Upload and display the image:

The image was converted to gray scale to display and further usage.

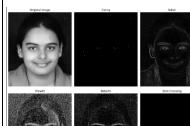


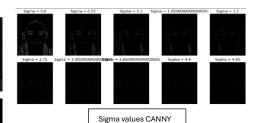


Edge detection on Gray scale image:

Roberts, Sobel, Prewitt, Frangi, Canny (with different sigma values) and Zero crossing were applied to identify edges.

Zero crossing did not perform well on the given image.







Segmentation:

K-means, SVM, CNN (Deep learning) were used for segmentation.







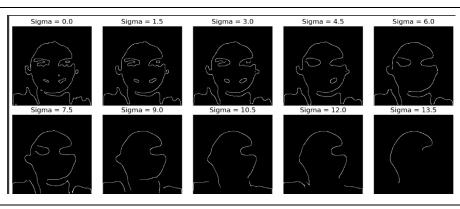


K-means segmented image & K-means (2 clusters

Deep learning -

Edge detection on segmented image.

The image which we got because of deep learning technique was used. Canny method was used for edge detection and sigma=12 gave the best result.



Additional features:

Edges were made red, green, and blue in colour on the segmented image which we got from deep learning technique- CNN with sigma=12

And

'ITI' (signature) was superimposed on the original-coloured image.











Edges were made red, green, blue on the segmented image

Original Image with superimposed initials

Designing of initials