Goal Conditioned Reinforcement Learning for Photo Finishing Tuning

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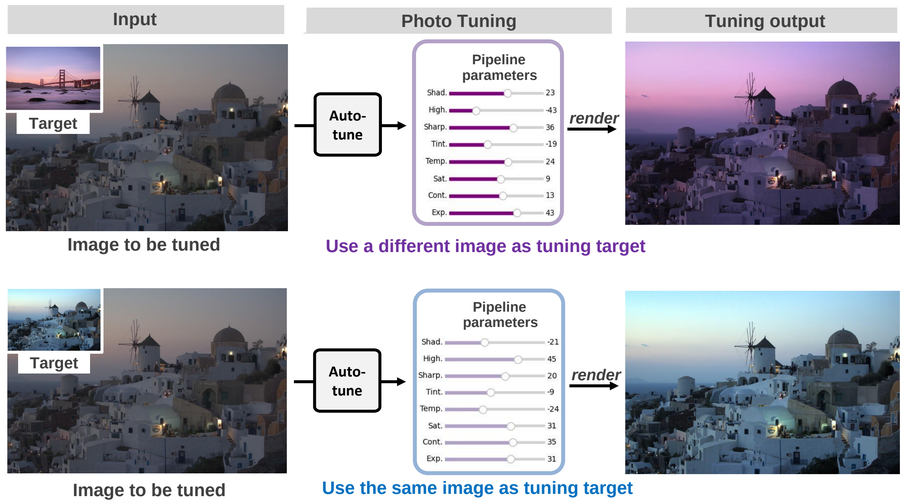
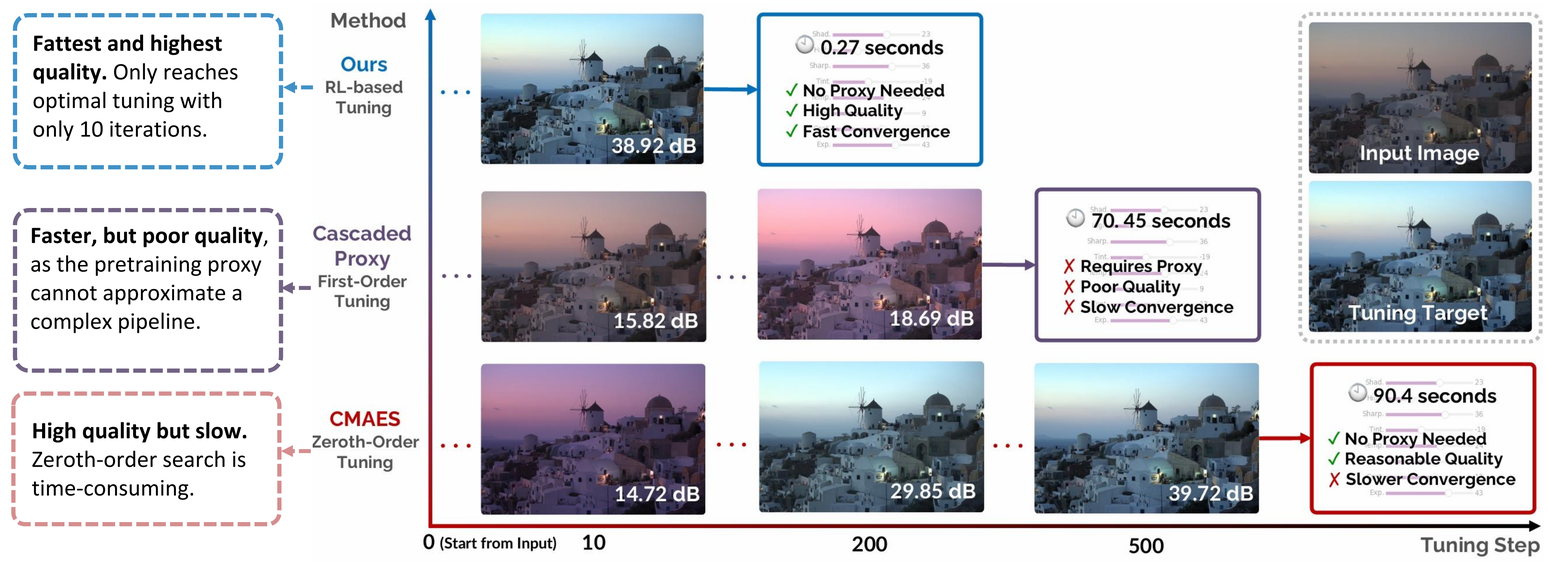
Project website

What is photo finishing tuning?

