Assignment 3

Suhong Kim

Part 1: Texture synthesis (70 pts)

Best Results (Left: Random, Middle: Overlap, Right: Min-cut)

Patch size is tuned with respect to the properties of the textures such as regularity or size. Overlap smoothes the output but tends to generate repeated or simpler patterns. Tolerance is the trade-off between the variance and matching, so I adjusted value based on each texture properties.
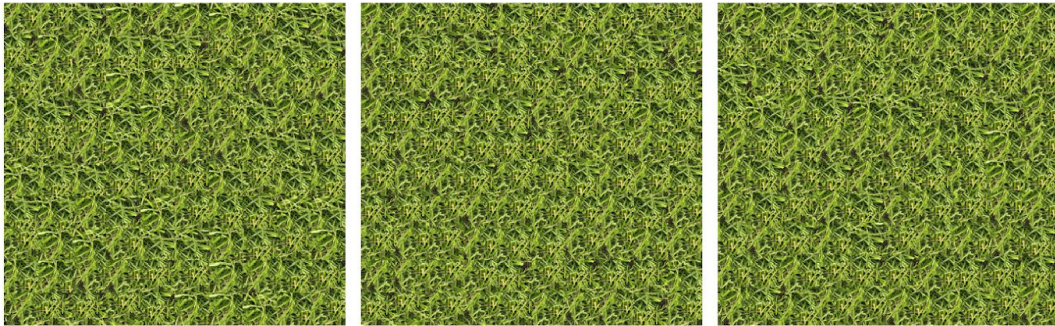
★ **Apples**: Patch=50x74 (ratio 0.4), Overlap = ½, Tolerance=0.1

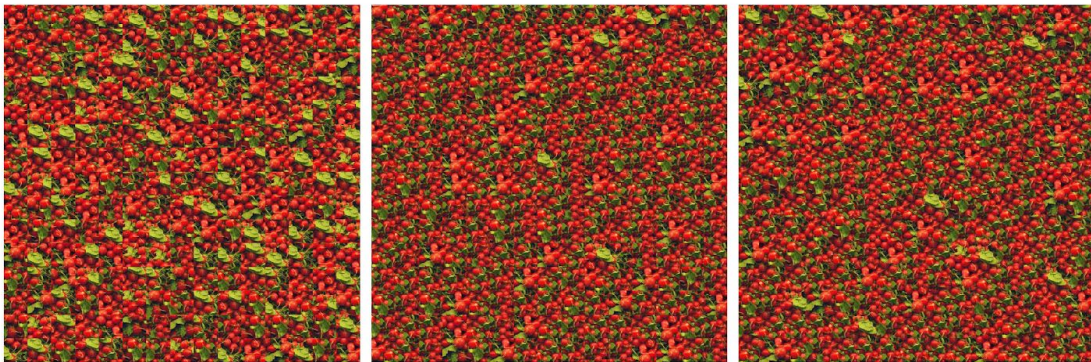★ **Brick**: Patch=154x154 (ratio 0.8), Overlap = ⅛ , Tolerance=0.1
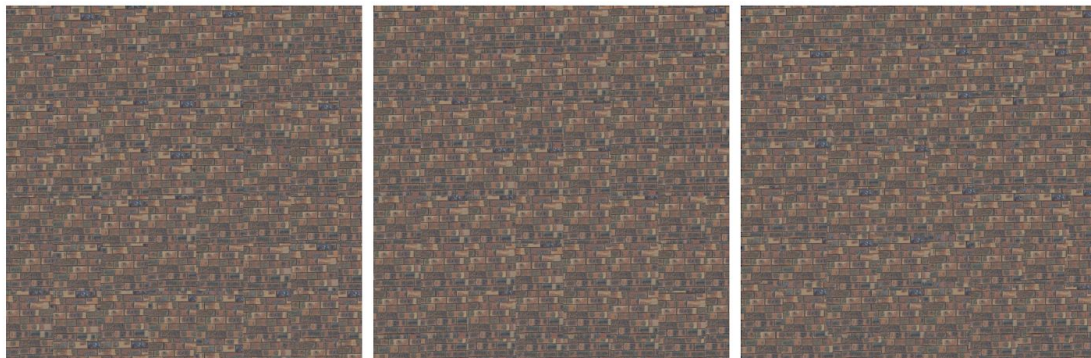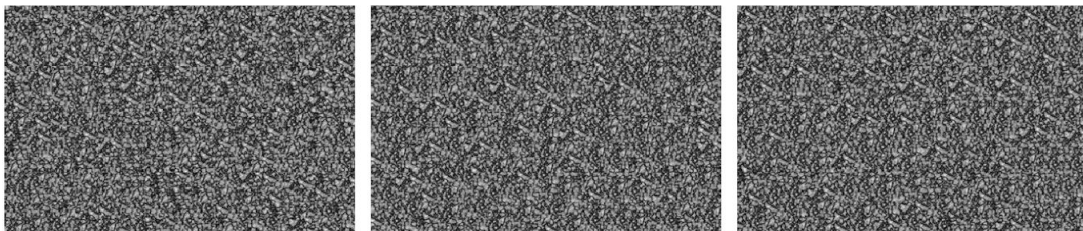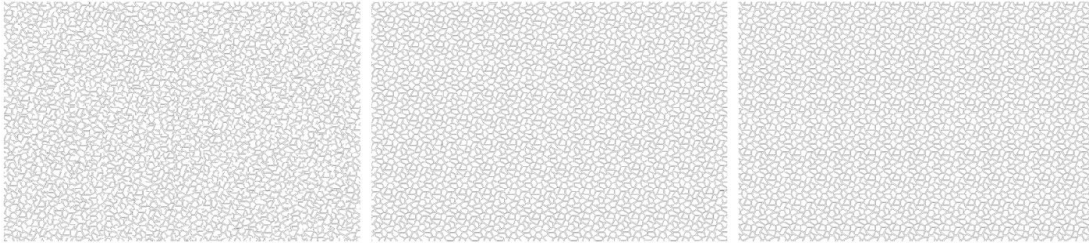
★ **Grass**: Patch=163x174 (ratio 0.6), Overlap = ⅛, Tolerance=0.2

