Optimization Techniques Assignment

IMAGE DENOISING

The purpose of the assignment is to perform optimization algorithms to obtain a de-noisy image from the noisy image.

Following are the steps to perform the test:

To add Noise:	To perform algorithms:
1. Read the image in Matlab. 2. Convert the image to double. 3. Add noise to the image. 4. Display the image	1. Convert objective function from 2D to 1D. 2. Solve using Quadratic regularization. 3. Form the TV Norm based on objective function. 4. Perform Dual optimization.

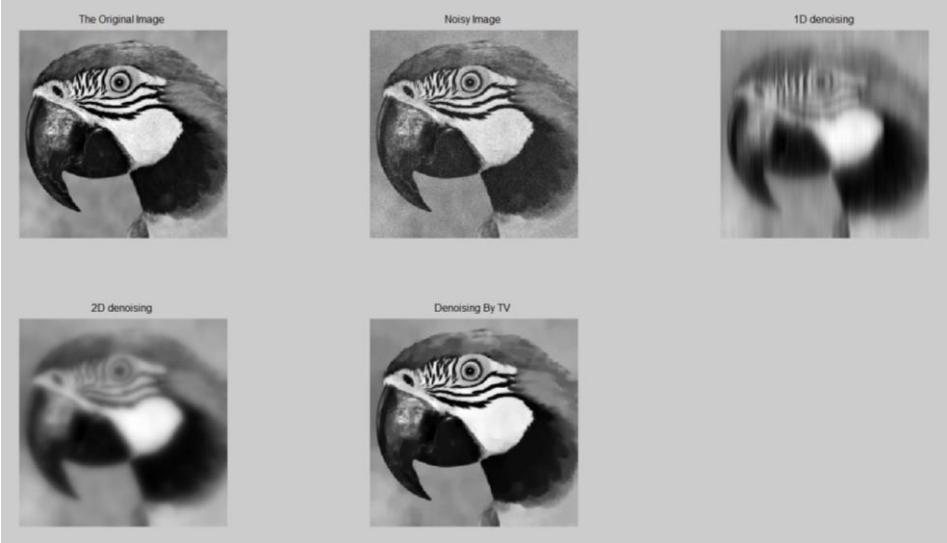
The code is generic code that can de-noise any Black & White image of square dimensions.

The code partitioned in 4 major fragments, namely:

- Reading and adding noise to the image.
- Performing 1 Dimensional Quadratic regularising - denoising the image
- 2 Dimensional Quadratic regularising - denoising the image operation.
- TV regularization.

Results and Simulations:

Test Image 1 – 'The Photographer'



Test Image 2 – 'The Parrot'

Test Image 3 – 'lena'

Observations and Conclusions:

The simulations shows quite accurate optimization of the noisy image. Although, the algorithm require greater processing if image size goes beyond 300X300. (As order of computation ~ O(n^4).
TV optimization is clearly better than quadratic optimization. This optimization is useful to de-noising those images in which the backgrounds are not finely mentioned, as it smoothens the images.

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