

Image Completion with Efros-Leung and Patchmatch

Albert Zhao

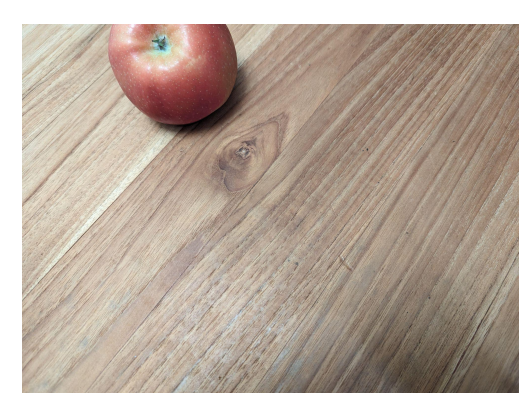
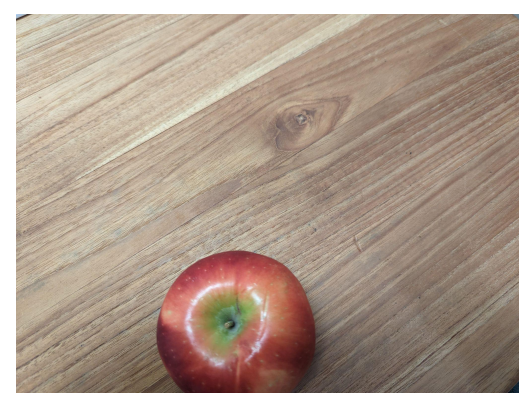
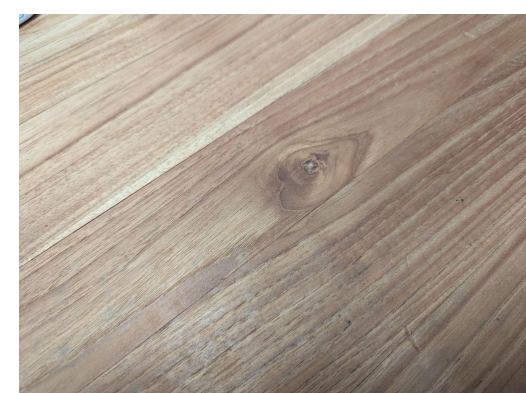
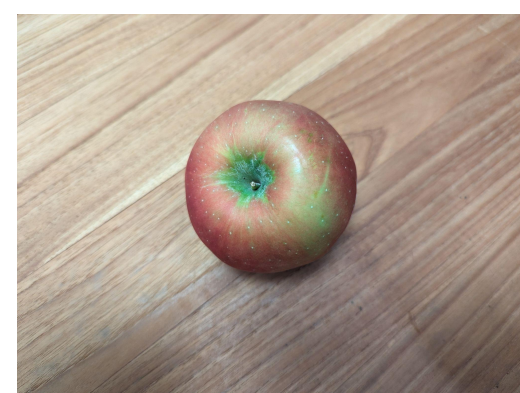
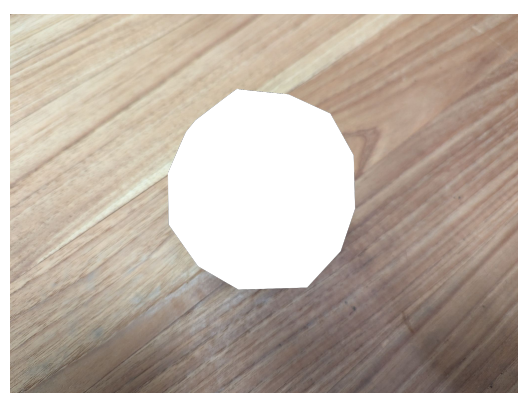
Overview

- Our goal is to create and compare two hole filling algorithms that take multiple inputs
- Additionally, we compare to generative AI
- Our approach is to implement modified versions of Efros Leung and PatchMatch algorithms for this task