★ **Radishes**: Patch=77x77 (ratio 0.4), Overlap = ⅛, Tolerance=0.1

★ **Random**: Patch=118x181 (ratio 0.4), Overlap = ⅛, Tolerance=0.1

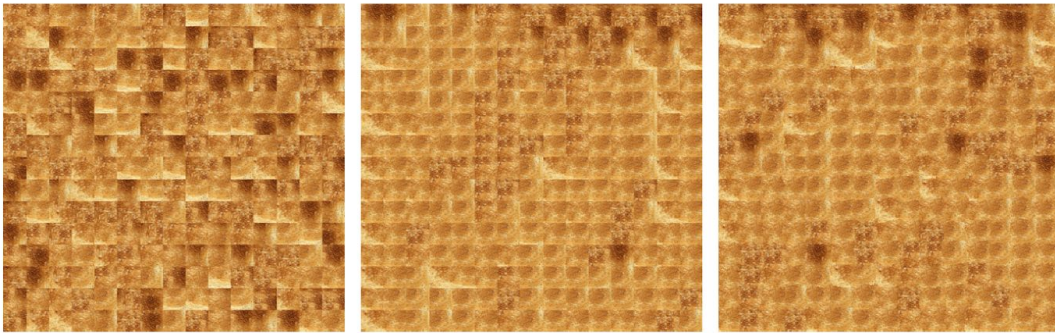★ **Random3**: Patch=113x170 (ratio 0.4), Overlap = ½ , Tolerance=0.1

