

Homework – Week 4

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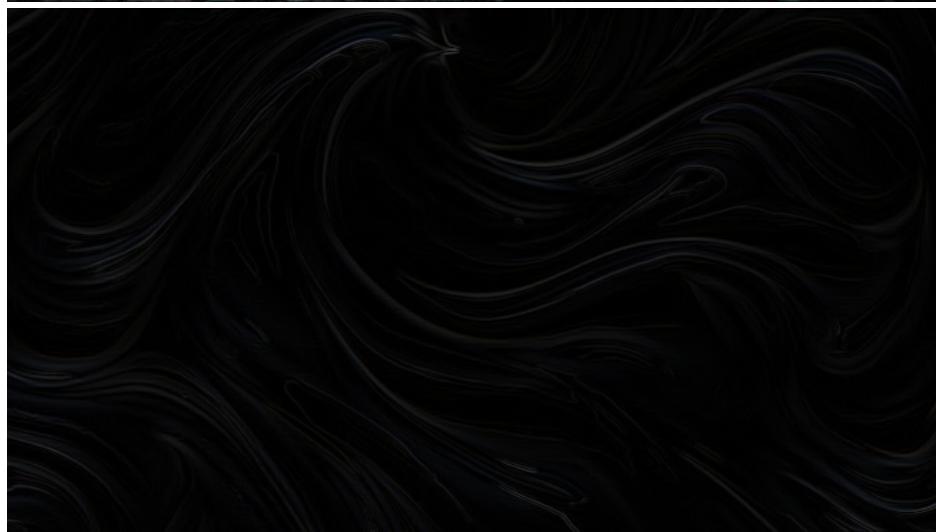
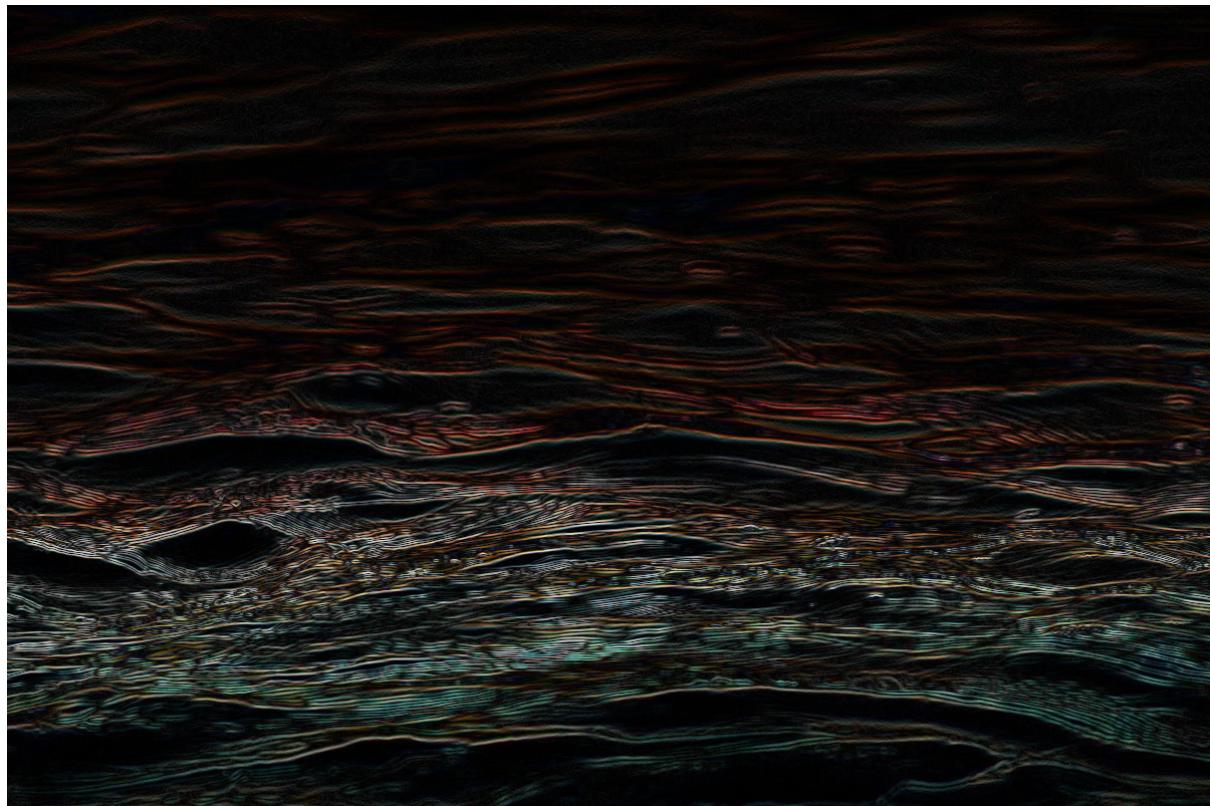
Question 1

