

DIP Final Project

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Implemetation

Method 1 Color Transfer

$$\begin{aligned}l^* &= l - \langle l \rangle & l' &= \frac{\sigma_t^l}{\sigma_s^l} l^* \\ \alpha^* &= \alpha - \langle \alpha \rangle & \alpha' &= \frac{\sigma_t^\alpha}{\sigma_s^\alpha} \alpha^* \\ \beta^* &= \beta - \langle \beta \rangle & \beta' &= \frac{\sigma_t^\beta}{\sigma_s^\beta} \beta^*\end{aligned}$$

Method 1: Color transfer between images

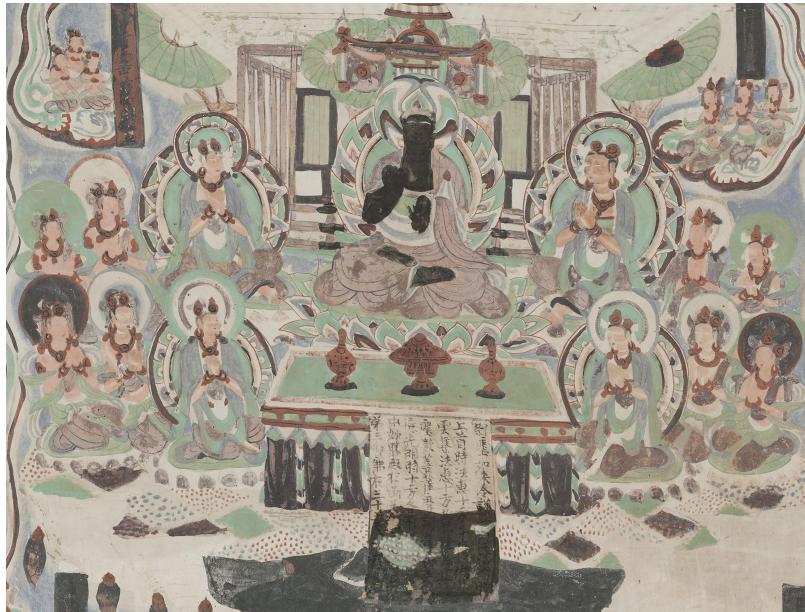
- 這個演算法使用的顏色座標軸為 $l\alpha\beta$ 系統，旨在讓不同channel之間交互的影響達到最小。
- 轉換過程為：RGB \rightarrow LMS(cone space) \rightarrow LMS \rightarrow $l\alpha\beta$

$$\begin{bmatrix} L \\ M \\ S \end{bmatrix} = \begin{bmatrix} 0.3811 & 0.5783 & 0.0402 \\ 0.1967 & 0.7244 & 0.0782 \\ 0.0241 & 0.1288 & 0.8444 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \end{bmatrix} \longrightarrow \begin{aligned}\mathbf{L} &= \log L \\ \mathbf{M} &= \log M \\ \mathbf{S} &= \log S\end{aligned} \longrightarrow \begin{bmatrix} l \\ \alpha \\ \beta \end{bmatrix} = \begin{bmatrix} \frac{1}{\sqrt{3}} & 0 & 0 \\ 0 & \frac{1}{\sqrt{6}} & 0 \\ 0 & 0 & \frac{1}{\sqrt{2}} \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & -2 \\ 1 & -1 & 0 \end{bmatrix} \begin{bmatrix} \mathbf{L} \\ \mathbf{M} \\ \mathbf{S} \end{bmatrix}$$

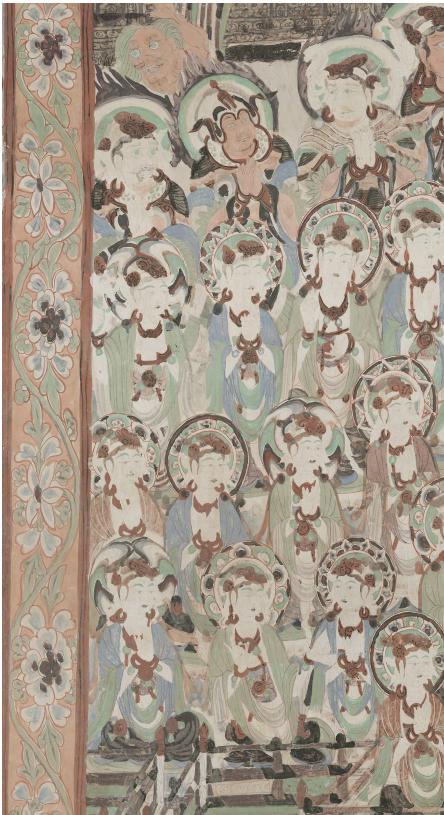
Color Transfer(Crop)



