

MISCADA Image Analysis questions (III)

Please submit answers on DUO

(1) The TIFF image shown below is provided on DUO. It shows nanoparticles on a perforated carbon support film.

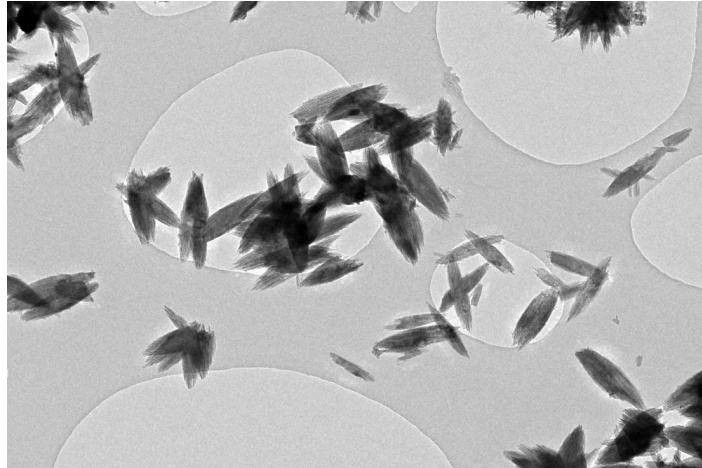


Figure: nanoparticles on a carbon support film

i) Write a program to detect the boundaries of the particles using a Sobel kernel.

[6 marks]

ii) Apply a 5x5 median filter to the image before applying the Sobel kernel. Is there an improvement in edge detection?

[6 marks]

iii) Write a program to extract the intensity histogram for the image (before median filtering). Use thresholding to create a binary image where the particles appear dark against a bright background. Comment on the usefulness of thresholding for segmenting the nanoparticles.

[8 marks]