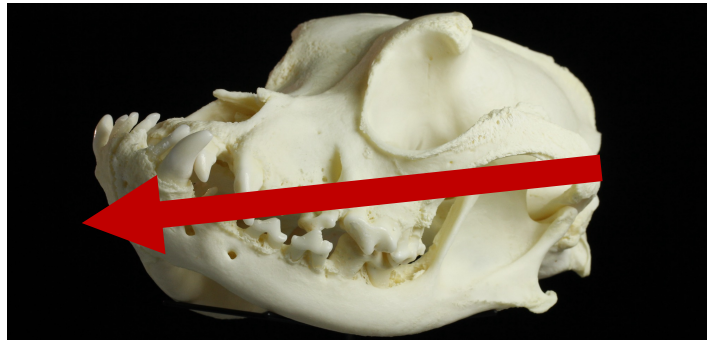
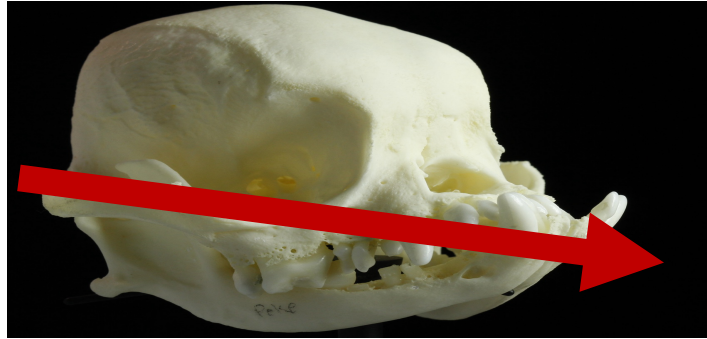
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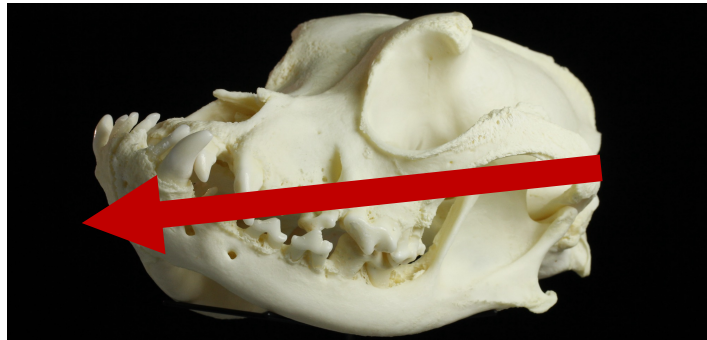
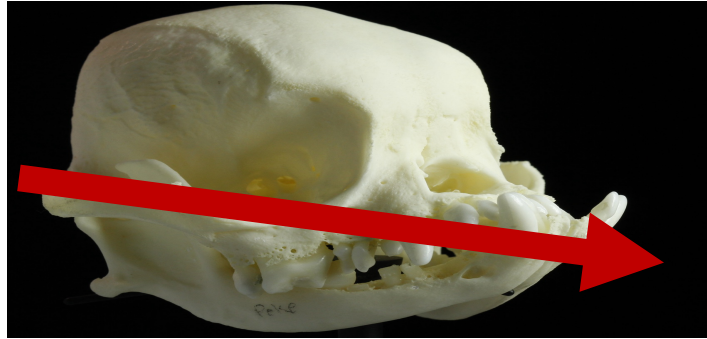
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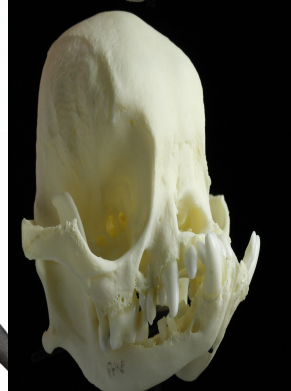
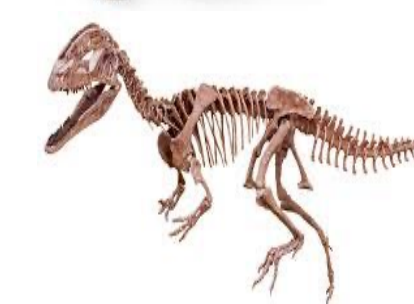
Faithfulness to the Source



Faithfulness to the Source







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<https://tinyurl.com/skull2animal>

Appendix

What's the difference between 95% and 100% model?

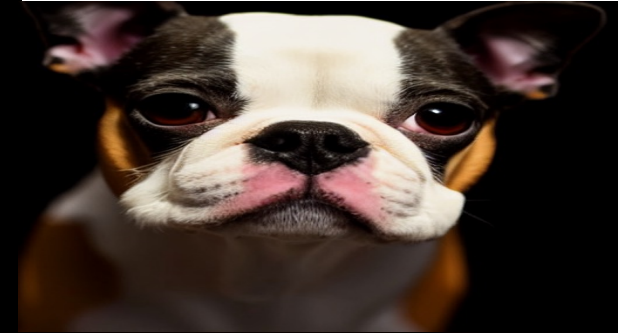
- 95% is more faithful to the source content than the 100%
- Faithfulness is determined by looking the same direction as the original and not hallucinating new features. (Hallucinating new features isn't a big difference because both models hallucinate whole body dogs at different points)

Original

95%

100%

Boston Terrier



Boxer



Great Dane



Rottweiler



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