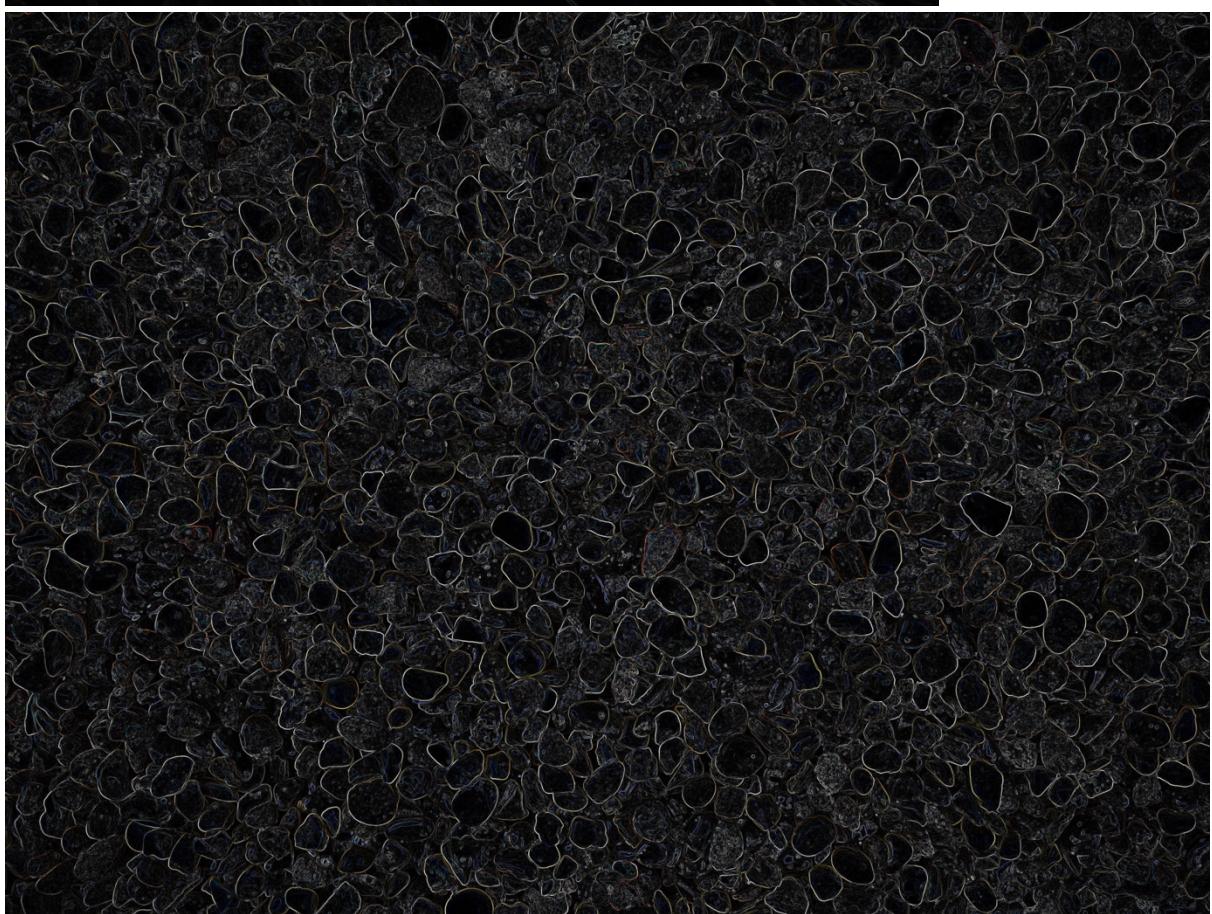
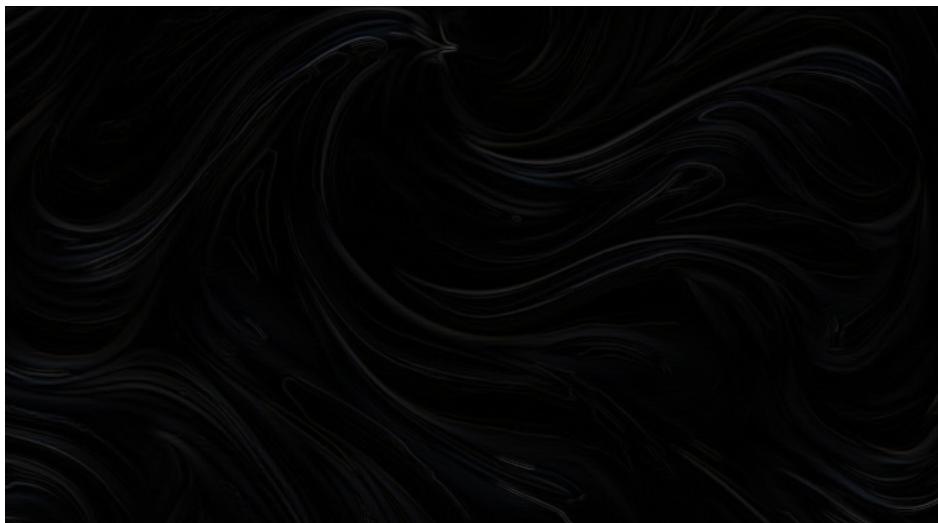
L1: v3 (4, 8) is closer to v1 (4, 3) as compared to v2(7, 7). L1 distance between v1 and v3 = $(4-4) + (8-3) = 5$. L1 distance between v1 and v2 is = $(7-4) + (7-3) = 7$.

