CSC320A3 Report

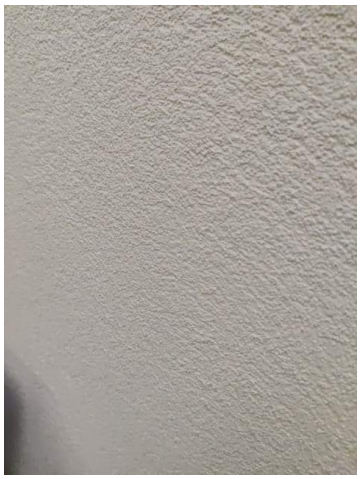
Zhisong Ni
Di Sun

Experiment 1:

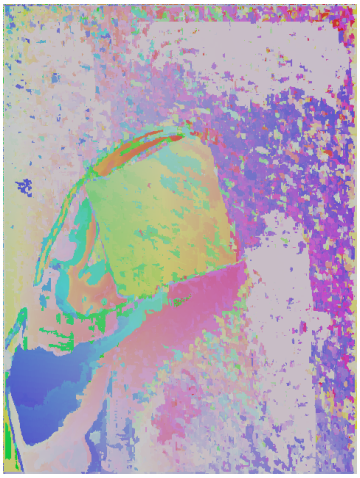
Source

Reconstructed Source

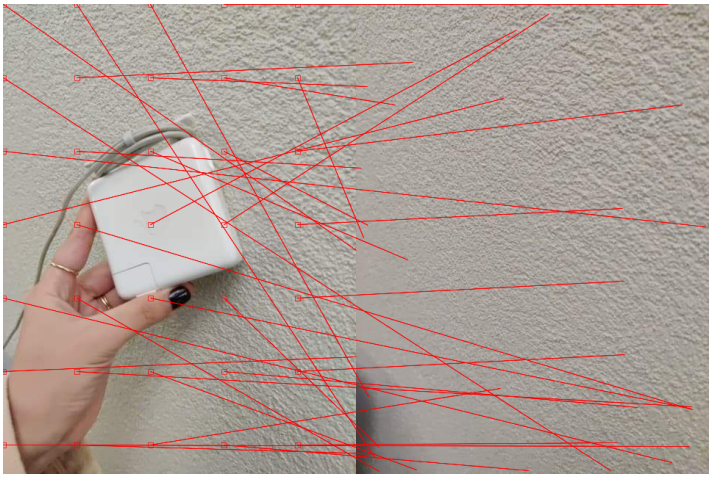
Target



NNF-col



NNF-vec



In this experiment, we have a source image with objects and a target image with no object. From the NNF-col image, we can see that the charger area is very bright,i.e., with very high intensity. However, the target image has no patches with such high intensity. But the algorithm tried to find the most matching patch to draw out the charger on the reconstructed image, which explained that why the charger is greyed out a bit. Due to the same reason, there is no similarly coloured patches in the target image to paint the hand on the reconstructed image. Also the details on the charger are missing, for example, the sharp edge-like detail on the charger will not be found on the target image due to the steep change in intensity, its shape and its size. We might want to try a smaller patch size to accommodate this feature.

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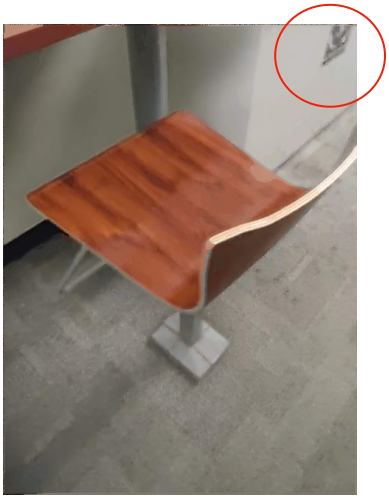
Experiment 2:

