

EE434 Biomedical Signal Processing Course
Homework # 3

Deadline: December 27th, 2021, 13:30

Download [Fig3.08\(a\).jpg](#) , [Fig3.46\(a\).jpg](#) and [Fig0462\(a\)\(PET_image\).tif](#).

Question #1:

- a) Apply power-law transformation, $s = c r^\gamma$, where c and γ are positive constants to the image named [Fig3.08\(a\).jpg](#) for each case below. Obtain the resulting image for each case. Plot it and comment on it.
- i. For $c = 1$ and $\gamma = 0.6$
 - ii. For $c = 1$ and $\gamma = 0.4$
 - iii. For $c = 1$ and $\gamma = 0.3$
- b) Apply below operations sequentially to the image named [Fig3.46\(a\).jpg](#). Plot resulting images for each case and comment on these images.
- i. Let's name the original image as "a". Plot "a".
 - ii. Take Laplacian of "a", name the resulting image as "b". Plot "b".
 - iii. Obtain sharpened image, "c", by adding "a" and "b". Plot "c".
 - iv. Apply Sobel operator to "a" and name the resulting image as "d". Plot "d".
 - v. Smooth "d" by applying a 5x5 averaging filter. Name the resulting image as "e". Plot "e".
 - vi. Obtain a mask image "f" by the product of "c" and "e". Plot "f".
 - vii. Obtain sharpened image "g" by the sum of "a" and "f". Plot "g".
 - viii. Obtain the final resulting image "h" by applying a power-law transformation to "g". Plot "h".
 - ix. Compare "g" and "h" with "a".

Please don't forget to put appropriate titles for each figure.

Question #2: Apply the homomorphic filtering approach to the image, [Fig0462\(a\)\(PET_image\).tif](#), obtain the enhanced result. Plot it. Comment on the result.