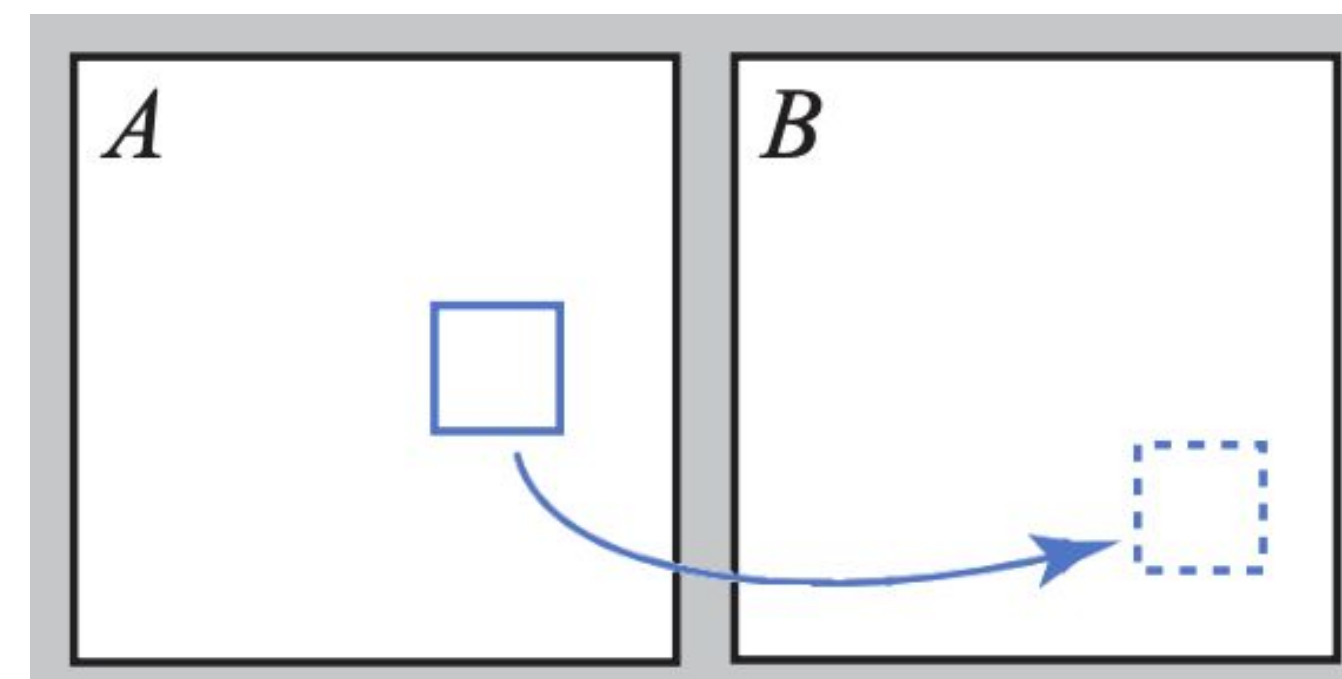
- The above example is an image generated by the PatchMatch algorithm

