

Error Rates		Data Sets					
		X1	X2	X3	X4	X5	X_test
Classifier	SVM	.032	.128	.105	.157	.126	.104
	KNN	.107	.054	.091	.148	.098	.084
	Logistic Regression	.113	.106	.006	.147	.107	.098
	Decision Tree	.325	.317	.311	0	.315	.332
	Random Forest	.122	.107	.123	.134	0	.122

Overall KNN had the best performance on the test dataset and consistently did better than most other classifiers on the bagged data. It would appear that decision trees and consequently random forests, performed very poorly on the datasets they weren't trained on in comparison to the training data. SVM was very consistent across all datasets, but just didn't perform as well as KNN.

Overall I would say that bagging helps to show what classifiers are going to be overfit to the training data as is evident with decision trees and random forests.

2.

For image 1 and image 2, for a constant low valued K the changes in iterations and R values, produced minimal differences between pictures, at most a handful of pixels.

Examples

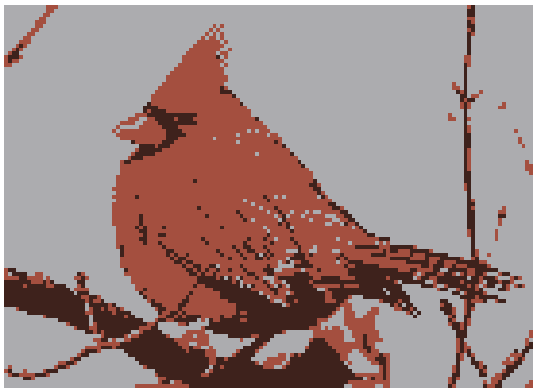
Img1_K3_iters7_R5



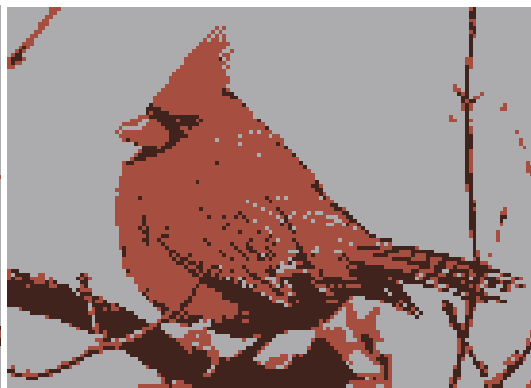
Img1_K3_iters20_R25



Img2_K3_iters7_R5



Img2_K3_iters20_R25



Again very little difference, but for higher values of K, as the iterations and Rs increase, the resultant images get closer to the original reference picture