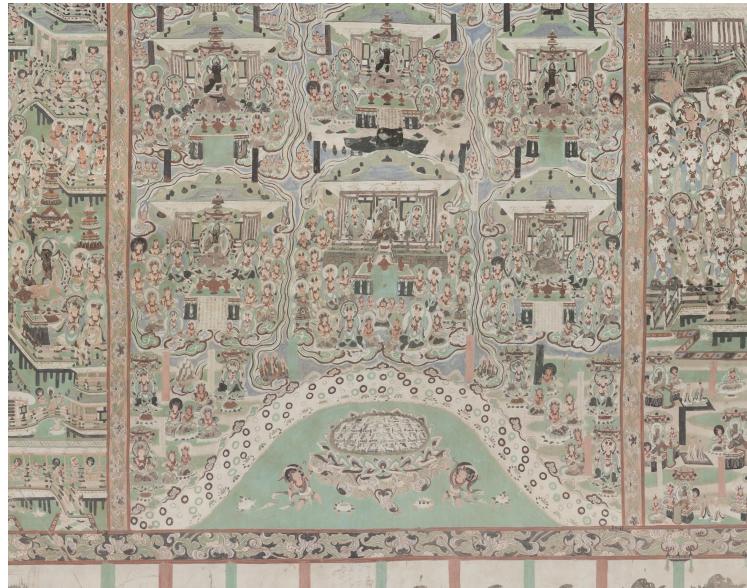
Color Transfer(Crop2)



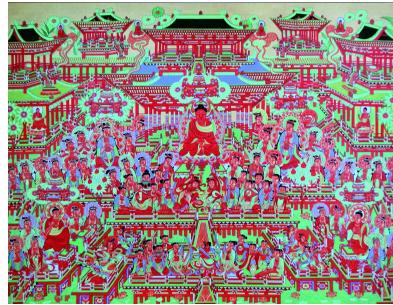
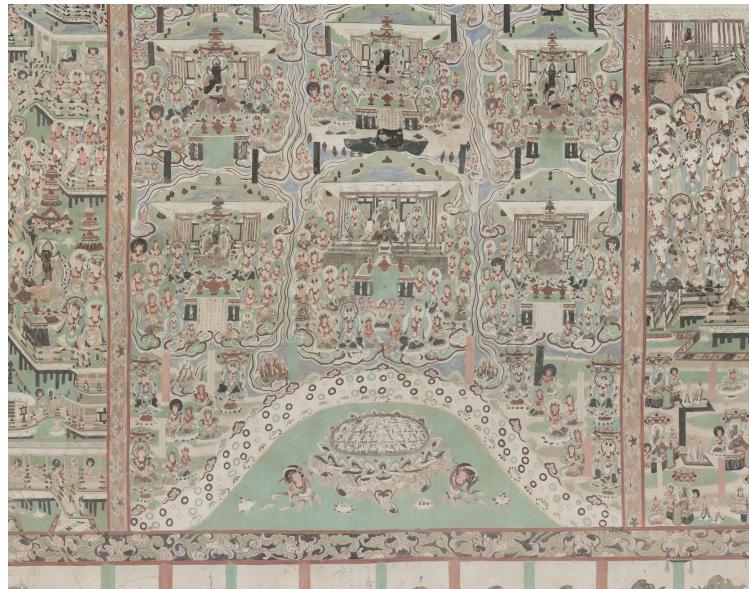
Color Transfer(Crop3)



