

Color Neighbourhood-Based Inpainting.

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Neighbourhood-based Spatial inpainting

- The similarity between two neighbourhoods is given by the Gaussian weighted sum of squared distance (SSD)
- Nearest Neighbour
 - Takes the pixel with the best matching neighbourhood

$$d(N(x), N(y)) = \sum_{\substack{\hat{x} \in N(x) \\ \hat{y} \in N(y)}} G_{\sigma}(\hat{x})(f(\hat{x}) - f(\hat{y}))^2$$

The Methods

- Nearest Neighbour
 - Takes the pixel with the best matching neighbourhood
- Non-Local Means
 - Averages out all the nearby (neighbourhoods) nbhds by how closely it matches the nbhd of the pixel to be inpainted
- Efros-Leung Texture Synthesis
 - Takes a weighted random pixel among those with the best matching neighbourhoods

Some results



Original



Nearest Nbr



Eff. Leung 1.99



Eff. Leung 2

NL-means



0.005



0.01



0.025



0.04



0.06



0.1



1

Aerial images (Rural areas)



Original



Nearest
Neighbour



NL-Means



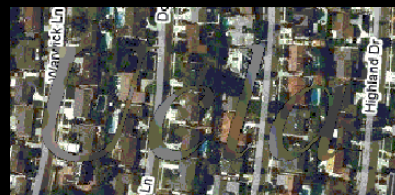
Efros-Leung



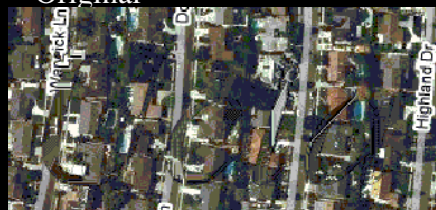
Aerial images (Suburban)



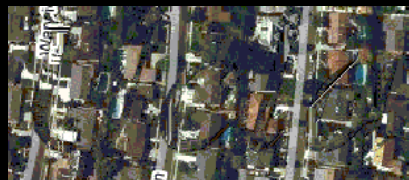
Original



NL-Means



Nearest Neighbour

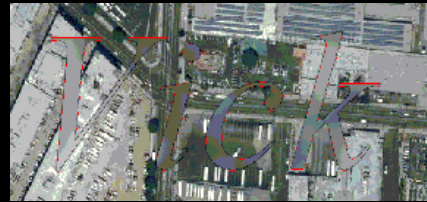


Efros-Leung

Aerial images (Urban)



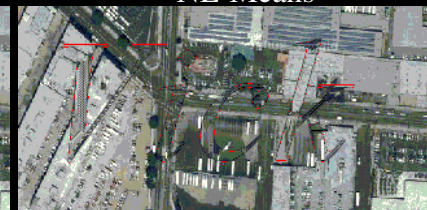
Original



NL-Means



Nearest Neighbour



Efros-Leung

Conclusions

- Nearest neighbour is the best for aerial images, NL-means, does not work that well
- Efros-Leung seems to work somewhat well on aerial images, especially on cluttered images, but could be partially because of the Nearest-Neighbour fallback condition
- Neighbourhood based methods work quite well on real data even though they fail on simple synthetic examples
- NL-means works reasonably well to predict shapes that are not in the image