★ **Rice**: Patch=113x170 (ratio 0.6), Overlap = ½ , Tolerance=0.2

★ **Text**: Patch=102x102 (ratio 0.4), Overlap = ⅛ , Tolerance=0.1

★ **Toast**: Patch=114x119 (ratio 0.4), Overlap = ⅙ , Tolerance=0.1

★ **Weave**: Patch=77x77 (ratio 0.4), Overlap = ⅙ , Tolerance=0.1
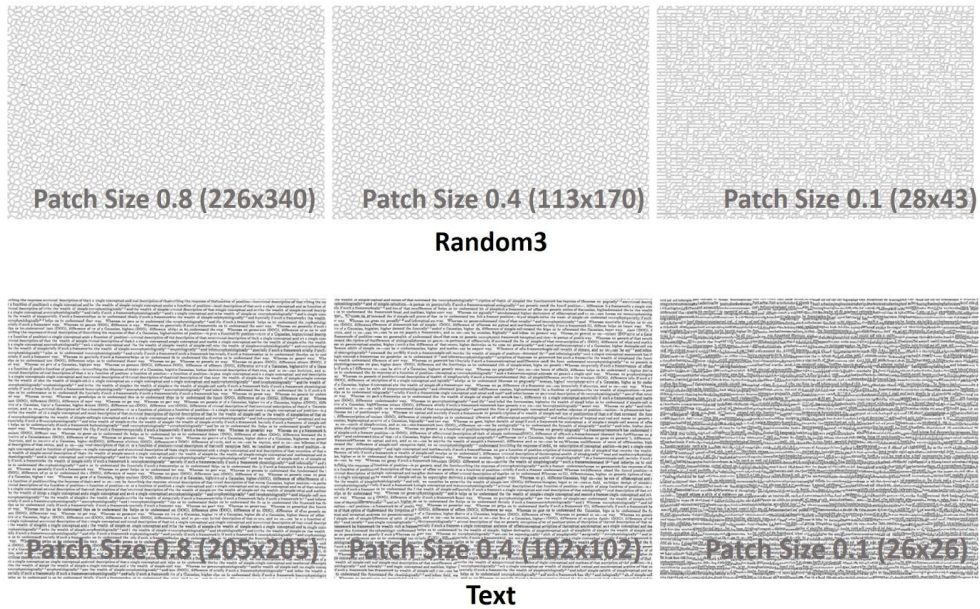

Patch Size Experiment ('grass', 'random3', and 'text')

Patch size depends on the type of texture. Since grass is more irregular, fewer artifacts can be found even at the smallest patch size. However, Random3 and text images have some structure in the texture so that they are usually cracked or disconnected when using smaller patch size than the size of the pattern.

Patch Size 0.8 (205x205) Patch Size 0.4 (102x102) Patch Size 0.1 (26x26)

Grass

Patch Size 0.8 (226x340)   Patch Size 0.4 (113x170)   Patch Size 0.1 (28x43)

Random3

Patch Size 0.8 (205x205)   Patch Size 0.4 (102x102)   Patch Size 0.1 (26x26)

Text

Part2: Texture transfer (30 pts)

### Best Results (from Left: Input Image, Iter 1, Iter2, Iter3)

Mostly, I got the best results using alpha as 0.1 (Patch Size 0.4, Overlap Ratio ⅙, Tolerance 0.1). The number of iterations can be chosen based on the taste of an individual so that I put all the results of 3 iterations to compare the outputs.