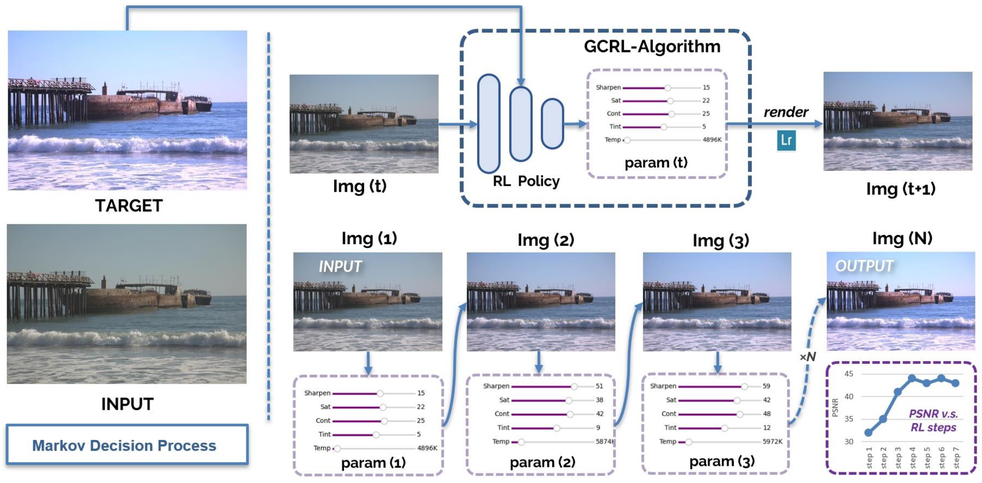
Photo Tuning: Given the *input image*, *photo finishing pipeline*, and the *tuning target*, automatic find the best set of parameters that produce the target rendering style.



Main idea: reinforcement learning to reduce tuning step



Method



For more details regarding the our RL framework, please check out our paper.

Goal Conditioned Reinforcement Learning based Photo Tuning:

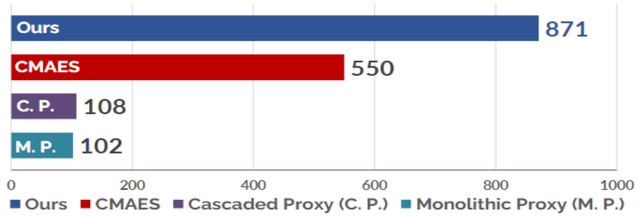
- By forming the problem into a Markov Decision Process and training the RL policy, we develop a smart searching algorithm that brings results closer to the target at each step.
- With a learned policy, our algorithm predicts the search direction more accurately than zeroth-order methods, without relying on a proxy.
- We also design a state representation to better model the relationship between the photo editing space and our policy network. See our paper for details.

Experimental results

Qualitative Results. Ours generalize well to unseen dataset.

Method	FiveK Test Set PSNR	FiveK Test Set SSIM	FiveK Test Set LPIPS	HDR+ *(cross-dataset generalization)* PSNR	HDR+ *(cross-dataset generalization)* SSIM	HDR+ *(cross-dataset generalization)* LPIPS
CMAES	28.53	0.9586	0.0968	28.08	0.9539	0.1307
Monolithic Proxy	21.71	0.9104	0.2144	17.80	0.8940	0.3044
Cascaded Proxy	22.31	0.9115	0.1939	18.90	0.8982	0.2797
Ours	**35.89**	**0.9764**	**0.0305**	**31.54**	**0.9652**	**0.0563**

User study results (No. of votes of each methods).



Qualitative Comparison of Photo Finishing Tuning on HDR+ dataset

Qualitative Comparison of Photo Stylization Tuning task

Title of research poster in 55pt should not exceed two lines

Author Name, Author Name,
Author Name, Author Name,
Author Name

NEURAL INFORMATION PROCESSING SYSTEMS

Headline in 34pt should not extend beyond 2-3 lines

This section is an example of a paragraph. When creating sections, regardless of whether you're putting in text or images, always try to align to the edges of the yellow guidelines. This poster canvas is broken into 3 columns, and aligning to the edges will make it much easier for viewers to differentiate sections and read information. The same is true of horizontal spaces between sections, try to space them equally and with a good amount of breathing room in between each.