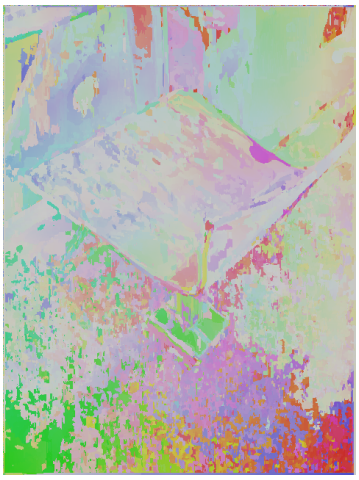
Source

Reconstructed Source

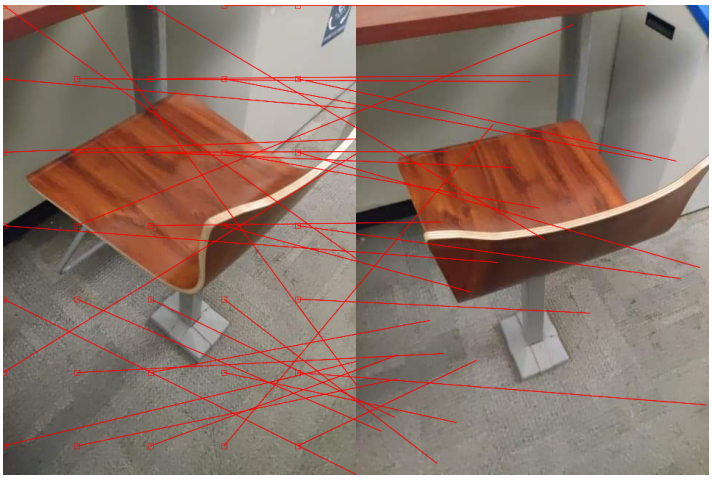


Target

NNF-col



NNF-vec



This experiment gives us a very good patch match example. Almost all the details that can be easily observed are reconstructed, except for the recycling label on the garbage bin, as indicated above. The recycling label is relatively big comparing to our patch size while there are details drawn on the label itself in blue. However, the blue area in the target image has higher intensity than the greyish blue label on the source image. Therefore, the algorithm might take some greyish patches that match the details with similar intensity on the recycling label to reconstruct the image. The impressive feature of this algorithm is that even we turn the angle a bit, the algorithm is still able to reconstruct the feature observed on the source image but missing on the target image. This is because there are enough resources on the target image that allows the algorithm to find a similar patch.

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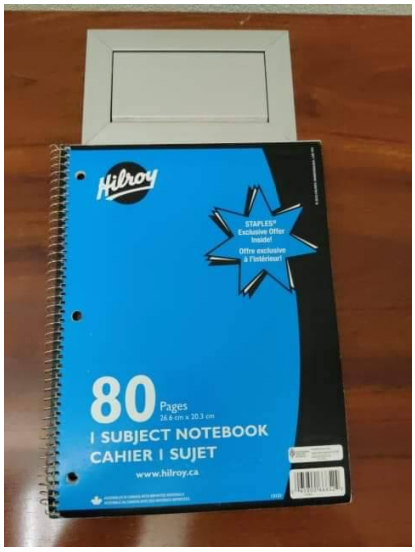
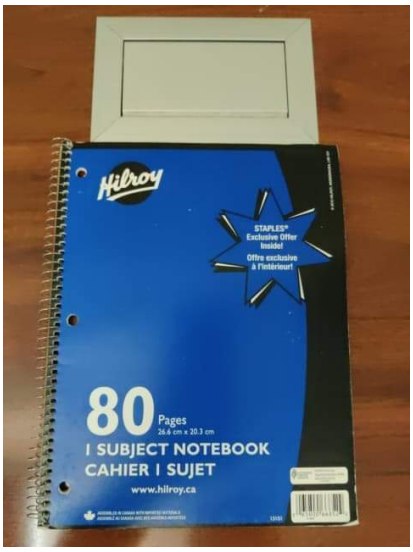
Experiment 3:

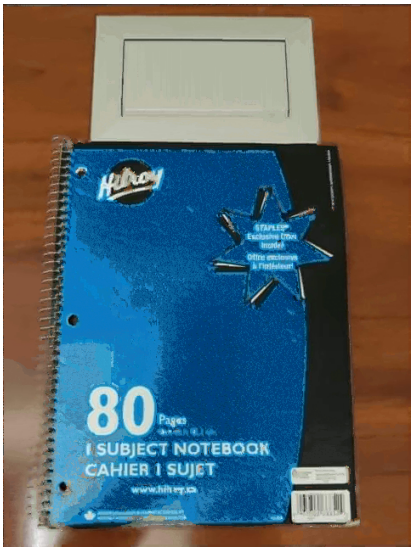
Source



Reconstructed Source

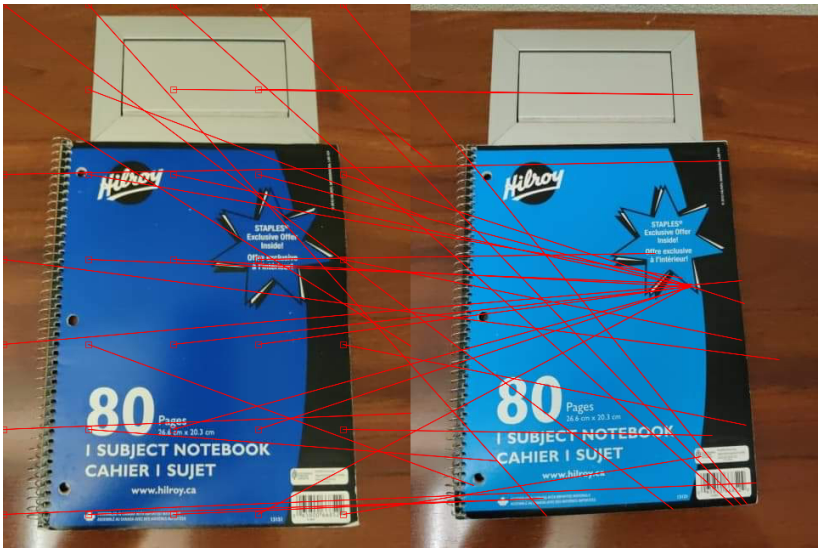


Target



NNF-col

NNF-vec



This experiment contains two notebooks of similar shape and with similar patterns. The background is the same with slightly different angle, but the notebooks have two different yet close colours. This testcase showcases the some of the strength of the PatchMatch algorithm; being able to find the darkest blue patches (for example the bottom of the star) on the lighter notebook and use them to reconstruct the darker notebook and being able to reconstruct shapes and details that are of the same colour. Only the bottom left side is matched with lighter blue due to the higher light intensity in the source image making the dark blue look lighter. However, it also showcases a very big limitation of the algorithm; that the source images' coloured patches must match patches in the target image in order for the reconstruction to actually look like the source image. The background is almost perfectly

reconstructed despite the angle difference because it would be an example of what PatchMatch is best at reconstructing, the same object at a different angle. As a result, the background is almost perfect while the foreground is visibly different.

Experiment 4:

Source

Reconstructed Source

Target

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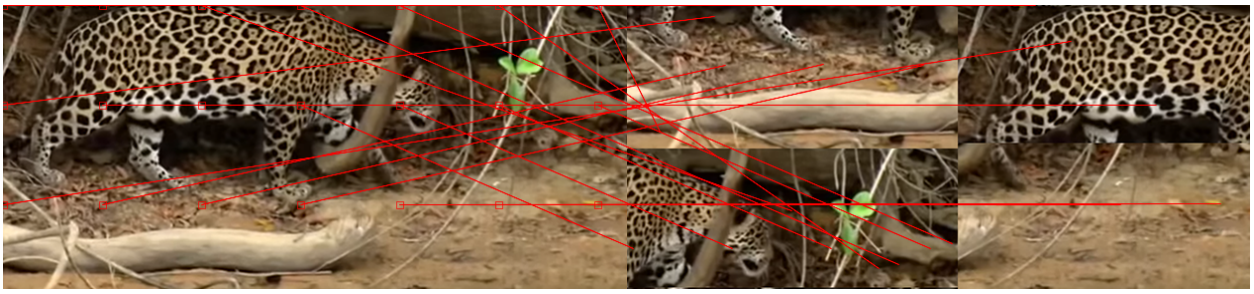
NNF-col

NNF-vec



This test case contains a scrambled version of the source image as the target image. This test tests the PatchMatch algorithm's ability to match patches that have linear position change. This test case is very easy for the algorithm as it tests one of its fundamental functions. The NNF-col is divided into 4 main colours, clearly identifying the 4 scrambled parts of the source image. There are, however, some artifacts on the border of each of the scrambled parts. An example is shown on the left, where the bottom left part and the top right part of the target image meets. The result overall, is quite good. Without magnifying the reconstructed image, it would be hard for a hum