L2: Both are equidistant from v1. Both are at a distance of 5 units. $v1 \rightarrow v2 = \sqrt{9 + 16} = 5$ and $v1 \rightarrow v3 = \sqrt{25 + 0} = 5$

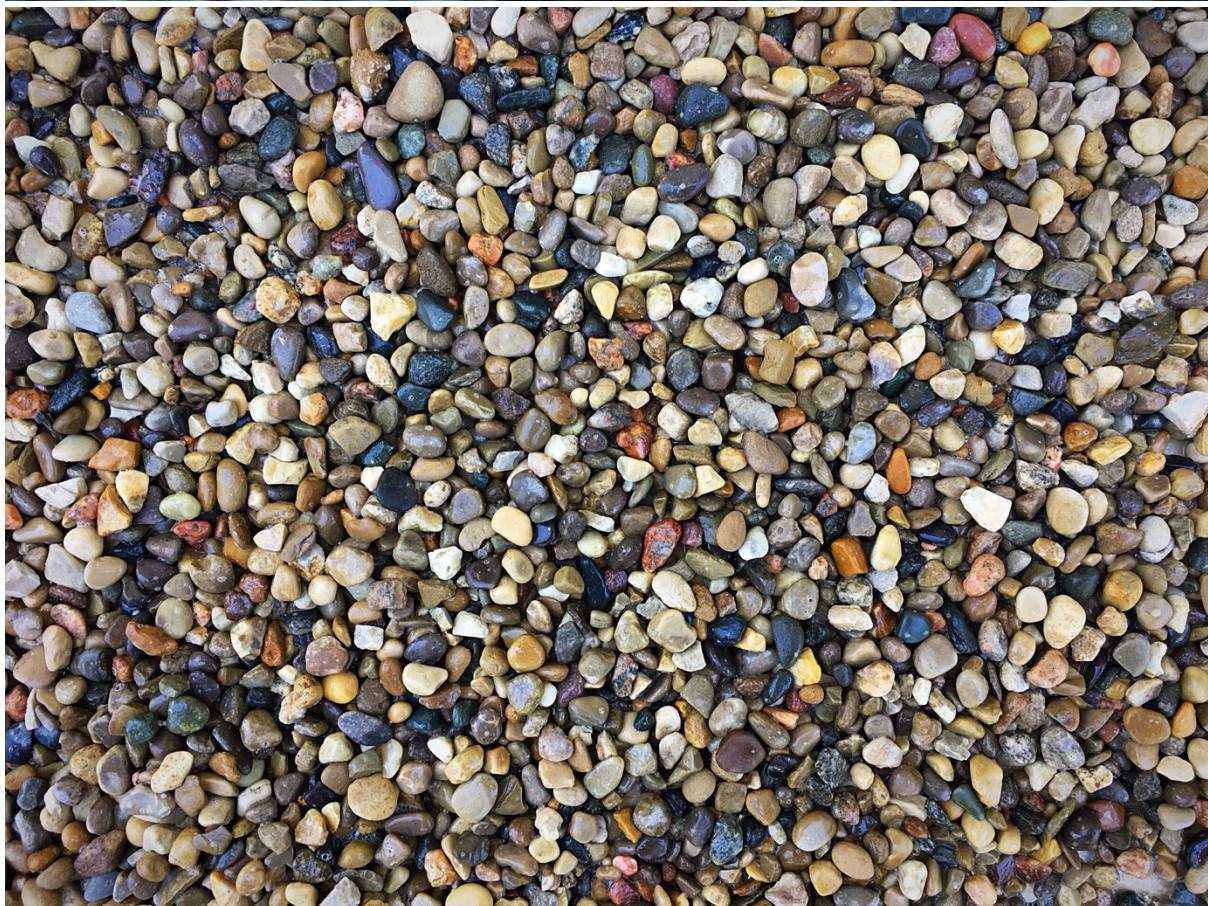
L-infinity: v2 is closer to v1. L-infinity distance between v1 and v3 = $\max\{(4-4), (8-3)\} = 5$. L-infinity distance between v1 and v2 is = $\max\{(7-4), (7-3)\} = 4$