- Bulleted list item
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Section header in 34pt font

Optional section descriptor in 21pt font

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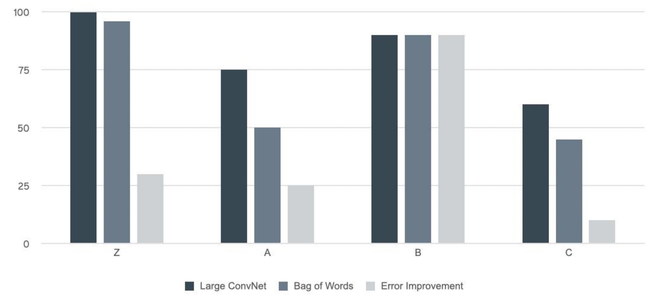
image

Optional caption for images, charts, and graphs

Section header in 34pt font

Optional section descriptor in 21pt font



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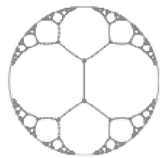
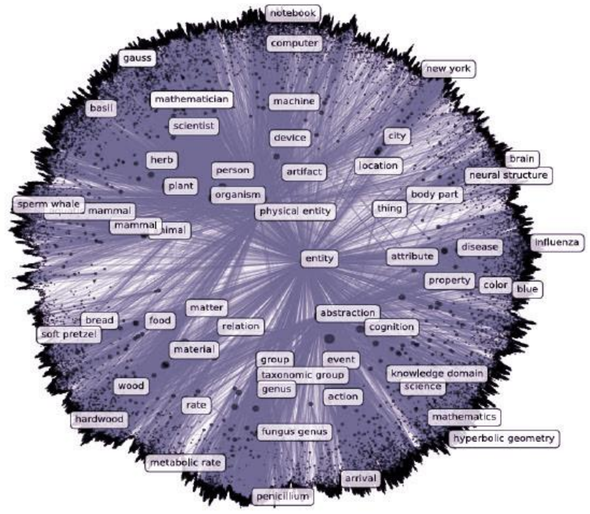


Dimensionality		5	10	20	50
Euclidean	Rank	3542.3	2286.9	1685.9	1281.7
	Map	0.024	0.059	0.087	0.140
Translational	Rank	205.9	179.4	95.3	92.8
	Map	0.517	0.503	0.563	0.566
Poincaré	Rank	4.9	4.02	3.84	3.98
	Map	0.823	0.851	0.855	0.86



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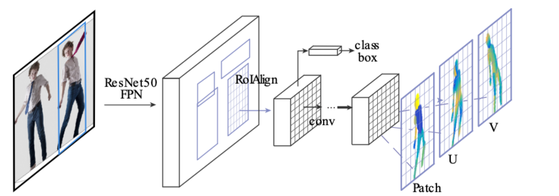

References

References in 14pt font

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Marge Simpson (2010). “Blue hair looks nice.”. In: Nature communications 1, p. 622.

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Marge Simpson et al. (2013). “Lorem Ipsum.” In: Advances in Neural Information Processing Systems 26. Ed. by Christopher J. C. Burges et al., pp. 27–29.

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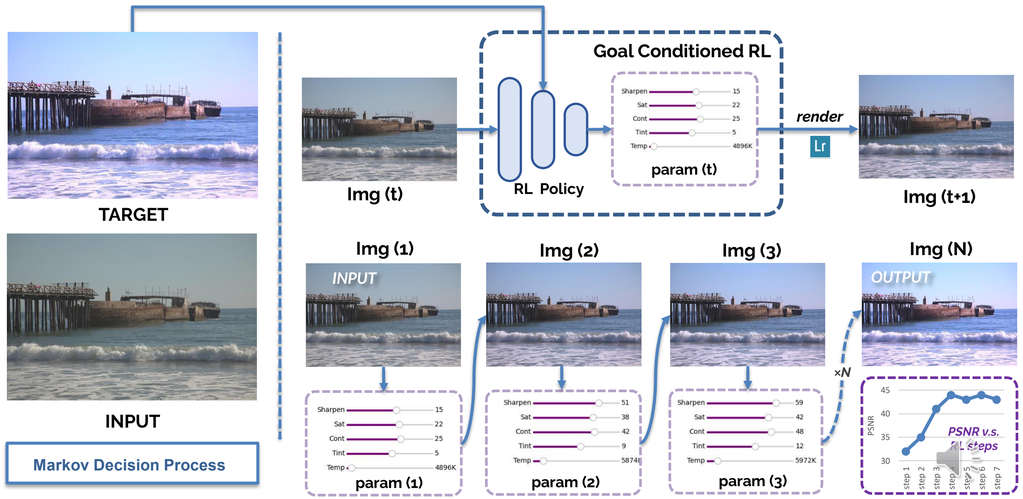