Img1_K7_iters7_R5



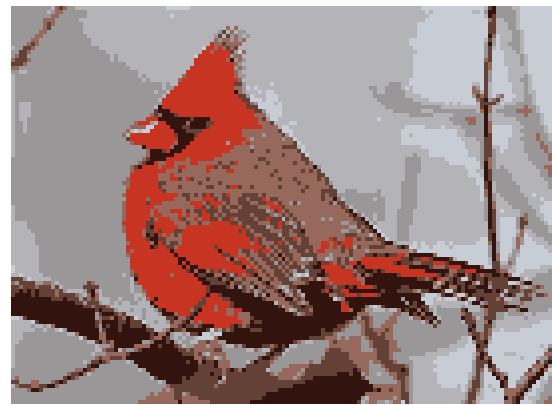
Img1_K7_iters20_R25



Img2_K7_iters7_R5



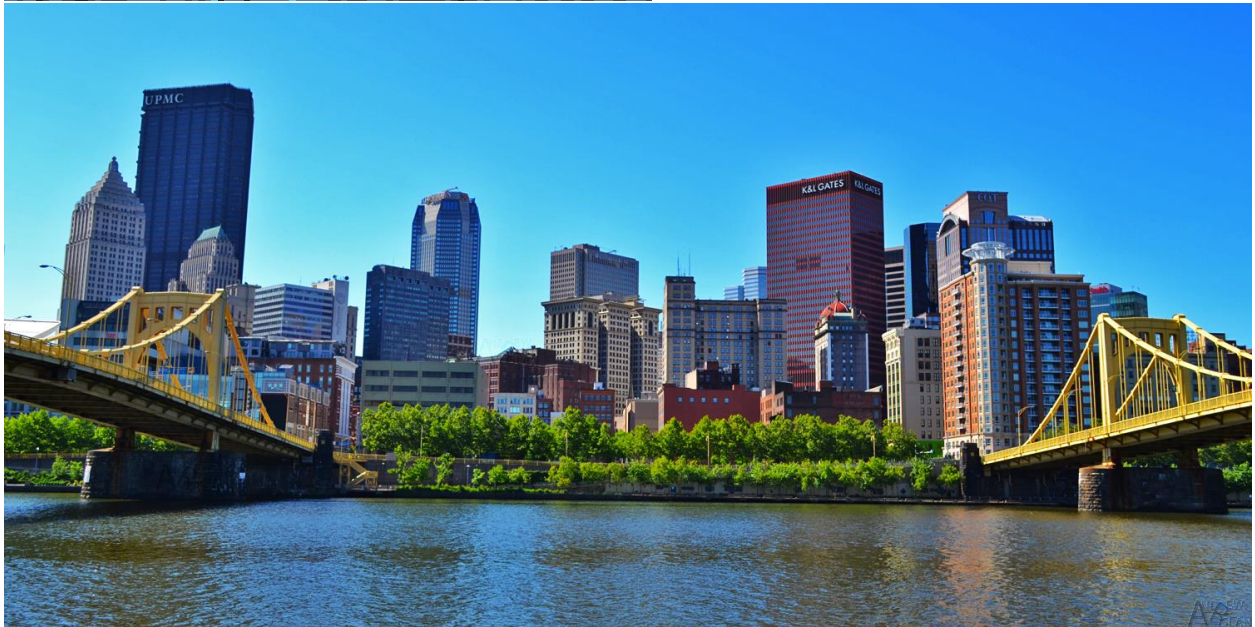
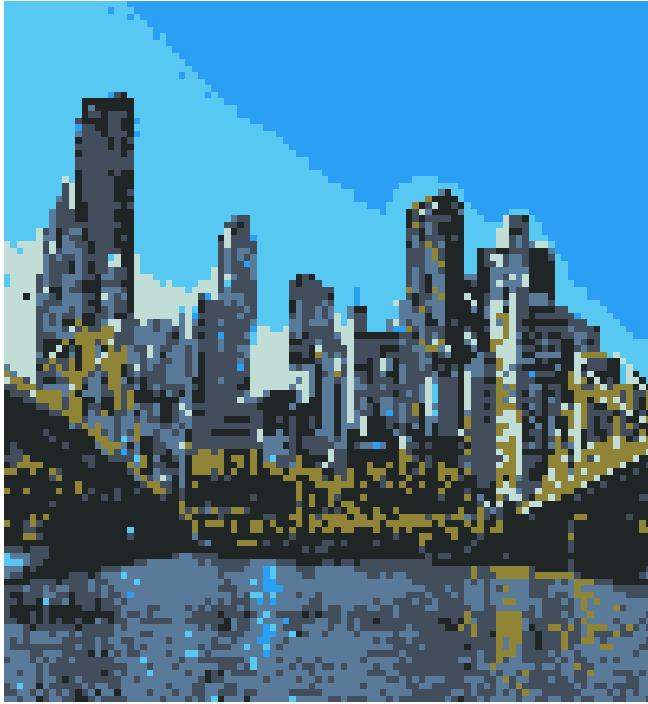
Img2_K7_iters20_R25



As you can see increasing iters and R helps to clarify areas of finer detail or gradual gradient, such as the cardinal's wings, the plants around the panda, and the sky behind the cardinal

For image 3, the performance is poor overall. The complexity of colors in the original image means that a large amount of K clusters (more than 7) is needed to accurately replicate the original image.

Even at K=r7, iters=20 and R=25, the resulting image fails to capture the color complexity seen in the original



As you can see, there is no green on the shoreline and the red/orange accents on some of the buildings on the right are not captured.

For fun I did two additional pictures, both with $\text{iters}=20$ and $R=25$, but with $K=15$ and $K=25$