Dataset & Evaluation

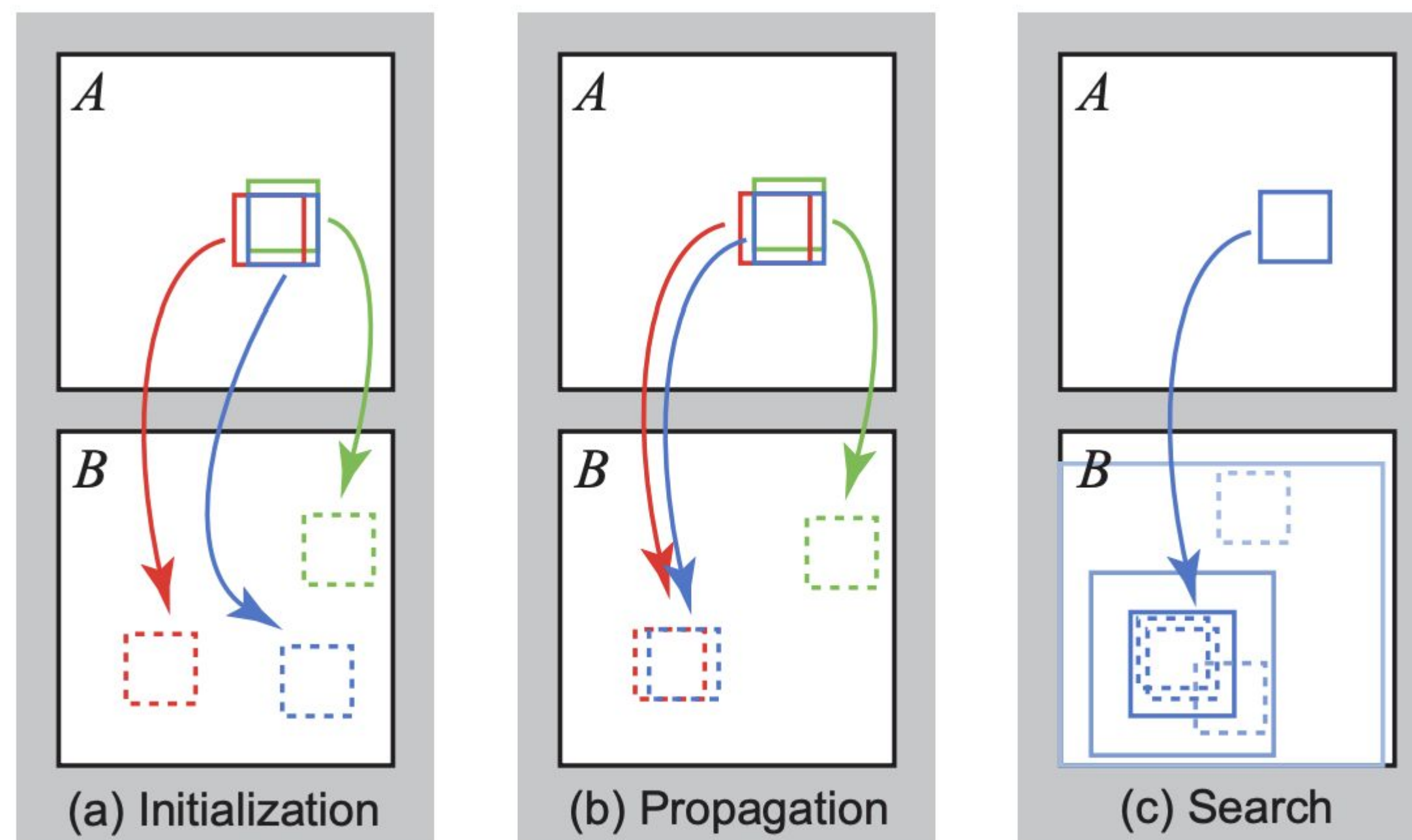


- Top left: Cutout input
- Top right: Original input
- Bottom: 3 reference images
- We evaluate based on plausibility of hole fill

Method



Efros Leung: For each pixel in hole, scan all patches and pick lowest distance
image based on image from Barnes 2009



PatchMatch:

1. Initialization: Random patches are chosen from the source images for each patch in the hole
 2. Propagation: If neighboring patches have a lower distance, this patch copies the neighbor's patch vector
 3. Search: Search within an exponentially decreasing area around current patch to escape local minima
- Likely converge to best result after 5 iterations
- image source: Barnes 2009

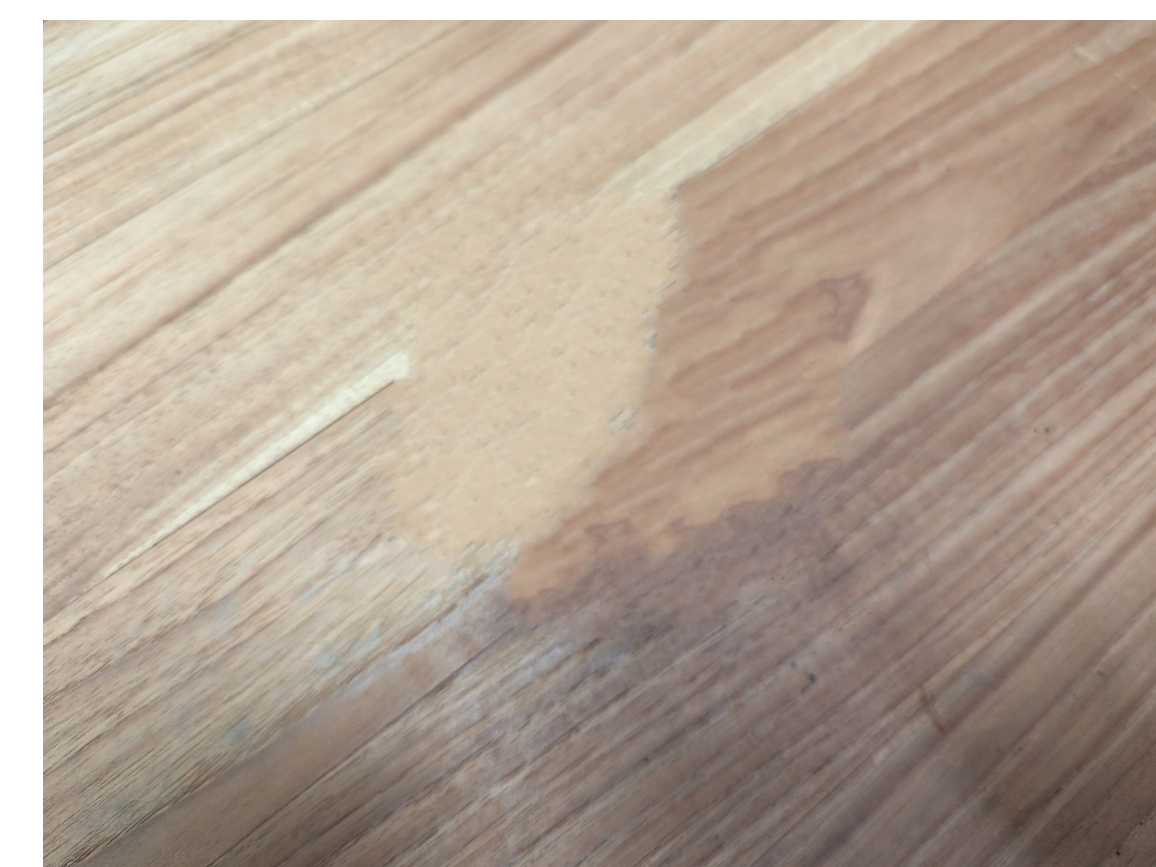
Results



Hole fill by Efros
Leung
(lower resolution)



Hole fill by
PatchMatch



Hole fill by free
online AI tool pixlr

Conclusion

- PatchMatch is much faster than Efros Leung
- However, against this specific dataset it does not do well
- Lack of colors and large circular hole