Final Project Report

Part A – Data Construction:

Discuss advice 2:

The advice talks about the possibility of zeros columns in CA which is the dictionary after we remove the rows corresponding to corrupted pixels.

Zeros columns essentially mean we should not use the in the corresponding reconstruction because they provide no information and can have corresponding infinite weight without changing the outcome.

This is not aproblam becomes the algorithem wont choose these colume amy way and tjthe only modification is to add asmall epsilon so we wont devide by zero

Show two clean images and their corresponding noisy and corrupted versions



Part B – Inpainting by the Oracle Estimator

45.198

Insert average PSNR result of the Oracle estimator:

Show clean, noisy, corrupted and Oracle-based reconstruction:







Part C – Inpainting by Greedy Pursuit

35.949

Insert average PSNR result of OMP:

Show clean, noisy, corrupted and OMP-based reconstruction:



Corrupted image





Compare between Oracle and OMP reconstructions:





Discuss results of OMP and compare to Oracle performance:

We can see that the omp is not far from oracle but still it have some atomes it got worng how ever the atom It got worong are usuly with small coffitions and that’s becose they aren’t there in the original image but the noise conteribut mascerat as these atomes this can be negated if we wont conside atomes that have small coffitins to the final soluting

Show average PSNR of OMP as a function of



The true kardinality of the solution is 10 an we can see the the best psnr result are obtin when k=12 which is not the true cardinality this can be expliend by the fact the when and if we choose all the correct atoms we are not acoreat with there coeffitins becose we astemet them when the noise is present this is why when we add more atome to the possible solution we can match better to the real solution using atomes that are not in the real solution and there for get closer to the real result a way to deal with that is to notise that the pser get much better with avery atome we add but after we reach the true cardinality it dosent improve by mach we can think of an algorithm that check how much we improve form the noisy image and if we don’t improv by much we know we have reached the true cardinality

We can do the check subtractiong the recunstrated image from the noisy input and see how much noise is left and if by adding atom we don’t change the noise we know we probably passed the true cardinalty (obisly that soluting depends on the type of problem and enery of the atomes and of the noise)

Discussion regarding the average PSNR as a function of :

Part D – Inpainting by Basis Pursuit

35.052

Insert average PSNR result of Basis-Pursuit:

Show clean, noisy, corrupted and BP-based reconstruction:



Clean image



Compare between Oracle and OMP and BP reconstructions:







Discuss results of BP and compare to greedy methods and to the oracle performance:

Show PSNR as a function of :



Discuss how affects BP reconstruction:

Part E – Effect of Parameters

Show MSE as a function of and :





Discuss the effect of :

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