Method 1 Color Transfer



Method 1 Color Transfer

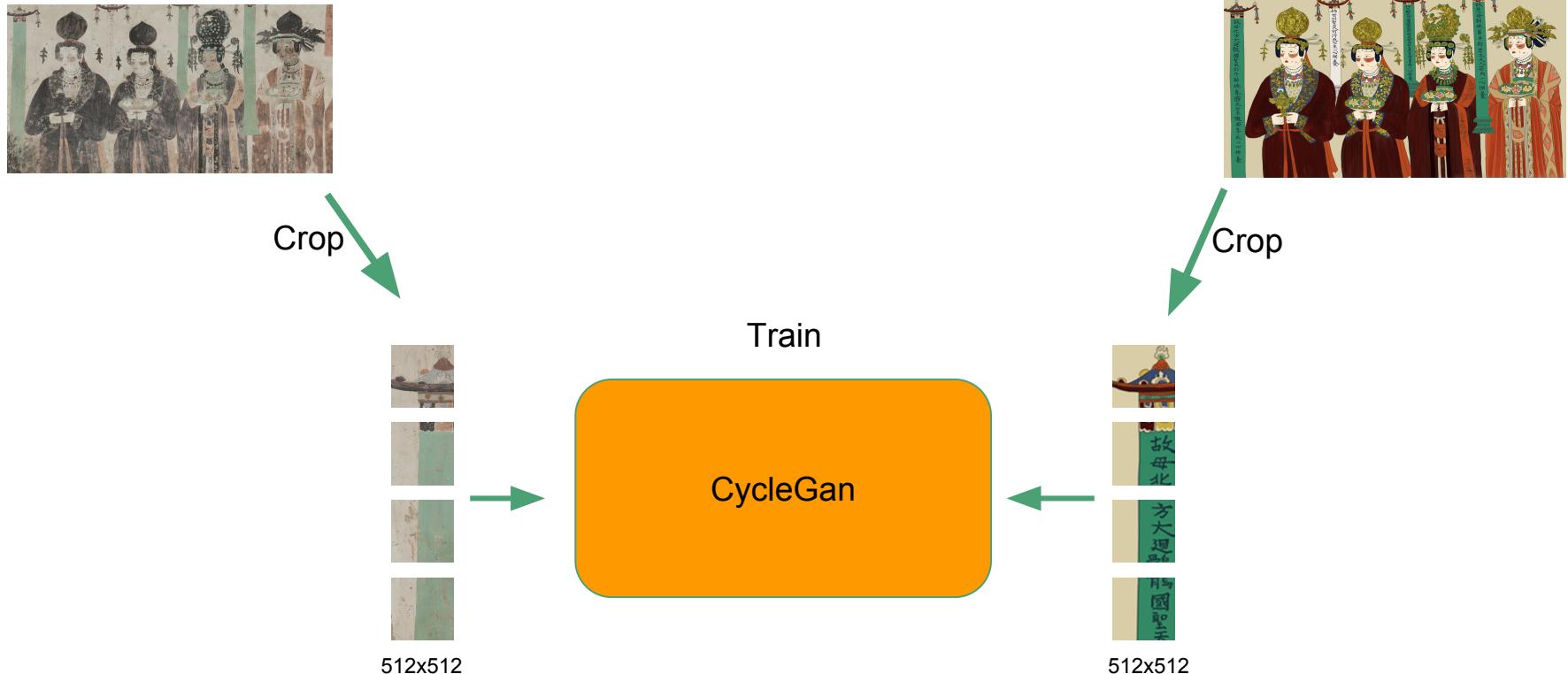


Method 2 CycleGan

Training Process:

1. Pretrain cycleGan with **paired images**
2. Train cycleGan with **unpaired images**(sampled)
3. Train cycleGan with **reconstructed image**

Step 1: Pretrain with paired images



Result of step 1



The result in step 1 actually looks pretty good,
but with **less saturation**.