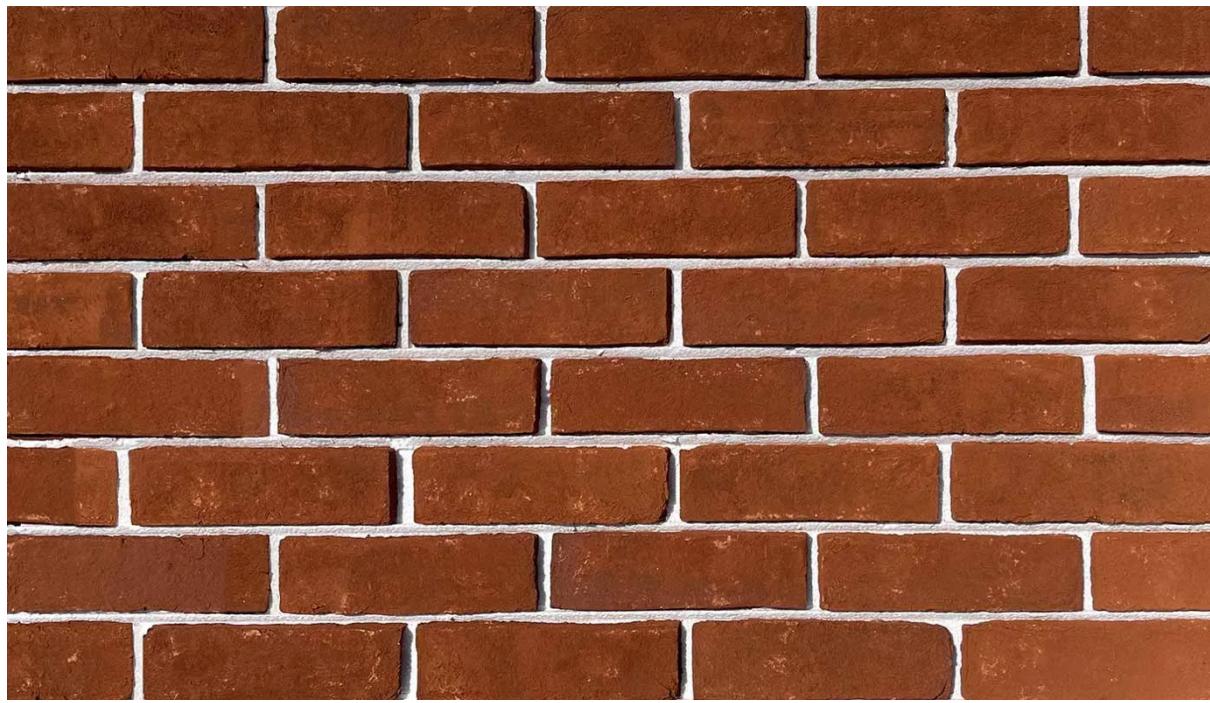
Question 2











Yes, average gradient magnitude can be used to differentiate between images. It can give us some information such as blur, edge sharpness, focus. However, it might be hard to identify or classify the image based on solely the average energy of gradient magnitude.

Question 3

Entropy:



Figure 1 Entropy: High

Contrast:



Figure 2: Contrast - High



Figure 3 Contrast – Low

Regularity:

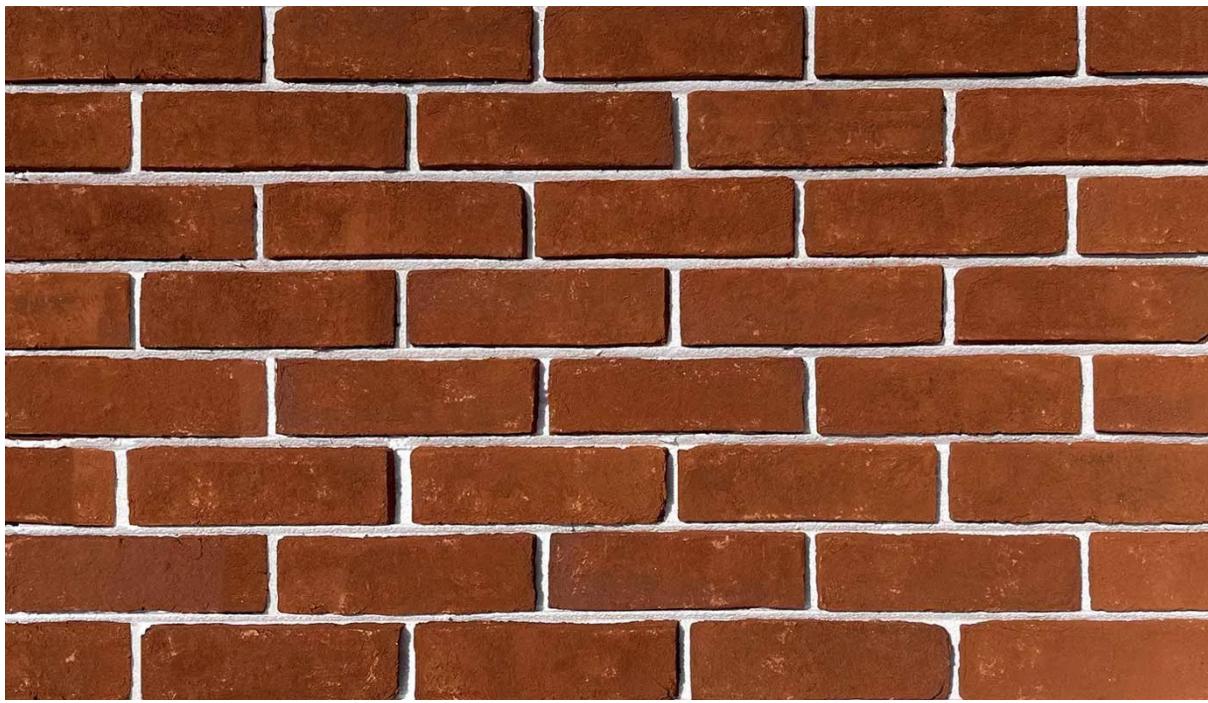


Figure 4: Regularity - High

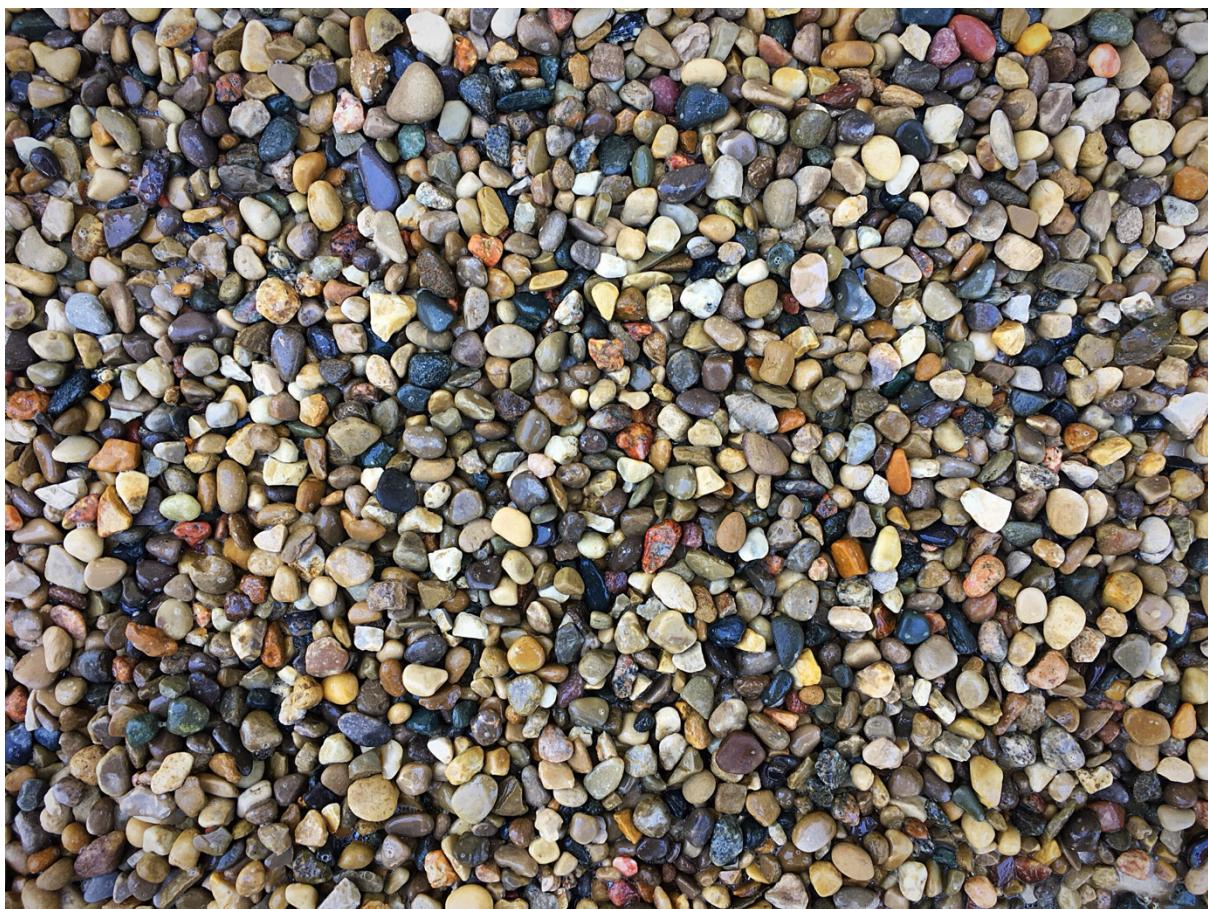


Figure 5: Regularity - Low

Question 4

It is done for normalization and illumination independence. This ensures that the response is independent of brightly or dimly lit the scene is.

Question 5

Two primary uses of Computer vision are exploratory and building a codebook. An example of exploratory is to try out different values of k. An example of the second use case is finding out k colours that can accurately reconstruct the image. This is used in compression of files. An example of a file type that uses only 256 colours in gif.

Question 6

1. First time on cluster vectors
2. Second time around on Pixels itself.

Question 7

Gabor filters are inspired by the modelling the human visual cortex.