CS518 : LAB 1 Report

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Observations:

➢ *Segmentation of image improves with number of iterations of EM steps.*
As the number of iteration increases for EM steps, image segmentation improves and becomes almost constant at convergence of the EM algorithm.
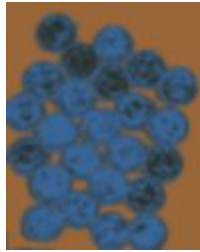
After 1 iteration	After 5 iterations	After 10 iterations	After 15 iterations	After 20 iterations

➢ *Segmentation of image changes with number of segments and different objects in image*
With change in segment counts, image segmentation changes. Image Segmentation is best when number of different objects/clusters present in input images matches with segment count,

original	2 Segments	3 Segments	4 Segments	5 Segments

original	2 Segments	3 Segments	4 Segments	5 Segments

➤ *Method of storing image affects the algorithm*

Storing whether as floating point number between 0 & 1 or storing as uint8 (0-255) affects the convergence of the EM algorithm. In case of uint8, convergence is achieved quicker. This is because with floating point number, mu is small and hence the updates in them. PIL library provided better output segmentation than Matplotlib library with given code.
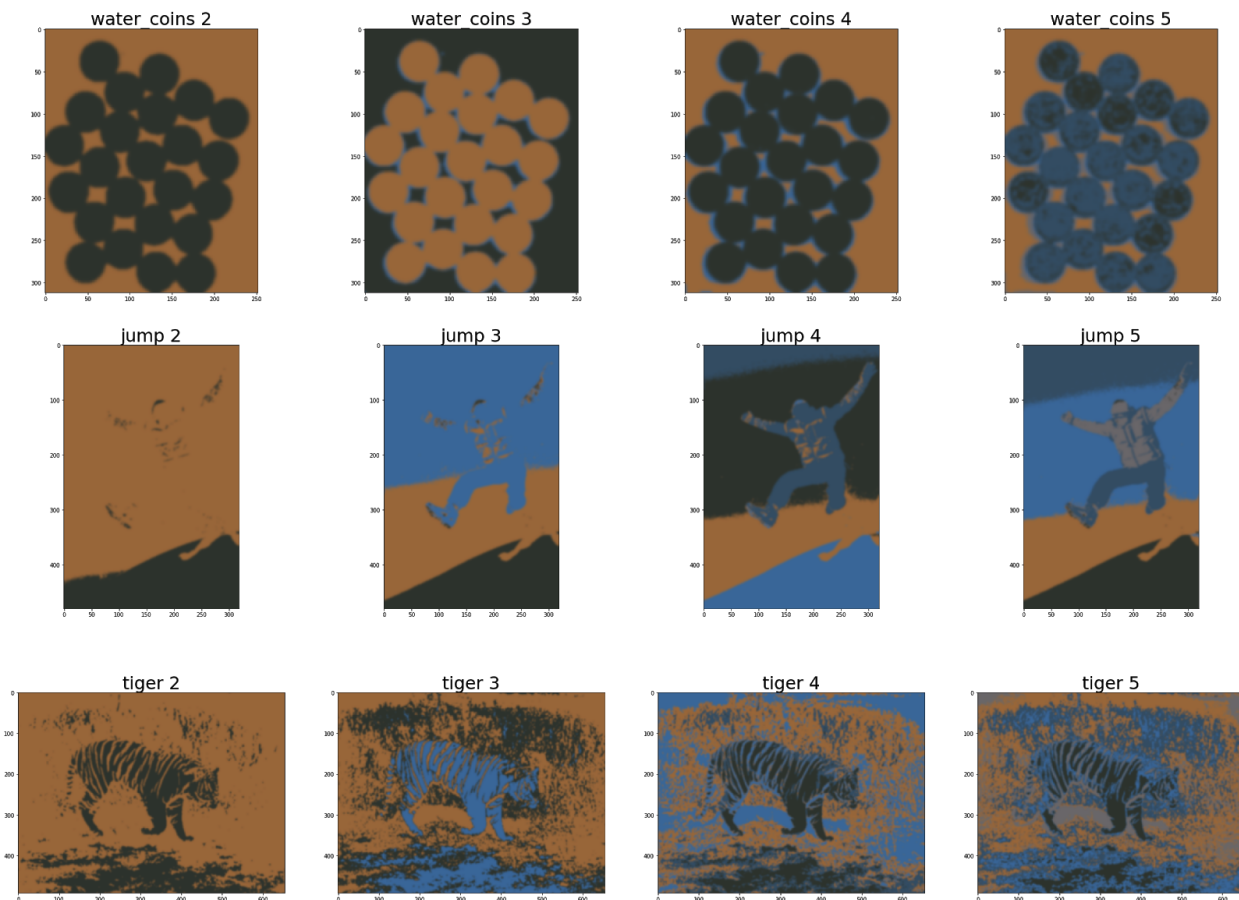
Final Results:

Image Segmentation:

Image segmentation is a process to divide given input image into multiple segments (different sets of pixels,also called superpixel or blob). In segmentation, we provide a label to each and every pixel in the image using some pixel's attribute like its intensity, neighbours, frequency etc. This technique can be used to locate objects in the picture, draw boundaries, extracting meaningful interpretation etc and is being widely used in medical imaging, self driving cars, satellite image mapping etc.