Step 2: Training with unpaired images



Crop & Mix



512x512

Train

CycleGan

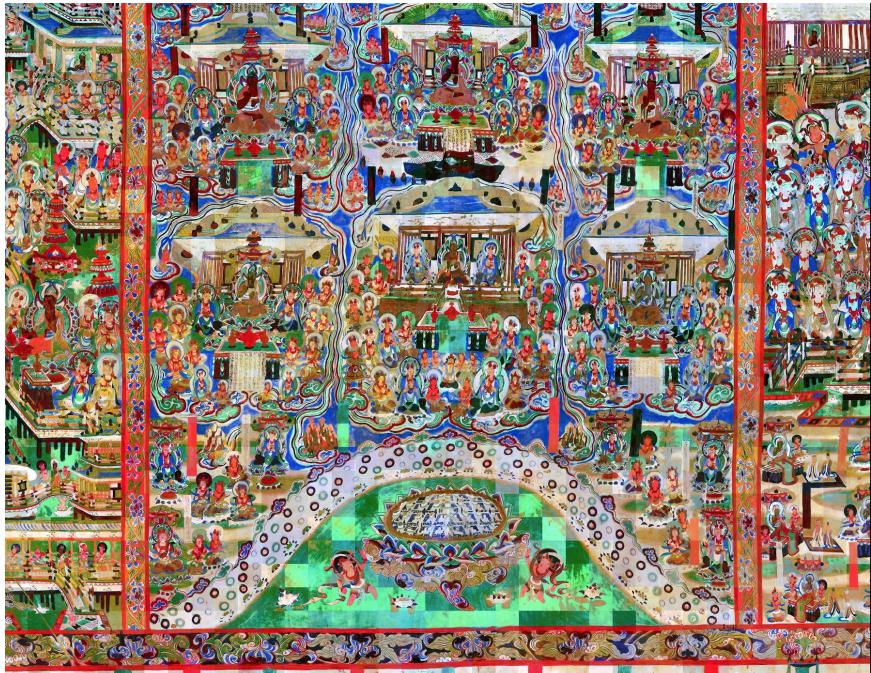


Crop & Mix & Sample

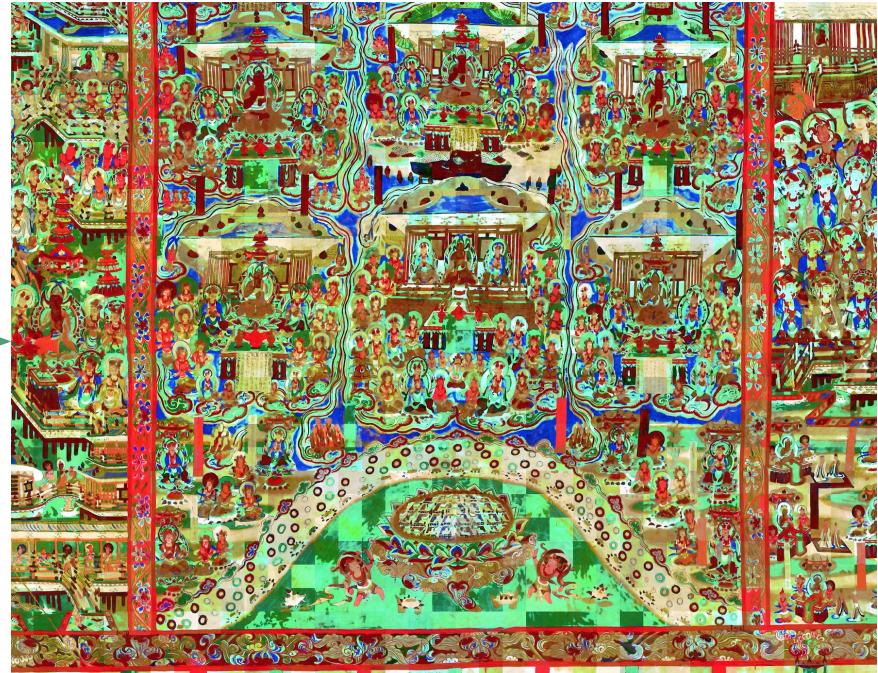


512x512

Result of step 2



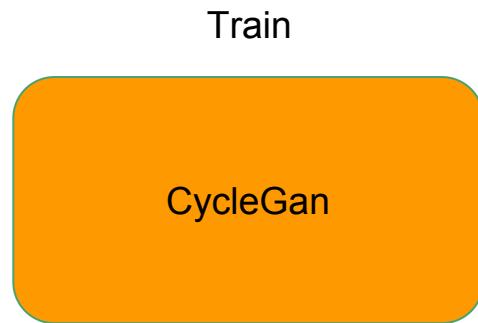
The model is affected by 297 repaired images, and become **too saturated**.