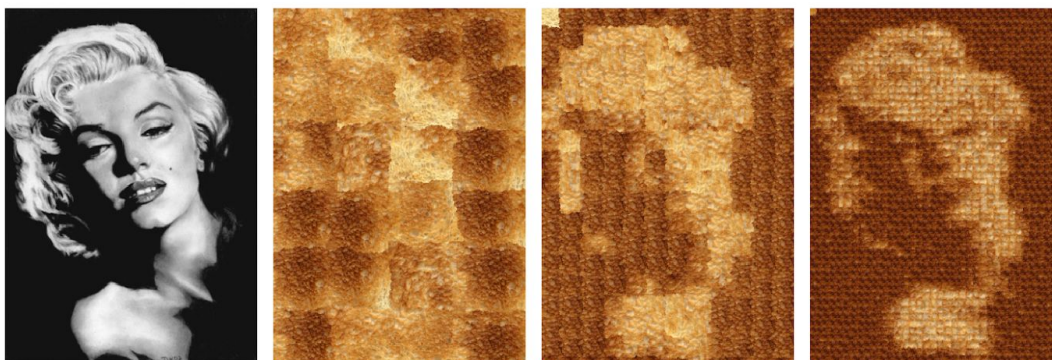★ **AL + Rice**: Alpha = 0.1, Patch=53x79 (ratio 0.4), Overlap = ⅙ , Tolerance=0.1

★ **AL + Toast**: Alpha = 0.1, Patch=114x119 (ratio 0.4), Overlap = ⅙ , Tolerance=0.1
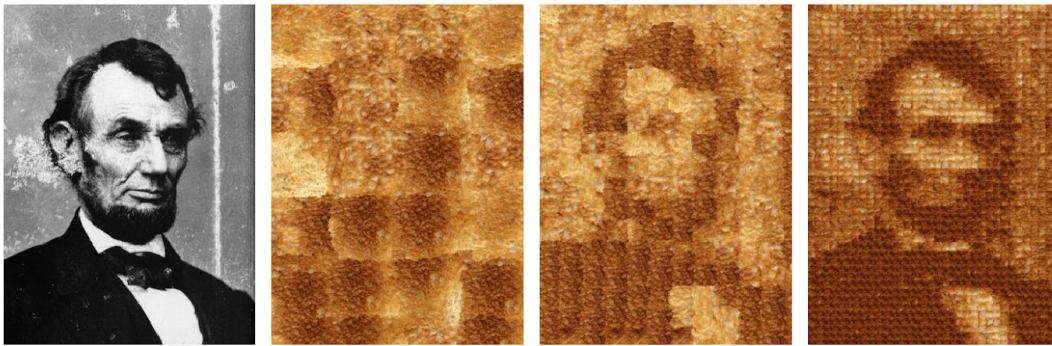
★ **ML + Rice**: Alpha = 0.1, Patch=53x79 (ratio 0.4), Overlap = ⅙ , Tolerance=0.1

★ **ML + Toast**: Alpha = 0.1, Patch=114x119 (ratio 0.4), Overlap = ⅙ , Tolerance=0.1
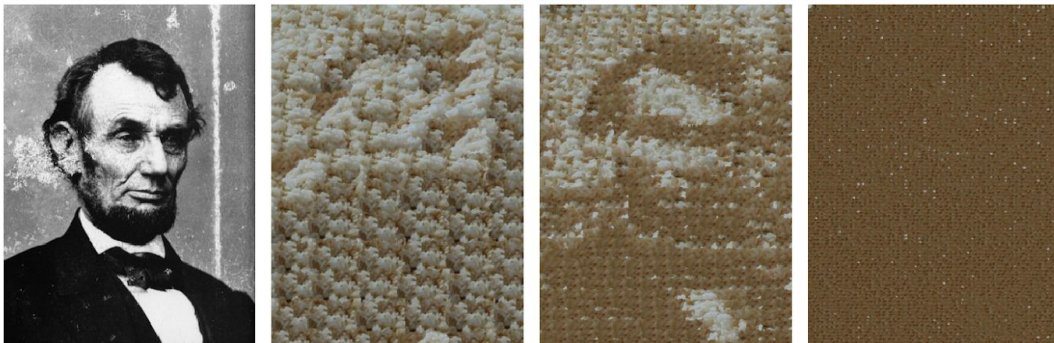
Parameter Experiment: Alpha

Alpha value interpolates between the context (source patch) and texture patterns. The below experiments showed that the image context is getting fade as alpha is getting bigger.

★ When alpha = 0.1

★ When alpha = 0.5

★ When alpha = 0.9