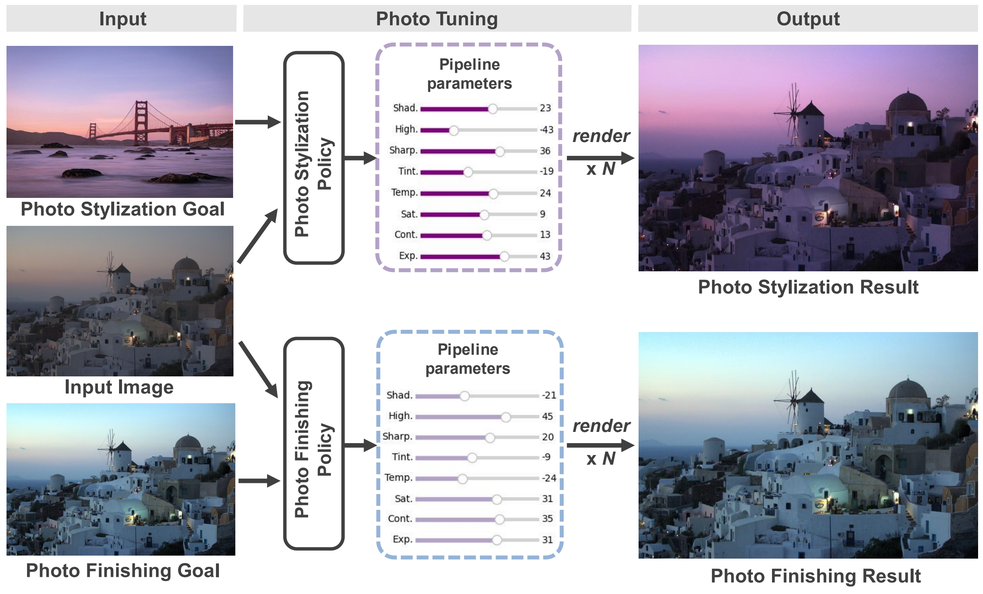

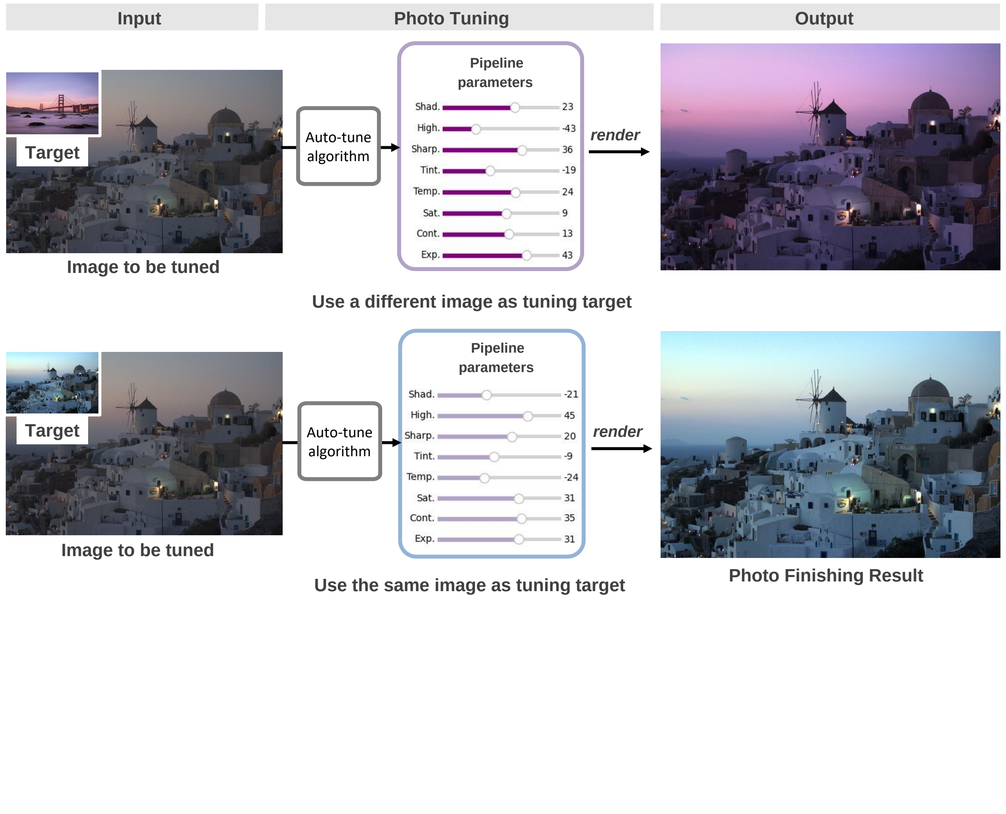
Input
Photo Tuning
Output
Target
Image to be tuned
Auto-tune algorithm
Pipeline parameters
Shad. 23
High. -43
Sharp. 36
Tint. -19
Temp. 24
Sat. 9
Cont. 13
Exp. 43
render
Use a different image as tuning target
Target
Image to be tuned
Auto-tune algorithm
Pipeline parameters
Shad. -21
High. 45
Sharp. 20
Tint. -9
Temp. -24
Sat. 31
Cont. 35
Exp. 31
render
Use the same image as tuning target
Photo Finishing Result