Step 3: Training with reconstructed images



Crop & Mix



512x512

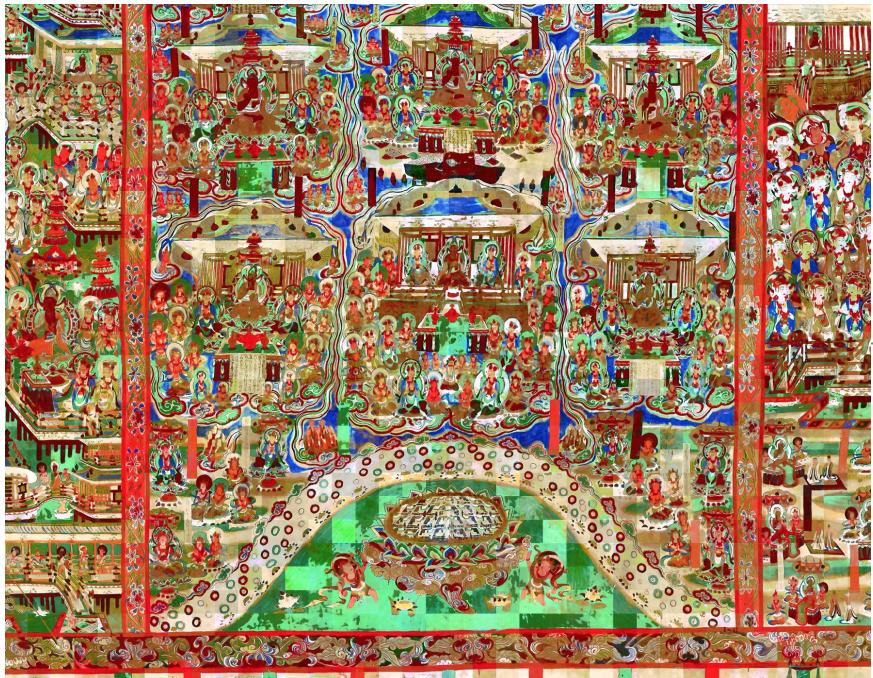


Crop & Mix

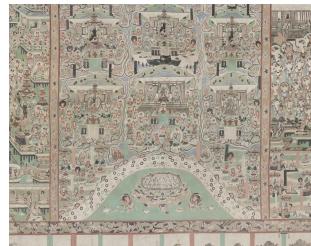


512x512

Result of step 3



Reconstruct the target image



Crop



512x512

CycleGan



512x512



Stitch

Result of cycleGan



Blending Process (poisson image editing)

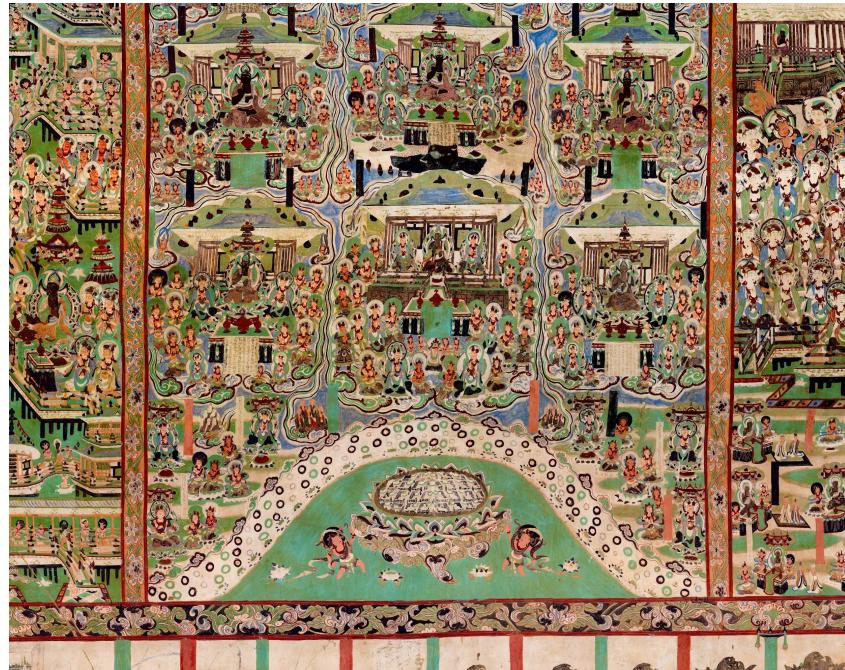
why blending?

Makes the picture smoother.

1. prepare mask
2. prepare source & target

target

1. Resize blocks into 512*512 and resize back to original size to become color constraint.



source

1. The final result from gan



Result of Blending

1. The result after blending

